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## Foreword

This Technical Specification has been produced by the 3<sup>rd</sup> Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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#### where:

- x the first digit:
  - 1 presented to TSG for information;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

The present document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of Evolved UTRA. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.

Modulation"

• For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

	•
[1]	3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode"
[2]	3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".
[3]	3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures"
[4]	3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements"
[5]	3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception"
[6]	3GPP TS 25.302: "Services provided by the Physical Layer".
[7]	3GPP TS 25.331: "RRC Protocol Specification".
[8]	3GPP TS 45.008: "Radio subsystem link control".
[9]	3GPP TS 45.005: "Radio transmission and reception".
[10]	3GPP TS 45.010: "Radio subsystem synchronization".
[11]	3GPP2 C.S0024-B: "cdma2000 High Rate Packet Data Air Interface Specification".
[12]	3GPP2 C.S0002-D: "Physical Layer Standard for cdma2000 Spread Spectrum Systems - Release A".
[13]	3GPP2 C.S0033-B: "Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal".
[14]	3GPP2 C.S0011-C: "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations".
[15]	3GPP2 C.S0005-D: Upper Layer (Layer 3) Signaling Specification for cdma2000 Spread Spectrum Systems
[16]	3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and

[17]	3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".
[18]	3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".
[19]	3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".
[20]	3GPP TS 25.214: "Physical layer procedures (FDD)".
[21]	3GPP TS 36. 212 "Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding".
[22]	3GPP TS 36.302: "Evolved Universal Terrestrial Radio Access (E-UTRA); Services provided by the physical layer".
[23]	3GPP TS 36.521-3: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management conformance testing".
[24]	3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)".
[25]	3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2"
[26]	3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
[27]	3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2"
[28]	3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".
[29]	3GPP TS 25.101: "UE Radio transmission and reception (FDD)".
[30]	3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".
[31]	3GPP TS 36.306: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities".
[32]	IEEE Standard 802.11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.
[33]	3GPP TS 23.303: "Technical Specification Group Services and System Aspects; Proximity-based services (ProSe); Stage 2".

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [26] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [26].

Any Cell Selection state: as defined in TS 36.304 [1]

Asynchronous Dual Connectivity: As defined in TS 36.331 [2].

**Carrier aggregation:** aggregation of two or more component carriers in order to support wider transmission bandwidths TS 36.104 [30].

**Dual Connectivity:** As defined in TS 36.331 [2].

**High operating band:** an operating band with a higher downlink frequency with respect to another, low, operating band.

**Inter-band carrier aggregation:** carrier aggregation of component carriers in different operating bands TS 36.104 [30].

**Intra-band contiguous carrier aggregation:** contiguous carriers aggregated in the same operating band TS 36.104 [30].

**Intra-band non-contiguous carrier aggregation:** non-contiguous carriers aggregated in the same operating band TS 36.104 [30].

**IDC autonomous denial subframes:** The maximum number of uplink subframes in which the UE is allowed not to transmit E-UTRAN signals when configured with IDC autonomous denial (TS 36.331 [2]).

**IDC** autonomous denial validity: It is the period over which the autonomous denial subframes are counted (TS 36.331 [2]).

**IDC solution:** This refers to DRX or IDC autonomous denial configured by eNodeB in response to receiving InDeviceCoexIndication from the UE (TS 36.331 [2]).

**Low operating band:** an operating band with a lower downlink frequency with respect to another, high, operating band.

Master Cell Group: As defined in TS 36.331 [2].

Master eNB: As defined in TS 36.300 [25].

MBSFN ABS: ABS configured in MBSFN-configurable subframe.

Non-MBSFN ABS: ABS configured in any downlink subframe.

**Normal Performance Group:** For UE which supports Increased UE carrier monitoring UTRA or E-UTRA the group of inter-frequency carriers or inter-RAT carriers is divided into two groups. The group which has a better delay performance compared to the other group is referred to as the normal performance group

Primary Cell: As defined in TS 36.331 [2].

ProSe Direct Communication: As defined in TS 23.303 [33]

**ProSe Direct Discovery**: As defined in TS 23.303 [33]

Primary SCell: As defined in TS 36.331 [2].

Primary Secondary Timing Advance Group: Timing Advance Group containing the PSCell.

Primary Timing Advance Group: Timing Advance Group containing the PCell.

**Reduced Performance Group:** For UE which supports Increased UE carrier monitoring UTRA or E-UTRA the group of inter-frequency carriers or inter-RAT carriers is divided into two groups. The group which has worse delay performance compared to the other group is referred to as the reduced performance group

**Secondary Cell**: As defined in TS 36.331 [2].

Secondary eNB: As defined in TS 36.300 [25].

**Serving Cell**: As defined in TS 36.331 [2].

**Secondary Cell Group:** As defined in TS 36.331 [2].

**Secondary Timing Advance Group**: As defined in TS 36.331 [2].

Synchronous Dual Connectivity: As defined in TS 36.331 [2].

**TDD-FDD carrier aggregation:** Carrier aggregation of component carriers in E-UTRA TDD and E-UTRA FDD operating bands TS 36.104 [30].

**Timing Advance Group**: As defined in TS 36.331 [2].

x\_RA: x-to-RS EPRE ratio for the channel or physical signal x in all transmitted OFDM symbols not containing RS.

x\_RB: x-to-RS EPRE ratio for the channel or physical signal x in all transmitted OFDM symbols containing RS.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

[...] Values included in square bracket must be considered for further studies, because it means that a

decision about that value was not taken.

 $BW_{Channel} \hspace{1.5cm} Channel \hspace{0.1cm} bandwidth, \hspace{0.1cm} defined \hspace{0.1cm} in \hspace{0.1cm} TS \hspace{0.1cm} 36.101 \hspace{0.1cm} subclause \hspace{0.1cm} 3.2 \hspace{0.1cm}$ 

CPICH\_Ec Average energy per PN chip for the CPICH

CPICH\_Ec/Io The ratio of the received energy per PN chip for the CPICH to the total received power spectral

density at the UE antenna connector.

Ec Average energy per PN chip.

Ês Received energy per RE (power normalized to the subcarrier spacing) during the useful part of the

symbol, i.e. excluding the cyclic prefix, at the UE antenna connector

Io The total received power density, including signal and interference, as measured at the UE antenna

connector.

Ioc The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized

to the chip rate) of a band limited noise source (simulating interference from cells, which are not

defined in a test procedure) as measured at the UE antenna connector.

Iot The received power spectral density of the total noise and interference for a certain RE (power

integrated over the RE and normalized to the subcarrier spacing) as measured at the UE antenna

connector

 $N_{oc}$  The power spectral density of a white noise source (average power per RE normalised to the

subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as

measured at the UE antenna connector

 $N_{\it PRS}$  Number of consecutive downlink positioning subframes as defined in clause 6.10.4.3 in TS 36.211

 $n_{PRR}$  Physical Resource Block number as defined in clause 3.1 in TS 36.211.

 $N_{\rm TA}$  Timing offset between uplink and downlink radio frames at the UE, as defined in clause 3.1 in TS

36.211.

 $N_{\rm TA\,offset}$  Fixed timing advance offset, as defined in clause 3.1 in TS 36.211.

 $P_{\text{CMAX}}$  Configured UE transmitted power as defined in clause 6.2.5 in TS 36.101.

 $P_{\text{CMAX},c}$  Configured UE transmitted power on a serving cell c as defined in clause 6.2.5A in TS 36.101.

PRP Received (linear) average power of the resource elements that carry E-UTRA PRS, measured at

the UE antenna connector.

S Cell Selection Criterion defined in TS 36.304, subclause 5.2.3.2 for E-UTRAN

SCH\_Ec/Ior The ratio of the transmit energy per PN chip of the SCH to the total transmit power spectral

density at the UTRA Node B antenna connector

SCH\_RP Received (linear) average power of the resource elements that carry E-UTRA synchronisation

signal, measured at the UE antenna connector

Srxlev Cell selection RX level, defined in TS 36.304, subclause 5.2.3.2 Squal Cell selection quality, defined in TS 36.304, subclause 5.2.3.2

Sintersearch Defined in TS 25.304, subclause 5.2.6.1.5

Sintrasearch Defined in TS 25.304, subclause 5.2.6.1.5 for UTRAN and in TS 36.304, subclause 5.2.4.7 for E-

UTRAN

 $T_{\rm PRS}$  Cell-specific positioning subframe configuration period as defined in clause 6.10.4.3 in TS 36.211

T<sub>RE-ESTABLISH-REQ</sub> The RRC Re-establishment delay requirement, the time between the moment when erroneous

CRCs are applied, to when the UE starts to send preambles on the PRACH.

Treselection Defined in TS 25.304, subclause 5.2.6.1.5 Treselection<sub>RAT</sub> Defined in TS 36.304, subclause 5.2.4.7

 $\begin{array}{ll} {\rm Treselection_{EUTRA}} & {\rm Defined~in~TS~36.304~,~subclause~5.2.4.7} \\ {\rm Treselection_{UTRA}} & {\rm Defined~in~TS~36.304~,~subclause~5.2.4.7} \\ {\rm Treselection_{GERA}} & {\rm Defined~in~TS~36.304~,~subclause~5.2.4.7} \\ {\rm T_S} & {\rm Basic~time~unit,~defined~in~TS~36.211~,~clause~4} \\ \end{array}$ 

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [26] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [26].

1x RTT CDMA2000 1x Radio Transmission Technology

ABS Almost Blank Subframe
ARQ Automatic Repeat Request
AWGN Additive White Gaussian Noise
BCCH Broadcast Control Channel

BCH Broadcast Channel
CA Carrier Aggregation
CC Component Carrier

CCCH SDU Common Control Channel SDU

CGI Cell Global Identifier CPICH Common Pilot Channel

CPICH Ec/No CPICH Received energy per chip divided by the power density in the band

CRS Cell-specific Reference Signals

C-RNTI Cell RNTI

CSI Channel-State Information
CSI-RS CSI Reference Signal
DC Dual Connectivity

DCCH Dedicated Control Channel

DL Downlink

DMTC Discovery signal Measurement Timing Configuration

DRX Discontinuous Reception
DTCH Dedicated Traffic Channel
DUT Device Under Test

E-CID Enhanced Cell-ID (positioning method)

ECGI Evolved CGI eNB E-UTRAN NodeB

E-SMLC Enhanced Serving Mobile Location Centre

E-UTRA Evolved UTRA E-UTRAN Evolved UTRAN

FDD Frequency Division Duplex

GERAN GSM EDGE Radio Access Network
GSM Global System for Mobile communication
HARQ Hybrid Automatic Repeat Request

HD-FDD Half-Duplex FDD HO Handover

HRPD High Rate Packet Data IDC In-Device Coexistence

IEEE Institute of Electrical and Electronics Engineers

LPP LTE Positioning Protocol
MAC Medium Access Control
MCG Master Cell Group
MeNB Master eNB

MBSFN Multimedia Broadcast multicast service Single Frequency Network

MBSFN ABS MBSFN Almost Blank Subframe
MDT Minimization of Drive Tests
MGRP Measurement Gap Repetition Period

MIB Master Information Block

OCNG OFDMA Channel Noise Generator

OFDM Orthogonal Frequency Division Multiplexing

**OFDMA** Orthogonal Frequency Division Multiple Access

**OTDOA** Observed Time Difference of Arrival

Physical Broadcast Channel **PBCH** 

Primary Common Control Physical Channel P-CCPCH

Primary Cell **PCell** 

**PCFICH** Physical Control Format Indicator CHannel **PDCCH** Physical Downlink Control CHannel **PDSCH** Physical Downlink Shared CHannel **PHICH** Physical Hybrid-ARQ Indicator CHannel

**PLMN** Public Land Mobile Network **PMCH** Physical Multicast Channel **PRACH** Physical Random Access CHannel

**Proximity-based Services** ProSe Positioning Reference Signal **PRS** 

Physical Sidelink Broadcast CHannel **PSBCH** Physical Sidelink Control Channel **PSCCH** 

Primary SCell **PSCell** 

**PSS** Primary Synchronization SignalPSSCH Physical Sidelink Shared CHannel

psTAG Primary Secondary Timing Advance Group

Primary Timing Advance Group pTAG **PUCCH** Physical Uplink Control CHannel Physical Uplink Shared Channel PUSCH **RSCP** Received Signal Code Power Reference Signal Received Power **RSRP** Reference Signal Received Quality RSRQ Received Signal Strength Indicator RSSI **RSTD** Reference Signal Time Difference QAM Quadrature Amplitude Modulation

**RACH** Random Access Channel Radio Access Technology **RAT RNC** Radio Network Controller

**RNTI** Radio Network Temporary Identifier

Radio Resource Control **RRC** Radio Resource Management **RRM** Small Cell Enhancement SCE SCH Synchronization Channel

**SCell** Secondary Cell

SCG Secondary Cell GroupSDU Service Data Unit

SeNB Secondary eNB System Frame Number SFN **System Information** SI SIB System Information Block

**SLSS** SideLink Synchronization Sequence

Self Optimized Network SON Sounding Reference Signal SRS Secondary Synchronization Signal SSS Secondary Timing Advance Group sTAG

**TAG** Timing Advance Group **TDD** Time Division Duplex **Transmission Point** TP

Transmission Time Interval TTI

UE User Equipment

UL Uplink

**UMTS** Universal Mobile Telecommunication System

Universal Terrestrial Radio Access **UTRA** 

Universal Terrestrial Radio Access Network **UTRAN** 

WB-RSRQ Wide Bandwith RSRQ

#### 3.4 Test tolerances

The requirements given in the present document make no allowance for measurement uncertainty. The test specification 36.521-3 [23] defines the test tolerances. These test tolerances are individually calculated for each test. The test tolerances are then added to the limits in this specification to create test limits. The measurement results are compared against the test limits as defined by the shared risk principle.

Shared Risk is defined in [ETR 273 Part 1 sub-part 2 clause 6.5].

#### Additional notation 3.5

#### 3.5.1 Groups of bands

The intention with the band grouping below is to increase the readability of the specification.

E-UTRA FDD E-UTRA TDD Group Band group Band group Operating bands Operating bands notation notation 1, 4, 6, 10, 11, 18, 19, 21, 23, 24, 32 Α FDD\_A TDD\_A 33, 34, 35, 36, 37, 38, 39, 40 В FDD B TDD B С FDD\_C 9, 30 TDD\_C 42, 43 D FDD\_D 28 TDD\_D FDD\_E Ε 2, 5, 7, 27 TDD\_E 41, 44 TDD\_F F FDD\_F G FDD\_G 3, 8, 17, 20, 22, 12, TDD\_G Н FDD\_H 25 TDD\_H FDD\_I TDD\_I FDD\_J TDD\_J K FDD\_K  $TDD_K$  $\overline{\mathsf{FDD}_\mathsf{L}}$ TDD\_L FDD\_M TDD\_M

Table 3.5.1-1: E-UTRA band groups

31

TDD\_N

#### 3.6 General

FDD\_N

М

#### 3.6.1 Applicability of requirements in this specification version

- The requirements for TDD-FDD carrier aggregation are specified for two downlink and one uplink component carriers. The requirements are specified for both cases when the PCell belongs to TDD or FDD.
- All the requirements for intra-band contiguous and non-contiguous CA apply under the assumption of the same uplink-downlink and special subframe configurations [16] in the PCell and SCell.
- All the requirements for inter-band CA apply for the same uplink-downlink and special subframe configurations [16] in the PCell and SCell. Different uplink-downlink and special subframe configurations [16] in the PCell and SCell are supported for inter-band CA for UEs which:
  - do not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and
  - are compliant to the requirements specified in TS 36.101 for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx.

NOTE 1: The bands within the same group have the same lo conditions in a corresponding requirement in this

NOTE 2: Band 29 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

NOTE 3: The minimum lo condition for Band 26 is reduced by 0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 2: Band 32 is used only for E-UTRA carrier aggregation with other E-UTRA bands

- All the inter-frequency requirements and requirements for measurements on deactivated carrier apply for the same uplink-downlink and special subframe configurations [16] in the PCell and SCell. Different uplink-downlink and special subframe configurations [16] in the PCell and SCell are supported for inter-frequency for UEs which:
  - do not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and
  - are compliant to the requirements specified in TS 36.101 for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx.
- The requirements for a UE category 0 are derived assuming UE category 0 [31] and a single antenna receiver.

# 4 E-UTRAN RRC\_IDLE state mobility

## 4.1 Cell Selection

After a UE has switched on and a PLMN has been selected, the Cell selection process takes place, as described in TS36.304. This process allows the UE to select a suitable cell where to camp on in order to access available services. In this process the UE can use stored information (*Stored information cell selection*) or not (*Initial cell selection*).

## 4.2 Cell Re-selection

## 4.2.1 Introduction

The cell reselection procedure allows the UE to select a more suitable cell and camp on it.

When the UE is in either *Camped Normally* state or *Camped on Any Cell* state on a cell, the UE shall attempt to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated by the serving cell. For intra-frequency and inter-frequency cells the serving cell may not provide explicit neighbour list but carrier frequency information and bandwidth information only. UE measurement activity is also controlled by measurement rules defined in TS36.304, allowing the UE to limit its measurement activity.

## 4.2.2 Requirements

The UE shall search every layer of higher priority at least every  $T_{higher\_priority\_search} = (60 * N_{layers})$  seconds, where  $N_{layers}$  is the total number of configured higher priority E-UTRA, UTRA FDD, UTRA TDD, CDMA2000 1x and HRPD carrier frequencies and is additionally increased by one if one or more groups of GSM frequencies is configured as a higher priority.

In the requirements of Section 4.2.2 for the UE capable of CA, the applicable exceptions for side conditions are specified in Annex B, Section B.4.2.

For a UE which supports increased carrier monitoring E-UTRA or increased carrier monitoring UTRA, the reselection performance for different carriers may be configured by higher layers to be either normal or reduced. The following definitions are used in the requirements:

K<sub>carrier</sub>: Total number of interfrequency carriers in the neighbour cell list

 $K_{carrier,normal} = K_{carrier} - K_{carrier,reduced}$ : Number of interfrequency carriers to be monitored in the normal performance group

 $K_{carrier,normal,FDD}$ : Number of interfrequency FDD carriers to be monitored in the normal performance group

K<sub>carrier,normal,TDD</sub>: Number of interfrequency TDD carriers to be monitored in the normal performance group

K<sub>carrier, reduced</sub>: Number of interfrequency carriers to be monitored in the reduced performance group

 $N_{UTRA\_carrier}$ : Total number of configured UTRA FDD carriers in the neighbour cell list

 $N_{UTRA\_carrier,normal} = N_{UTRA\_carrier} - N_{UTRA\_carrier,reduced}$ : Number of UTRA FDD carriers to be monitored in the normal performance group

N<sub>UTRA</sub> carrier,reduced: Number of UTRA FDD carriers to be monitored in the reduced performance group

 $N_{UTRA\_carrier\_TDD}$ : Total number of configured UTRA TDD carriers in the neighbour cell list

 $N_{UTRA\_carrier\_TDD,normal} = N_{UTRA\_carrier\_TDD} - N_{UTRA\_carrier\_TDD,reduced} : Number of UTRA \ TDD \ carriers to be monitored in the normal performance grop$ 

 $N_{UTRA\_carrier\_TDD,reduced}$ : Number of UTRA TDD carriers to be monitored in the reduced performance group

The minimum performance requirements for a UE which supports Increased UE carrier monitoring E-UTRA [2, 31] are calculated as defined in section 4.2.2.4 provided that  $K_{carrier,normal} \le 3$  for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or  $K_{carrier,normal} \leq 6$  for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided  $K_{carrier,normal,FDD} \le 3$  and  $K_{carrier,normal,TDD} \le 3$  and the minimum performance requirements for a UE which supports Increased UE carrier monitoring UTRA [2, 31] are calculated as defined in section 4.2.2.5 provided that  $N_{UTRA\_carrier\_normal} \le 3$  and  $N_{UTRA\_carrier\_TDD,normal} \le 3$ . In case the limits for the number of normal performance carriers is exceeded considering the broadcast neighbour cell list and the bands supported by the UE, the UE which supports Increased UE carrier monitoring E-UTRA shall measure at least 3 interfrequency carriers with normal performance and the UE which supports Increased UE carrier monitoring UTRA shall measure at least 3 UTRA carriers with normal performance. For a UE capable of monitoring E-UTRAN FDD and TDD carriers, in case the limits for the number of normal performance carriers is exceeded considering the broadcast neighbour cell list and the bands supported by the UE, the UE shall measure at least 3 FDD and 3 TDD E-UTRAN interfrequency carriers with normal performance. Additionally, reduced performance requirements shall be met for carriers for which the Reduced measurement performance IE is indicated, up to the UE measurement capability in section 4.2.2.9a. The minimum performance requirements for a UE which does not support Increased UE carrier monitoring E-UTRA [2,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e. K<sub>carrier,normal</sub> = K<sub>carrier,reduced</sub> = 0. The minimum performance requirements for a UE which does not support Increased UE carrier monitoring UTRA [2,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e. N<sub>UTRA\_carrier,normal</sub>=  $N_{UTRA\_carrier}, N_{UTRA\_carrier\_TDD, normal} = N_{UTRA\_carrier\_TDD} \ \ and \ N_{UTRA\_carrier, reduced} = 0 \ and \ N_{UTRA\_carrier\_TDD, reduced} = 0. \ No \ reduced$ performance carrier requirement applies to a UE not supporting Increased UE carrier monitoring E-UTRA or UTRA [2, 31]. Capabilities for number of carriers to monitor for a UE which does not support Increased carrier monitoring E-UTRA or Increased carrier monitoring UTRA are specified in section 4.2.2.9

#### 4.2.2.1 Measurement and evaluation of serving cell

The UE shall measure the RSRP and RSRQ level of the serving cell and evaluate the cell selection criterion S defined in [1] for the serving cell at least every DRX cycle.

The UE shall filter the RSRP and RSRQ measurements of the serving cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least DRX cycle/2.

If the UE has evaluated in  $N_{\text{serv}}$  consecutive DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities.

If the UE in RRC\_IDLE has not found any new suitable cell based on searches and measurements using the intra-frequency, inter-frequency and inter-RAT information indicated in the system information for 10 s, the UE shall initiate cell selection procedures for the selected PLMN as defined in [1].

Table 4.2.2.1-1: N<sub>serv</sub>

#### 4.2.2.2 Void

#### 4.2.2.3 Measurements of intra-frequency E-UTRAN cells

The UE shall be able to identify new intra-frequency cells and perform RSRP and RSRQ measurements of identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS36.304 within  $T_{\text{detect}, \text{EUTRAN\_Intra}}$  when that Treselection= 0. An intra frequency cell is considered to be detectable according to RSRP, RSRP £s/Iot, SCH\_RP and SCH £s/Iot defined in Annex B.1.1 for a corresponding Band.

The UE shall measure RSRP and RSRQ at least every  $T_{measure,EUTRAN\_Intra}$  (see table 4.2.2.3-1) for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP and RSRQ measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least  $T_{measure,EUTRAN\ Intra}/2$ 

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined [1] within  $T_{\text{evaluate,E-UTRAN\_intra}}$  when  $T_{\text{reselection}} = 0$  as specified in table 4.2.2.3-1 provided that the cell is at least 3dB better ranked. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and non-serving intra-frequency cells.

If  $T_{reselection}$  timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the  $T_{reselection}$  time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

	DRX cycle length [s]	T <sub>detect,EUTRAN_Intra</sub> [s] (number of DRX cycles)	T <sub>measure,EUTRAN_Intra</sub> [s] (number of DRX cycles)	T <sub>evaluate,E-UTRAN_intra</sub> [s] (number of DRX cycles)
Ī	0.32	11.52 (36)	1.28 (4)	5.12 (16)
Ī	0.64	17.92 (28)	1.28 (2)	5.12 (8)
	1.28	32(25)	1.28 (1)	6.4 (5)
ſ	2.56	58.88 (23)	2.56 (1)	7.68 (3)

Table 4.2.2.3-1: T<sub>detect,EUTRAN\_Intra</sub>, T<sub>measure,EUTRAN\_Intra</sub> and T<sub>evaluate, E-UTRAN\_intra</sub>

#### 4.2.2.4 Measurements of inter-frequency E-UTRAN cells

The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If  $Srxlev > S_{nonIntraSearchP}$  and  $Squal > S_{nonIntraSearchQ}$  then the UE shall search for inter-frequency layers of higher priority at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is described in clause 4.2.2.

If  $Srxlev \leq S_{nonIntraSearchP}$  or  $Squal \leq S_{nonIntraSearchQ}$  then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell in normal performance group meets the reselection criteria defined in TS36.304 within  $K_{carrier,normal}$  \*  $T_{detect,EUTRAN\_Inter}$ , and able to evaluate whether a newly detectable inter-frequency cell in reduced performance group meets the reselection criteria defined in TS36.304 within 6 \*  $K_{carrier,reduced}$  \*  $T_{detect,EUTRAN\_Inter}$  if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when  $T_{reselection} = 0$  provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. An inter-frequency cell is considered to be detectable according to RSRP, RSRP £s/Iot, SCH\_RP and SCH £s/Iot defined in Annex B.1.2 for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every  $T_{\text{measure},E-}$   $_{\text{UTRAN\_Inter}}$ . If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP or RSRQ at least every  $K_{carrier,normal}$  \*  $T_{measure,EUTRAN\_Inter}$  (see table 4.2.2.4-1) for identified lower or equal priority inter-frequency cells in normal performance group, and at least every 6 \*  $K_{carrier,reduced}$  \*

 $T_{measure,EUTRAN\_Inter}$  for identified lower or equal priority inter-frequency cells in reduced performance group. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell

The UE shall filter RSRP or RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least  $T_{measure,EUTRAN\_Inter}/2$ .

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell in normal performance group has met reselection criterion defined TS 36.304 within  $K_{carrier,normal} * T_{evaluate,E-UTRAN\_Inter}$ , and capable of evaluating that the inter-frequency cell in reduced performance group has met reselection criterion defined TS 36.304 within 6 \*  $K_{carrier,reduced} * T_{evaluate,E-UTRAN\_Inter}$ , when  $T_{reselection} = 0$  as specified in table 4.2.2.4-1 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If  $T_{reselection}$  timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the  $T_{reselection}$  time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

С	ORX sycle ength [s]	T <sub>detect,EUTRAN_Inter</sub> [s] (number of DRX cycles)	T <sub>measure,EUTRAN_Inter</sub> [s] (number of DRX cycles)	T <sub>evaluate,E</sub> .  UTRAN_Inter [s] (number  of DRX  cycles)
(	0.32	11.52 (36)	1.28 (4)	5.12 (16)
(	0.64	17.92 (28)	1.28 (2)	5.12 (8)
	1.28	32(25)	1.28 (1)	6.4 (5)
2	2.56	58.88 (23)	2.56 (1)	7.68 (3)

Table 4.2.2.4-1: T<sub>detect,EUTRAN\_Inter</sub>, T<sub>measure,EUTRAN\_Inter</sub> and T<sub>evaluate,E-UTRAN\_Inter</sub>

For higher priority cells, a UE may optionally use a shorter value for  $T_{\text{measureE-UTRA\_Inter}}$ , which shall not be less than Max(0.64 s, one DRX cycle).

#### 4.2.2.5 Measurements of inter-RAT cells

If  $Srxlev > S_{nonIntraSearchP}$  and  $Squal > S_{nonIntraSearchQ}$  then the UE shall search for inter-RAT layers of higher priority at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is described in clause 4.2.2

If  $Srxlev \leq S_{nonIntraSearchP}$  or  $Squal \leq S_{nonIntraSearchQ}$  then the UE shall search for and measure inter-RAT layers of higher, lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

#### 4.2.2.5.1 Measurements of UTRAN FDD cells

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

The UE shall evaluate whether newly detectable UTRA FDD cells in normal performance group have met the reselection criteria in TS 36.304 within time  $N_{UTRA\_carrier,normal} * T_{detectUTRA\_FDD}$ , and evaluate whether newly detectable UTRA FDD cells in reduced performance group have met the reselection criteria in TS 36.304 within time 6 \*  $N_{UTRA\_carrier,reduced} * T_{detectUTRA\_FDD}$  when  $Srxlev \leq S_{nonIntraSearchP}$  or  $Squal \leq S_{nonIntraSearchP}$  when  $Treselection_{RAT} = 0$ 

provided that the reselection criteria is met by a margin of at least 6dB for reselections based on RSCP, or a margin of at least 3dB for reselections based on Ec/Io.

Cells which have been detected shall be measured at least every  $N_{UTRA\_carrier,normal}$  \*  $T_{measureUTRA\_FDD}$  for the cells in normal performance group, and at least every 6 \*  $N_{UTRA\_carrier,reduced}$  \*  $T_{measureUTRA\_FDD}$  for the cells in reduced performance group when  $Srxlev \leq S_{nonIntraSearchP}$  or  $Squal \leq S_{nonIntraSearchO}$ .

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every  $T_{measure,UTRA\_FDD}$ . If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met reselection criterion defined in TS 36.304 [1] within  $N_{\rm UTRA\_carrier,normal}$  \*  $T_{\rm evaluateUTRA\_FDD}$  if the cell is in normal performance group and within 6 \*  $N_{\rm UTRA\_carrier,reduced}$  \*  $T_{\rm evaluateUTRA\_FDD}$  if the cell is in reduced performance group when  $T_{\rm reselection} = 0$  as specified in table 4.2.2.5.1-1 provided that the reselection criteria is met by a margin of at least 6dB for reselections based on RSCP, or a margin of at least 3dB for reselections based on Ec/Io.

If  $T_{reselection}$  timer has a non zero value and the UTRA FDD cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this UTRA FDD cell for the  $T_{reselection}$  time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

DRX cycle length [s]	T <sub>detectUTRA_FDD</sub> [s]	T <sub>measureUTRA_FDD</sub> [s] (number of DRX cycles)	T <sub>evaluateUTRA_FDD</sub> [s] (number of DRX cycles)
0.32		5.12 (16)	15.36 (48)
0.64	30	5.12 (8)	15.36 (24)
1.28		6.4(5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)

Table 4.2.2.5.1-1: T<sub>detectUTRA\_FDD</sub>, T<sub>measureUTRA\_FDD</sub>, and T<sub>evaluateUTRA\_FDD</sub>

For higher priority cells, a UE may optionally use a shorter value for  $T_{measureUTRA\_FDD}$ , which shall not be less than Max(0.64 s, one DRX cycle).

#### 4.2.2.5.2 Measurements of UTRAN TDD cells

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period. P-CCPCH RSCP of UTRAN TDD cells shall not be filtered over a longer period than that specified in table 4.2.2.5.2-1.

The UE shall evaluate whether newly detectable UTRA TDD cells in normal performance group have met the reselection criteria in TS 36.304 within time  $N_{UTRA\_carrier\_TDD,normal}$  \*  $T_{detectUTRA\_TDD}$ , and evaluate whether newly detectable UTRA TDD cells in reduced performance group have met the reselection criteria in TS 36.304 within time 6 \*  $N_{UTRA\_carrier\_TDD,reduced}$  \*  $T_{detectUTRA\_TDD}$  when  $Srxlev \leq S_{nonIntraSearchP}$  or  $Squal \leq S_{nonIntraSearchP}$  when  $T_{reselection} = 0$  provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every  $N_{UTRA\_carrier\_TDD,normal} * T_{measureUTRA\_TDD}$  for the cells in normal performance group, and at least every  $6 * N_{UTRA\_carrier\_TDD,reduced} * T_{measureUTRA\_TDD}$  for the cells in reduced performance group, when  $Srxlev \leq S_{nonIntraSearchP}$  or  $Squal \leq S_{nonIntraSearchP}$ .

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every  $T_{measure,UTRA\_TDD}$ . If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met reselection criterion defined in [1] within  $N_{UTRA\_carrier\_TDD,normal}$  \* $T_{evaluateUTRA\_TDD}$  if the cell is in normal performance group and within 6 \*  $N_{UTRA\_carrier\_TDD,reduced}$  \*  $T_{evaluateUTRA\_TDD}$  if the cell is in reduced performance group when  $T_{reselection} = 0$  as specified in table 4.2.2.5.2-1 provided that the reselection criteria is met by a margin of at least 6dB.

If  $T_{reselection}$  timer has a non zero value and the UTRA TDD cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this UTRA TDD cell for the  $T_{reselection}$  time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

DRX cycle length [s]	T <sub>detectUTRA_TDD</sub>	T <sub>measureUTRA_TDD</sub> [s] (number of DRX cycles)	T <sub>evaluateUTRA_TDD</sub> [s] (number of DRX cycles)
0.32		5.12 (16)	15.36 (48)
0.64	30	5.12 (8)	15.36 (24)
1.28		6.4(5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)

Table 4.2.2.5.2-1: T<sub>detectUTRA TDD</sub>, T<sub>measureUTRA TDD</sub> and T<sub>evaluateUTRA TDD</sub>

For higher priority cells, a UE may optionally use a shorter value for **T**<sub>measureUTRA\_TDD</sub>, which shall not be less than Max(0.64 s, one DRX cycle).

#### 4.2.2.5.3 Measurements of GSM cells

When the measurement rules defined in [1] indicate that E-UTRAN inter-frequencies or inter-RAT frequency cells are to be measured, the UE shall measure the signal level of the GSM BCCH carriers if the GSM BCCH carriers are indicated in the measurement control system information of the serving cell. GSM BCCH carriers of lower priority than the serving cell shall be measured at least every T<sub>measure,GSM</sub> (see table 4.2.2.5.3-1).

When higher priority GSM BCCH carriers are found by the higher priority search, they shall be measured at least every  $T_{\text{measure,GSM}}$ , and the UE shall decode the BSIC of the GSM BCCH carrier. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell.

The UE shall maintain a running average of 4 measurements for each GSM BCCH carrier. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

If continuous GSM measurements are required by the measurement rules in [1], the UE shall attempt to verify the BSIC at least every 30 seconds for each of the 4 strongest GSM BCCH carriers. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell. If the UE detects on a BCCH carrier a BSIC which is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform BSIC re-confirmation for that cell.

The UE shall not consider the GSM BCCH carrier in cell reselection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

If  $T_{reselection}$  timer has a non zero value and the GSM cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this GSM cell for the  $T_{reselection}$  time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

Table 4.2.2.5.3-1: T<sub>measure,GSM</sub>.

DRX cycle length [s]	T <sub>measure,GSM</sub> [s] (number of DRX cycles)
0.32	5.12 (16)
0.64	5.12 (8)
1.28	6.4(5)
2.56	7.68 (3)

#### 4.2.2.5.4 Measurements of HRPD cells

In order to perform measurement and cell reselection to HRPD cell, the UE shall acquire the timing of HRPD cells.

When the measurement rules indicate that HRPD cells are to be measured, the UE shall measure CDMA2000 HRPD Pilot Strength of HRPD cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of HRPD Neighbor Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all HRPD cells in the neighbour cell list.

When the E-UTRA serving cell fulfils  $Srxlev > S_{nonIntraSearchP}$  and  $Squal > S_{nonIntraSearchQ}$ , the UE shall search for CDMA2000 HRPD layers of higher priority at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is defined in clause 4.2.2.

For CDMA2000 HRPD cells which have been detected, the UE shall measure CDMA2000 HRPD Pilot Strength at least every (Number of HRPD Neighbor Frequency)\* $T_{measureHRPD}$ , when the E-UTRA serving cell Srxlev  $\leq S_{nonIntraSearchP}$  or Squal  $\leq S_{nonIntraSearchO}$ .

The UE shall be capable of evaluating that the CDMA2000 HRPD cell has met cell reselection criterion defined in [1] within  $T_{\text{evaluateHRPD}}$ .

Table 4.2.2.5.4-1 gives values of T<sub>measureHRPD</sub> and T<sub>evaluateHRPD</sub>.

Table 4.2.2.5.4-1: T<sub>measureHRPD</sub> and T<sub>evaluateHRPD</sub>

DRX cycle length [s]	T <sub>measureHRPD</sub> [s] (number of DRX cycles)	T <sub>evaluateHRPD</sub> [s] (number of DRX cycles)
0.32	5.12 (16)	15.36 (48)
0.64	5.12 (8)	15.36 (24)
1.28	6.4 (5)	19.2 (15)
2.56	7.68 (3)	23.04 (9)

If  $T_{reselection}$  timer has a non zero value and the CDMA2000 HRPD cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this CDMA2000 HRPD cell for the  $T_{reselection}$  time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

#### 4.2.2.5.5 Measurements of cdma2000 1X

In order to perform measurement and cell reselection to cdma2000 1X cell, the UE shall acquire the timing of cdma2000 1X cells.

When the measurement rules indicate that cdma2000 1X cells are to be measured, the UE shall measure cdma2000 1x RTT Pilot Strength of cdma2000 1X cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of CDMA2000 1X Neighbor Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all cdma2000 1X cells in the neighbour cell list.

When the E-UTRA serving cell fulfils  $Srxlev > S_{nonIntraSearchP}$  and  $Squal > S_{nonIntraSearchQ}$ , the UE shall search for cdma2000 1X layers of higher priority at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is defined in clause 4.2.2.

For CDMA2000 1X cells which have been detected, the UE shall measure CDMA2000 1xRTT Pilot Strength at least every (Number of CDMA2000 1X Neighbor Frequency)\* $T_{measureCDMA2000\_1X}$ , when the E-UTRA serving cell Srxlev  $\leq S_{nonIntraSearchP}$  or Squal  $\leq S_{nonIntraSearchP}$ . The UE shall be capable of evaluating that the cdma2000 1X cell has met cell reselection criterion defined in [1] within  $T_{evaluateCDMA2000\_1X}$ .

Table 4.2.2.5.5-1 gives values of T<sub>measureCDMA2000\_1X</sub> and T<sub>evaluateCDMA2000\_1X</sub>.

Table 4.2.2.5.5-1: T<sub>measureCDMA2000 1X and</sub> T<sub>evaluateCDMA2000 1X</sub>

	DRX cycle length [s]	T <sub>measureCDMA2000_1X</sub> [s] (number of DRX cycles)	T <sub>evaluateCDMA2000_1X</sub> [s] (number of DRX cycles)
	0.32	5.12 (16)	15.36 (48)
	0.64	5.12 (8)	15.36 (24)
	1.28	6.4 (5)	19.2 (15)
Г	2.56	7.68 (3)	23.04 (9)

If  $T_{reselection}$  timer has a non zero value and the CDMA2000 1X cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this CDMA2000 1X cell for the  $T_{reselection}$  time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

#### 4.2.2.6 Evaluation of cell re-selection criteria

The UE shall evaluate the intra-frequency, inter-frequency and inter-RAT cell reselection criteria defined in [1] at least every DRX cycle. When a non zero value of  $T_{reselection}$  is used, the UE shall only perform reselection on an evaluation which occurs simultaneously to, or later than the expiry of the  $T_{reselection}$  timer.

#### 4.2.2.7 Maximum interruption in paging reception

UE shall perform the cell re-selection with minimum interruption in monitoring downlink channels for paging reception.

At intra-frequency and inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency and inter-frequency cell for paging reception. The interruption time shall not exceed  $T_{SI\text{-}EUTRA} + 50$  ms.

At inter-RAT cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels for paging reception of the target inter-RAT cell. For E-UTRAN to UTRA cell re-selection the interruption time must not exceed  $T_{SI-UTRA} + 50$  ms. For E-UTRAN to GSM cell reselection the interruption time must not exceed  $T_{BCCH} + 50$  ms.

T<sub>SI-EUTRA</sub> is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [2] for a E-UTRAN cell.

 $T_{\text{SI-UTRA}}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in [7] for a UTRAN cell.

T<sub>BCCH</sub> is the maximum time allowed to read BCCH data from a GSM cell defined in [8].

These requirements assume sufficient radio conditions, so that decoding of system information can be made without errors and does not take into account cell re-selection failure.

At cell re-selection to HRPD, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable of starting to monitor downlink channels for paging reception of the target HRPD cell. For HRPD cell reselection the interruption time must not exceed  $T_{SI-HRPD} + 50$  ms.

 $T_{\text{SI-HRPD}}$  is the time required for receiving all the relevant system information data according to the reception procedure and the upper layer (Layer 3) procedure delay of system information blocks defined in [11] in for HRPD cell.

At cell re-selection to cdma2000 1X, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable of starting to monitor downlink channels for paging reception of the target cdma2000 1X cell. For cdma2000 1X cell re-selection the interruption time must not exceed  $T_{SI\text{-}cdma2000\ IX} + 50$  ms.

 $T_{SI\text{-}cdma2000\_1X}$  is the time required for receiving all the relevant system information data according to the reception procedure and the upper layer (Layer 3) procedure delay of system information blocks defined in [15] for cdma2000 1X cell.

#### 4.2.2.8 void

#### 4.2.2.9 UE measurement capability

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Intra-frequency carrier, and
- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 TDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 FDD UTRA carriers, and
- Depending on UE capability, 3 TDD UTRA carriers, and
- Depending on UE capability, 32 GSM carriers, and
- Depending on UE capability, 3 cdma2000 1x carriers, and
- Depending on UE capability, 3 HRPD carriers.

In addition to the requirements defined above, a UE supporting E-UTRA measurements in RRC\_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

#### 4.2.2.9a UE measurement capability (Increased UE carrier monitoring)

UE which support Increased UE carrier monitoring E-UTRA according to the capabilities in [2,31] shall be capable of monitoring at least

- Depending on UE capability, 8 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 8 TDD E-UTRA inter-frequency carriers

UE which support increased UE carrier monitoring UTRA according to the capabilities in [2,31] shall additionally be capable of monitoring at least

- Depending on UE capability, 6 FDD UTRA carriers, and
- Depending on UE capability, 7 TDD UTRA carriers, and

In addition to the requirements defined above, a UE supporting E-UTRA measurements in RRC\_IDLE state and supporting Increased UE carrier monitoring E-UTRA or increased UE carrier monitoring UTRA according to the capabilities in [2,31] shall be capable of monitoring a total of at least 13 carrier frequency layers, which includes serving layer, comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

#### 4.2.2.10 Reselection to CSG cells

NOTE: Requirements in this clause are minimum requirements defined to ensure the testability of autonomous CSG search. Further information on autonomous search times in practical deployments is available in [25].

Reselection from non CSG to CSG cells may be performed using UE autonomous search as defined in [1] when at least one CSG ID is included in the UE's CSG whitelist. The requirements in this clause are valid for reselection to CSG cells previously visited by the UE when the radio configuration parameters, including the carrier frequency and physical cell identity of the CSG cell, non CSG cell and other neighbour cells are unchanged from the most recent previous visit.

NOTE: According to [1], the UE autonomous search function, per UE implementation, determines when and/or where to search for allowed CSG cells.

#### 4.2.2.10.1 Reselection from a non CSG to an inter-frequency CSG cell

The UE shall perform search and reselection to an allowed inter-frequency CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.10.1-1. There is no need for statistical testing of this requirement.

Table 4.2.2.10.1-1: Parameters for CSG inter-frequency reselection

Parameter	Unit	Cell 1	Cell 2
EARFCN NOTE1		Channel 1	Channel 2
CSG indicator		False	True
Physical cell identity <sup>NOTE1</sup>		1	2
CSG identity		Not sent	Sent
			(Already stored
			in UE whitelist
			from previous
			visit)
Propagation conditions		Static, non	
CSG cell previously		Ye	S
visited by UE			T
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		0
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>NOTE 1</sup>	dB		
OCNG_RB <sup>NOTE 1</sup>	dB		
Qrxlevmin	dBm	-140	-140
$N_{oc}$	dBm/15 kHz	Of	f
RSRP NOTE2	dBm/15 KHz	-110	-110

NOTE 1: For this requirement to be applicable, the EARFCN and physical cell identity for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously

NOTE 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE

#### 4.2.2.10.2 Reselection from a non CSG to an inter-RAT UTRAN FDD CSG cell

The UE shall perform search and reselection to an allowed inter-RAT UTRAN FDD CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.10.2-1. There is no need for statistical testing of this requirement.

Table 4.2.2.10.2-1: Parameters for CSG inter-RAT UTRAN FDD reselection

Parameter	Unit	Cell 1	Cell 2
EARFCN NOTE1		Channel 1	N/A
UARFCN NOTE1		N/A	Channel 2
CSG indicator		False	True
Physical cell identity <sup>NOTE1</sup>		1	N/A
Primary scrambling code		N/A	Scrambling
NOTE1			code 2
CSG identity		Not sent	Sent
			(Already stored
			in UE whitelist
			from previous
			visit)
Propagation conditions		Static, non	
CSG cell previously		Ye	S
visited by UE	in .		T
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB	0	N/A
PHICH_RB	dB	O	IN/A
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB OCNG_RA <sup>NOTE 1</sup>	dB		
OCNG_RB <sup>NOTE 1</sup>	dB		
	dB	4.40	
Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	Off	
RSRP NOTE2	dBm/15 KHz	-110	
CPICH_RSCP NOTE2	dBm		-100
CPICH_Ec/lor	dB		-10
PCCPCH_Ec/lor	dB		-12
SCCPCH_Ec/lor	dB	<b>.</b>	-12
AICH_Ec/lor	dB	N/A	-15
SCH_Ec/lor	dB		-15
PICH_Ec/lor	dB		-15
$I_{oc}$	dBm/3.84 MHz		Off

NOTE 1: For this requirement to be applicable, the EARFCN and physical cell identity for cell 1 and the UARFCN and scrambling code for cell 2 shall be unchanged from when the CSG cell was visited previously

NOTE 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE

# 4.3 Minimization of Drive Tests (MDT)

UE supporting minimisation of drive tests in RRC\_IDLE shall be capable of:

- logging measurements in RRC\_IDLE, reporting the logged measurements and meeting requirements in this clause;
- logging of RRC connection establishment failure, reporting the logged failure and meeting requirements in this clause;
- logging of radio link failure and handover failure, reporting the logged failure and meeting requirements in this clause.

#### 4.3.1 Introduction

The logged MDT requirements consist of measurement requirements as specified in clause 4.3.2 and relative time stamp accuracy requirements as specified in clause 4.3.3. Both sets of requirements are applicable for intra-frequency, inter-frequency and inter-RAT cases in RRC\_IDLE state. The MDT procedures are described in [27].

For RRC connection establishment failure logging and reporting, the MDT requirements consist of requirements for measurements performed and logged in RRC\_IDLE state specified in clause 4.3.2 and relative time stamp accuracy requirement for RRC connection establishment failure log reporting as specified in clause 4.3.4.

#### 4.3.2 Measurements

The requirements specified in this clause apply for the measurements (GSM carrier RSSI, UTRA CPICH RSCP, UTRA CPICH Ec/Io, P-CCPCH RSCP for UTRA 1.28 TDD, E-UTRA RSRP, E-UTRA RSRQ, MBSFN RSRP, MBSFN RSRQ, and MCH BLER) performed and logged by the UE for MDT in RRC\_IDLE. The requirements apply for the measurements included in logged MDT reports and RRC connection establishment failure reports.

#### 4.3.2.1 Requirements

The measurement values that are used to meet

- serving cell and reselection requirements as specified in sections 4.2.2.1, 4.2.2.3, 4.2.2.4, 4.2.2.5,
- MBSFN measurement requirements as specified in section 4.4,

shall also apply to values logged for MDT measurements in RRC\_IDLE state.

## 4.3.3 Relative Time Stamp Accuracy

The relative time stamp for a logged measurement is defined as the time from the moment the MDT configuration was received at the UE until the measurement was logged, see TS 36.331 [2].

#### 4.3.3.1 Requirements

The accuracy of the relative time stamping is such that the drift of the time stamping shall be not more than  $\pm 2$  seconds per hour.

# 4.3.4 Relative Time Stamp Accuracy for RRC Connection Establishment Failure Log Reporting

Relative time stamp for RRC connection establishment failure log reporting is defined as the time elapsed from the last RRC connection establishment failure to the time when the log is included in the report TS 36.331 [2]. The UE shall report the RRC connection establishment failure log, while meeting the accuracy requirement specified in clause 4.3.4.1.

#### 4.3.4.1 Requirements

The accuracy of the relative time stamping for RRC connection establishment failure log reporting is such that the drift of the time stamping shall not be larger than  $\pm$  0.72 seconds per hour and  $\pm$  10 seconds over 48 hours. The relative time stamp accuracy requirements shall apply provided that:

- no power off or detach occurs after the RRC connection establishment failure had been detected and until the log is time-stamped.

NOTE: This requirement does not need to be tested.

# 4.3.5 Relative Time Stamp Accuracy for Radio Link Failure and Handover Failure Log Reporting

The UE shall report the radio link and handover failure log, while meeting the accuracy requirements specified in this section.

#### 4.3.5.1 Requirements for timeSinceFailure

Relative time stamp accuracy requirements for *timeSinceFailure* reported for MDT in a radio link failure or handover failure log are specified in this clause. *timeSinceFailure* determines the time elapsed from the last radio link failure or handover failure in E-UTRA to the time when the log is included in the report TS 36.331 [2].

The accuracy of the relative time stamping for timeSinceFailure is such that the drift of the time stamping shall not be larger than  $\pm$  0.72 seconds per hour and  $\pm$  10 seconds over 48 hours. These relative time stamp accuracy requirements shall apply provided that:

- no power off or detach occurs after the RLF or handover failure had been detected and until the log is time-stamped.

#### 4.4 MBSFN Measurements

#### 4.4.1 Introduction

The requirements specified in Section 4.4 apply for MBSFN measurements (MBSFN RSRP, MBSFN RSRQ, and MCH BLER defined in [4]), which are performed in RRC\_IDLE state and logged for MDT by UEs which are MBMS-capable and also indicate their MBSFN measurement logging capability [2].

UE shall measure MBSFN RSRP, MBSFN RSRQ and MCH BLER only in subframes and on carriers where UE is decoding PMCH. The requirements are specified for any carrier where PMCH is received by UE. The requirements specified in this section apply for any carrier frequency with configured MBSFN subframes with PMCH, which may be the same as or different from any serving unicast carrier.

The UE receiving PMCH on any non-serving carrier and performing MBSFN measurements shall not cause interruptions on any serving carrier in the subframes with paging and non-MBSFN multicast transmissions such as system information.

#### 4.4.2 MBSFN RSRP measurements

The MBSFN RSRP measurement requirements for UEs in RRC\_IDLE and the corresponding MBSFN RSRP measurement report mapping are the same as specified in Section 8.9.2 and 9.8.2.

#### 4.4.3 MBSFN RSRQ measurements

The MBSFN RSRQ measurement requirements for UEs in RRC\_IDLE and the corresponding MBSFN RSRQ measurement report mapping are the same as specified in Section 8.9.3 and 9.8.3.

#### 4.4.4 MCH BLER measurements

The MCH BLER measurement requirements for UEs in RRC\_IDLE and the corresponding MCH BLER measurement report mapping are the same as specified in Section 8.9.4 and 9.8.4.

## 4.5 Proximity-based Services

#### 4.5.1 Introduction

This section contains the requirements for the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery in RRC\_IDLE state. The requirements in this section shall apply provided that the sidelink used by the UE for ProSe Direct Communication and/or ProSe Direct Discovery is on the carrier of the serving cell.

#### 4.5.2 Requirements

When a UE in RRC\_IDLE state is participating in transmissions and/or reception for ProSe Direct Discovery and/or ProSe Direct Communication, the UE shall meet all the requirements of Section 4.

NOTE: The UE may need to interrupt ProSe operation in order to meet the requirements of Section 4.

#### 4.5.2.1 Interruptions with ProSe Direct Discovery

A UE capable of ProSe direct discovery in RRC\_IDLE state shall not cause any interruption for the reception of paging and system information:

- while switching reception between ProSe Direct Discovery and the PCell, or
- when receiving ProSe direct discovery signals or
- while switching receiver chain ON/OFF for ProSe Direct Discovery reception if the UE has a dedicated receiver chain for ProSe Direct Discovery

#### 4.5.2.2 Interruptions with ProSe Direct Communication

A UE capable of ProSe direct communication in RRC\_IDLE state shall not cause any interruption for the reception of paging and system information:

- while switching reception between ProSe Direct Communication and the PCell, or
- when receiving ProSe direct communication signals, or
- while switching receiver chain ON/OFF for ProSe Direct Comunications reception.

#### 4.5.2.3 Initiation/Cease of SLSS transmissions with ProSe Direct Discovery

The requirements in this subclause are applicable to a UE capable of ProSe Direct Discovery and SLSS transmission and reception.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType19*. The UE shall be capable of measuring the RSRP of the cell used to transmit Prose Direct Discovery announcements and evaluate to initiate/cease SLSS transmissions within T<sub>evaluate,SLSS</sub> as specified in Table 4.5.2.3-1.

Table 4.5.2.3-1: Tevaluate.SLSS with ProSe Direct Discovery

DRX cycle length [s]	T <sub>evaluate,SLSS</sub> [s] (number of DRX cycles)
0.32	1.92 (6)
0.64	3.84 (6)
1.28	7.68 (6)
2.56	15.36 (6)

For the cell used to transmit ProSe Direct Discovery announcements:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

#### 4.5.2.4 Initiation/Cease of SLSS transmissions with ProSe Direct Communication

The requirements in this subclause are applicable to a UE capable of ProSe Direct Communication.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType18*. The UE shall be capable of measuring the RSRP of the cell used to transmit ProSe Direct Communication and evaluate to initiate/cease SLSS transmissions within T<sub>evaluate,SLSS</sub> as specified in Table 4.5.2.4-1.

DRX cycle length [s]	T <sub>evaluate,SLSS</sub> [s] (number of DRX cycles)
0.32	1.92 (6)
0.64	3.84 (6)
1.28	7.68 (6)
2.56	15.36 (6)

Table 4.5.2.4-1: T<sub>evaluate,SLSS</sub> with ProSe Direct Communication

For the cell used to transmit ProSe Direct Communication:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 for a corresponding Band are fulfilled,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

# 5 E-UTRAN RRC\_CONNECTED state mobility

NOTE 1: For the performance requirements specified hereafter, the state when no DRX is used is defined as follows:

- DRX parameters are not configured; or
- DRX parameters are configured and
  - o drx-InactivityTimer is running; or
  - o drx-RetransmissionTimer is running; or
  - o mac-ContentionResolutionTimer is running; or
  - o a Scheduling Request sent on PUCCH is pending; or
  - o an uplink grant for a pending HARQ retransmission can occur and there is data in the corresponding HARQ buffer; or
  - a PDCCH indicating a new transmission addressed to the C-RNTI of the UE has not been received after successful reception of a Random Access Response for the explicitly signaled preamble (only applicable to UEs in RRC\_CONNECTED).

#### Otherwise

- It is the state when DRX is used.

NOTE 2: Unless otherwise stated, the requirements in sections 5.1, 5.2.2.2, 5.2.2.3, 5.2.2.4, 5.3 and 5.4 are also applicable when a UE is configured with Scell(s) or PSCell.

## 5.1 E-UTRAN Handover

#### 5.1.1 Introduction

## 5.1.2 Requirements

#### 5.1.2.1 E-UTRAN FDD – FDD

The requirements in this clause are applicable to both intra-frequency and inter-frequency handovers.

#### 5.1.2.1.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [2].

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within D<sub>handover</sub> seconds from the end of the last TTI containing the RRC command.

#### Where:

 $D_{\text{handover}}$  equals the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2] plus the interruption time stated in clause 5.1.2.1.2.

#### 5.1.2.1.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

$$T_{interrupt} \equiv T_{search} + T_{IU} + 20 \ ms$$

Where:

 $T_{search}$  is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then  $T_{search} = 0$  ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then  $T_{search} = 80$  ms. Regardless of whether DRX is in use by the UE,  $T_{search}$  shall still be based on non-DRX target cell search times.

 $T_{IU}$  is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell.  $T_{IU}$  can be up to 30 ms.

NOTE: The actual value of T<sub>IU</sub> shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.1 for intra-frequency handover and Clause 8.1.2.3.1 for inter-frequency handover.

#### 5.2.2.2 E-UTRAN FDD – TDD

The requirements in this clause are applicable to handover from FDD to TDD. The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 5.2.2.4 apply for this section.

5.2.2.2.1 (Void)

5.2.2.2 (Void)

#### 5.2.2.3 E-UTRAN TDD – FDD

The requirements in this clause are applicable to handover from TDD to FDD. The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 5.1.2.1 apply for this section.

5.2.2.3.1 (Void)

5.2.2.3.2 (Void)

#### 5.2.2.4 E-UTRAN TDD – TDD

The requirements in this clause are applicable to both intra-frequency and inter-frequency handovers.

#### 5.2.2.4.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [2].

When the UE receives a RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within  $D_{handover}$  seconds from the end of the last TTI containing the RRC command.

#### Where:

 $D_{handover}$  equals the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2] plus the interruption time stated in clause 5. 2.2.4.2.

#### 5.2.2.4.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where

 $T_{search}$  is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then  $T_{search} = 0$  ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then  $T_{search} = 80$  ms. Regardless of whether DRX is in use by the UE,  $T_{search}$  shall still be based on non-DRX target cell search times.

 $T_{IU}$  is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell.  $T_{IU}$  can be up to 30 ms.

NOTE: The actual value of T<sub>IU</sub> shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.2 for intra-frequency handover and Clause 8.1.2.3.4 for inter-frequency handover.

#### 5.2.2.5 E-UTRAN HD – FDD

The requirements in this clause are applicable to intra-frequency handovers.

#### 5.2.2.5.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [2].

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within D<sub>handover</sub> seconds from the end of the last TTI containing the RRC command.

Where:

D<sub>handover</sub> equals the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2] plus the interruption time stated in clause 5.1.2.1.2.

#### 5.2.2.5.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency handover is commanded, the interruption time shall be less than Tinterrupt

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

 $T_{search}$  is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then  $T_{search}=0$  ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then  $T_{search}=80$  ms. Regardless of whether DRX is in use by the UE,  $T_{search}$  shall still be based on non-DRX target cell search times.

 $T_{IU}$  is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell.  $T_{IU}$  can be up to 30 ms.

NOTE: The actual value of  $T_{\rm IU}$  shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.1 for intra-frequency handover.

## 5.3 Handover to other RATs

#### 5.3.1 E-UTRAN - UTRAN FDD Handover

#### 5.3.1.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to UTRAN FDD is to change the radio access mode from E-UTRAN to UTRAN FDD. The handover procedure is initiated from E-UTRAN with a RRC message that implies a hard handover as described in TS 36.331 [2].

#### 5.3.1.1.1 Handover delay

When the UE receives a RRC message implying handover to UTRAN the UE shall be ready to start the transmission of the new UTRA uplink DPCCH within  $D_{handover}$  seconds from the end of the last E-UTRAN TTI containing the RRC MOBILITY FROM E-UTRA command.

where:

- D<sub>handover</sub> equals the RRC procedure delay, which is 50 ms plus the interruption time stated in clause 5.3.1.1.2.

#### 5.3.1.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCCH in UTRAN FDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The target cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell is known the interruption time shall be less than Tinterrupt1

$$T_{interrupt1} = T_{IU} + T_{sync} + 50 + 10*F_{max} + T_{MC} ms$$

If the target cell is unknown the interruption time shall be less than Tinterrupt2

$$T_{interrupt2} = T_{IU} + T_{sync} + 150 + 10*F_{max} + T_{MC} \text{ ms}$$

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. Performance requirements for E-UTRA to UTRA soft handover are not specified. When UE is connected to an E-UTRA cell, UTRA SFN timing measurements are not reported. This implies that the timing of the DPCH of the UTRA target cells in the active set cannot be configured by UTRAN to guarantee that all target cells fall within the UE reception window of  $T_0 + 148$  chips.

Where:

 $T_{MC}$ 

$\mathrm{T}_{\mathrm{IU}}$	is the interruption uncertainty when changing the timing from the E-UTRAN to the new UTRAN
	cell. $T_{IU}$ can be up to one UTRA frame (10 ms).

 $F_{max}$  denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH on the UTRA target cell. If HS-PDSCH is configured in the UTRA target cell,  $F_{max}$  is 4 radio frames.

 $T_{sync}$  is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [20], clause 4.3.1.2. In case higher layers indicate the usage of a post-verification period  $T_{sync}$ =0 ms. Otherwise  $T_{sync}$ =40 ms.

T<sub>MC</sub> is 0ms if a single UTRA cell is configured as the handover target, otherwise 20ms if handover to UTRA with 1, 2 or 3 UTRA carriers with secondary HS-PDSCH is configured.

The phase reference is the primary CPICH.

The requirements in this clause assume that N312 has the smallest possible value i.e. only one insync is required.

#### 5.3.2 E-UTRAN - UTRAN TDD Handover

#### 5.3.2.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to UTRAN TDD is to change the radio access mode from E-UTRAN to UTRAN TDD. The handover procedure is initiated from E-UTRAN with a RRC message that implies a hard handover as described in TS 36.331 [2].

#### 5.3.2.2 Requirements

The requirements in this clause shall apply to UE supporting E-UTRAN and UTRAN TDD.

#### 5.3.2.2.1 Handover delay

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover the UE shall be ready to start the transmission of the SYNC-UL within  $D_{handover}$  seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

- D<sub>handover</sub> equals the RRC procedure delay, which is 50 ms plus the interruption time stated in clause 5.3.2.2.

#### 5.3.2.2.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the SYNC-UL in UTRAN TDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell has been measured by the UE during the last 5 seconds, the interruption time shall be less than  $T_{interrupt1}$ 

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 \text{ ms}$$

If the target cell has not been measured by the UE during the last 5 seconds, the interruption time shall be less than  $T_{interrupt2}$ 

Where:

T<sub>offset</sub> Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time

that can elapse until the appearance of a Beacon channel

 $T_{UL}$  Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

F<sub>SEN</sub> Equal to 1 if SFN decoding is required and equal to 0 otherwise

The interruption time requirements for an unknown target cell shall apply only if the signal quality of the unknown target cell is sufficient for successful synchronisation with one attempt.

#### 5.3.3 E-UTRAN - GSM Handover

#### 5.3.3.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to GSM is to transfer a connection between the UE and E-UTRAN to GSM. The handover procedure is initiated from E-UTRAN with a RRC message (MOBILITY FROM E-UTRA). The procedure is described in in TS 36.331 [2].

#### 5.3.3.2 Requirements

The requirements in this clause shall apply to UE supporting E-UTRAN and GSM.

The requirements given below in Tables 5.3.3.2.1-1 and 5.3.3.2.2-1 for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in TS 36.331 [2].

#### 5.3.3.2.1 Handover delay

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in [10]) on the channel of the new RAT within the value in table 5.3.3.2.1-1 from the end of the last TTI containing the RRC command. The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.3.3.2.1-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the	90
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before	190
the RRC MOBILITY FROM E-UTRA COMMAND is	
received	

#### 5.3.3.2.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink channel in GSM, excluding the RRC procedure delay. The interruption time depends on whether the UE has synchronized to the target GSM cell or not and shall be less than the value specified in table 5.3.3.2.2-1.

Table 5.3.3.2.2-1: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the	40
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before	140
the RRC MOBILITY FROM E-UTRA COMMAND is	
received	

## 5.4 Handover to Non-3GPP RATs

#### 5.4.1 E-UTRAN – HRPD Handover

#### 5.4.1.1 Introduction

The handover procedure from E-UTRAN to HRPD is initiated when E-UTRAN sends handover command to the UE through dedicated RRC signalling.

#### 5.4.1.1.1 Handover delay

The handover delay ( $D_{handover}$ ) is defined as the sum of the RRC procedure delay, which is 50 ms and the interruption time specified in clause 5.4.1.1.2.

When the UE receives a RRC message implying handover to HRPD, the UE shall be ready to start the transmission of the new reverse control channel in HRPD within  $D_{handover}$  from the end of the last E-UTRAN TTI containing the RRC command.

#### 5.4.1.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in HRPD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

An HRPD cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 6.6 of [13], the interruption time shall be less than T<sub>interrupt</sub>

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

Where:

 $T_{IU}$  It is the interruption uncertainty when changing the timing from the E-UTRAN to the new HRPD cell.  $T_{IU}$  can be up to one HRPD frame (26.66 ms).

$$SW_K \qquad \qquad \text{is } SW_K = \left\lceil \frac{srch\_win\_k}{60} \right\rceil \text{ where } srch\_win\_k \text{ is the number of HRPD chips indicated by the}$$

search window for known target HRPD cells in the message

SW<sub>O</sub> is SW<sub>O</sub> = 
$$\left[\frac{\text{srch\_win\_o}}{60}\right]$$
 where srch\_win\_o is the number of HRPD chips indicated by the

search window for unknown target HRPD cells in the message

KC It is the number of known target HRPD cells in the message, and

OC It is the number of unknown target HRPD cells in the message.

NOTE: An additional delay in the interruption time may occur due to the reverse link silence interval [11], which is specific to HRPD.

#### 5.4.2 E-UTRAN – cdma2000 1X Handover

#### 5.4.2.1 Introduction

The handover procedure from E-UTRAN to cdma2000 1X is initiated when E-UTRAN sends handover command to the UE through dedicated RRC signalling.

#### 5.4.2.1.1 Handover delay

The handover delay ( $D_{handover}$ ) is defined as the sum of the RRC procedure delay, which is 130 ms and the interruption time specified in clause 5.4.2.1.2.

When the UE receives a RRC message implying handover to cdma2000 1X, the UE shall be ready to start the transmission of the new reverse control channel in cdma2000 1X within  $D_{handover}$  from the end of the last E-UTRAN TTI containing the RRC command.

#### 5.4.2.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in cdma2000 1X, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1X cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 4.2.1 of [14], the interruption time shall be less than T<sub>interrupt</sub>:

$$T_{interrupt} = T_{IU} + 140 + 10*KC*SW_K + 10*OC*SW_O ms$$

Where:

 $T_{\rm IU}$  It is the interruption uncertainty when changing the timing from the E-UTRAN to the new cdma2000 1X cell.  $T_{\rm IU}$  can be up to one cdma2000 1X frame (20 ms).

$$SW_K$$
 is  $SW_K = \left\lceil \frac{srch\_win\_k}{300} \right\rceil$  where  $srch\_win\_k$  is the number of cdma2000 1x chips indicated by

the search window for known target cdma2000 1x cells in the message

$$SW_{O} \qquad \qquad \text{is } SW_{O} = \left\lceil \frac{srch\_win\_o}{300} \right\rceil \text{ where } srch\_win\_o \text{ is the number of } cdma2000 \text{ 1x chips indicated by}$$

the search window for unknown target cdma2000 1x cells in the message

KC It is the number of known target cdma2000 1X cells in the message, and

OC It is the number of unknown target cdma2000 1X cells in the message.

## 6 RRC Connection Mobility Control

#### 6.1 RRC Re-establishment

The requirements in this clause are applicable to both E-UTRAN FDD and TDD.

#### 6.1.1 Introduction

RRC connection re-establishment is initiated when a UE in RRC connected mode looses RRC connection due to any of these reasons: radio link failure, handover failure or radio link problem. The RRC es-tablishment procedure is specified in clause 5.3.7 in TS 36.331 [2].

### 6.1.2 Requirements

In RRC connected mode the UE shall be capable of sending RRCConnectionReestablishmentRequest message within  $T_{re\text{-establish\_delay}}$  seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ( $T_{re\text{-establish\_delay}}$ ) shall be less than:

$$T_{\text{re-establish\_delay}} = T_{\text{UL\_grant}} + T_{\text{UE\_re-establish\_delay}}$$

 $T_{UL\_grant}$ : It is the time required to acquire and process uplink grant from the target PCell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

The UE re-establishment delay (T<sub>UE re-establish delay</sub>) is specified in clause 6.1.2.1.

#### 6.1.2.1 UE Re-establishment delay requirement

The UE re-establishment delay ( $T_{UE\_re-establish\_delay}$ ) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in clause 5.3.7 in TS 36.331 [2] is detected by the UE to the time when the UE sends PRACH to the target PCell. The UE re-establishment delay ( $T_{UE\_re-establish\_delay}$ ) requirement shall be less than:

$$T_{UE\text{-}re\text{-}establish\_delay} = 50 \text{ ms} + N_{freq} * Tsearch + T_{SI} + T_{PRACH}$$

T<sub>search</sub>: It is the time required by the UE to search the target PCell.

 $T_{\text{search}} = \text{It is } 100 \text{ ms if the target PCell is known by the UE}$ ; the target PCell is known if it has been measured by the UE in the last 5 seconds.

 $T_{search}$  = It is 800 ms if the target PCell is unknown by the UE; the target PCell is unknown if it has not been measured by the UE in the last 5 seconds.

 $T_{SI}$  = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [2] for the target PCell.

T<sub>PRACH</sub> = The additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

 $N_{\text{freq}}$ : It is the total number of E-UTRA frequencies to be monitored for RRC re-establishment;  $N_{\text{freq}} = 1$  if the target PCell is known.

There is no requirement if the target cell does not contain the UE context.

#### 6.2 Random Access

#### 6.2.1 Introduction

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is specified in clause 6 of TS 36.213[3] and the control of the RACH transmission is specified in clause 5.1 of TS 36.321[17]. Contention based random access procedures can only be carried out on PCell and PSCell, while non-contention based random access procedures can be carried out on PCell, an activated SCell, and PSCell.

### 6.2.2 Requirements

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula defined in TS 36.213[3] and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as specified in table 6.3.5.1.1-1 of TS 36.101[5]. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of 36.101[5].

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached for the random access procedure on PCell or PSCell as specified in clause 5.1.4 in TS 36.321 [17].

The UE shall stop preamble transmission if maximum number of preamble transmission counter has been reached for the random access procedure on an activated Scell as specified in clause 5.1.4 in TS 36.321 [17].

#### 6.2.2.1 Contention based random access

#### 6.2.2.1.1 Correct behaviour when receiving Random Access Response reception

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

#### 6.2.2.1.2 Correct behaviour when not receiving Random Access Response reception

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 TS 36.321.

#### 6.2.2.1.3 Correct behaviour when receiving a NACK on msg3

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3.

#### 6.2.2.1.4 Void

#### 6.2.2.1.5 Correct behaviour when receiving a message over Temporary C-RNTI

The UE shall send ACK if the Contention Resolution is successful.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

#### 6.2.2.1.6 Correct behaviour when contention Resolution timer expires

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

#### 6.2.2.2 Non-Contention based random access

#### 6.2.2.2.1 Correct behaviour when receiving Random Access Response

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

#### 6.2.2.2.2 Correct behaviour when not receiving Random Access Response

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

#### 6.3 RRC Connection Release with Redirection

#### 6.3.1 Introduction

RRC connection release with redirection is initiated by the UE upon receiving the "*RRCConnectionRelease*" message from the E-UTRAN, TS 36.331 [2]. The RRC connection release with redirection procedure is specified in clause 5.3.8 in TS 36.331 [2].

The requirements in this clause are applicable to both E-UTRAN FDD and TDD.

## 6.3.2 Requirements

#### 6.3.2.1 RRC connection release with redirection to UTRAN FDD

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN FDD cell within  $T_{connection\_release\_redirect\_UTRA\ FDD}$ .

The time delay ( $T_{connection\_release\_redirect\_UTRA\,FDD}$ ) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" (TS 36.331 [2]) on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA FDD cell. The time delay ( $T_{connection\_release\_redirect\_UTRA\,FDD}$ ) shall be less than:

$$T_{connection\_release\_redirect\_UTRA\ FDD} = T_{RRC\_procedure\_delay} + T_{identify\_UTRA\ FDD} + T_{SI\_UTRA\ FDD} + T_{RA}$$

The target UTRA FDD cell shall be considered detectable when:

- CPICH Ec/Io  $\geq$  -15 dB,
- SCH\_Ec/Io ≥ -15 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

 $T_{RRC\_procedure\_delay}$ : It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

T<sub>identify-UTRA FDD</sub>: It is the time to identify the target UTRA FDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ FDD}$ : It is the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released.

 $T_{RA}$ : It is the delay caused due to the random access procedure when sending random access to the target UTRA FDD cell.

#### 6.3.2.2 RRC connection release with redirection to GERAN

The UE shall be capable of performing the RRC connection release with redirection to the target GERAN cell within  $T_{\text{connection\_release\_redirect\_GERAN}$ .

The time delay ( $T_{connection\_release\_redirect\_GERAN}$ ) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" (TS 36.331 [2]) on the E-UTRAN PDSCH and the time the UE starts to send random access to the target GERAN cell. The time delay ( $T_{connection\_release\_redirect\_GERAN}$ ) shall be less than:

$$T_{connection\_release\_redirect\_\ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\_GERAN} + T_{SI\_GERAN} + T_{RA}$$

The target GERAN cell shall be considered detectable when the UE receives the GERAN cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in [9].

 $T_{RRC\_procedure\_delay}$ : It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

T<sub>identify-UTRA GERAN</sub>: It is the time to identify the BSIC of the target GERAN cell. It shall be less than 1 second.

 $T_{SI\text{-}UTRA\ GERAN}$ : It is the time required for acquiring all the relevant system information of the target GERAN cell. This time depends upon whether the UE is provided with the relevant system information of the target GERAN cell or not by the E-UTRAN before the RRC connection is released.

 $T_{RA}$ : It is the delay caused due to the random access procedure when sending random access burst to the target GERAN cell.

#### 6.3.2.3 RRC connection release with redirection to UTRAN TDD

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN TDD cell within  $T_{connection\_release\_redirect\_UTRA\ TDD}$ .

The time delay ( $T_{connection\_release\_redirect\_UTRA\ TDD}$ ) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" (TS 36.331 [2]) on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA TDD cell. The time delay ( $T_{connection\_release\_redirect\_UTRA\ TDD)$  shall be less than:

$$T_{connection\_release\_redirect\_UTRA\ TDD} = T_{RRC\_procedure\_delay} + T_{identify\_UTRA\ TDD} * N_{redirect\_UTRA\ TDD} + T_{SI\_UTRA\ TDD} + T_{RAC\_procedure\_delay} + T_{identify\_UTRA\ TDD} * N_{redirect\_UTRA\ TDD} + T_{SI\_UTRA\ TDD} + T_{RAC\_procedure\_delay} + T_{identify\_UTRA\ TDD} * N_{redirect\_UTRA\ TDD} + T_{identify\_UTRA\ TDD} + T_{identi$$

The target UTRA TDD cell shall be considered detectable when:

- P-CCPCH Ec/Io > -6 dB,
- DwPCH\_Ec/Io  $\geq$  -1 dB.

 $T_{RRC\_procedure\_delay}$ : It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

 $T_{identify-UTRA\ TDD}$ : It is the time to identify the target UTRA TDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ TDD}$ : It is the time required for acquiring all the relevant system information of the target UTRA TDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA TDD cell or not by the E-UTRAN before the RRC connection is released.

 $T_{RA}$ : It is the delay caused due to the random access procedure when sending random access to the target UTRA TDD cell.

 $N_{redirect-UTRA\ TDD}$ : It is the total number of target UTRA TDD frequencies included in RedirectedCarrierInfo in "RRCConnectionRelease" message. It can be up to 4 UTRA TDD frequencies.

## 6.4 CSG Proximity Indication for E-UTRAN and UTRAN

#### 6.4.1 Introduction

The requirements defined in this section are applicable to a UE supporting and configured with CSG proximity indication and are valid when a UE is entering the proximity of one or more CSG member cell(s) or leaving the proximity of all CSG member cell(s) on a UTRA or E-UTRA frequency as specified in [2].

The detection of CSG proximity is based on a UE autonomous search function.

### 6.4.2 Requirements

The UE shall initiate transmission of the ProximityIndication message with "entering" according to [2] within [6] minutes after entering the proximity of one or more CSG member cell(s) on a UTRA or E-UTRA frequency.

The UE shall initiate transmission of the ProximityIndication message with "leaving" according to [2] within [6] minutes after leaving the proximity of all CSG member cell(s) on a UTRA or E-UTRA frequency.

There is no need for statistical testing of this requirement.

NOTE:

Entering the proximity of one or more CSG member cell(s) means that the UE is near a cell whose CSG ID is in the UE's CSG whitelist (as determined based on autonomous search procedures). Leaving the proximity of one or more CSG member cell(s) means that the UE is no longer near any cell whose CSG ID is in the UE's CSG whitelist.

## 7 Timing and signalling characteristics

## 7.1 UE transmit timing

#### 7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected eNode B. The uplink frame transmission takes place  $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{s}}$  before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. The UE shall be configured with a pTAG containing the PCell. The pTAG may also contain one or two SCells, if configured. The UE capable of supporting multiple timing advance [2] may also be configured with one sTAG, in which case the pTAG shall contain the PCell and the sTAG shall contain one SCell with configured uplink. The other downlink SCell will be contained in either the pTAG or the sTAG. In pTAG, UE shall use the PCell as the reference cell for deriving the UE transmit timing for cells in the pTAG. When the UE capable of supporting multiple timing advance [2] is configured with an sTAG, the UE shall use an activated SCell from the sTAG for deriving the UE transmit timing for cells in the sTAG. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements. The requirements in clause 7 apply to both TAGs.

The UE capable of supporting dual connectivity shall be configured with one pTAG and may also be configured with one psTAG. The pTAG shall contain the PCell and the psTAG shall contain the PSCell. In pTAG, UE shall use the PCell as the reference cell for deriving the UE transmit timing for pTAG, and in psTAG, UE shall use the PSCell as the reference cell for deriving the UE transmit timing for psTAG. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements. The requirements in clause 7 apply to both TAGs.

## 7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to  $\pm T_e$  where the timing error limit value  $T_e$  is specified in Table 7.1.2-1. This requirement applies when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus  $(N_{TA\_Ref} + N_{TA\_offset}) \times T_s$ . The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell.  $N_{TA\_Ref}$  for PRACH is defined as 0.  $(N_{TA\_Ref} + N_{TA\_offset})$  (in  $T_s$  units) for other channels is the difference between UE transmission timing and the Downlink timing immediately after when the last timing advance in clause 7.3 was applied.  $N_{TA\_Ref}$  for other channels is not changed until next timing advance is received.

Table 7.1.2-1: Te Timing Error Limit

Downlink Bandwidth (MHz)	T <sub>e_</sub>
1.4	24*T <sub>S</sub>
≥3	12*T <sub>S</sub>
NOTE: T <sub>S</sub> is the basic timing unit defined in TS 36.211	

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame of the reference cell except when the timing advance in clause 7.3 is applied. When in one TAG the transmission timing error between the UE and the reference timing exceeds  $\pm T_e$  the UE is required to adjust its timing to within  $\pm T_e$  in this TAG, as long as, for the UE configured with a pTAG and an sTAG, the transmission timing difference between TAGs does not exceed the maximum transmission timing difference (i.e., 32.47us) after such adjustment. If the transmission timing difference after such adjustment is bigger than the maximum transmission timing difference (i.e., 32.47us) UE may stop adjustment in this TAG. The reference timing shall be  $(N_{TA\_Ref} + N_{TA\_offset}) \times T_s$  before the downlink timing of the reference cell. All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum amount of the magnitude of the timing change in one adjustment shall be  $T_q$  seconds.
- 2) The minimum aggregate adjustment rate shall be  $7*T_S$  per second.
- 3) The maximum aggregate adjustment rate shall be  $T_q$  per 200ms.

where the maximum autonomous time adjustment step  $T_q$  is specified in Table 7.1.2-2.

Table 7.1.2-2: T<sub>q</sub> Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T <sub>q_</sub>
1.4	17.5*T <sub>S</sub>
3	9.5*T <sub>S</sub>
5	5.5*T <sub>S</sub>
≥10	3.5*T <sub>S</sub>
NOTE: T <sub>S</sub> is the basic timing unit defined in TS 36.211	

## 7.2 UE timer accuracy

#### 7.2.1 Introduction

UE timers are used in different protocol entities to control the UE behaviour.

## 7.2.2 Requirements

For UE timers specified in TS 36.331 [2], UE shall comply with the timer accuracies according to Table 7.2.2-1.

The requirements are only related to the actual timing measurements internally in the UE. They do not include the following:

- Inaccuracy in the start and stop conditions of a timer (e.g. UE reaction time to detect that start and stop conditions of a timer is fulfilled), or
- Inaccuracies due to restrictions in observability of start and stop conditions of a UE timer (e.g. TTI alignment when UE sends messages at timer expiry).

Table 7.2.2-1

Timer value [s]	Accuracy
timer value < 4	± 0.1s
timer value > 4	+ 2.5%

## 7.3 Timing Advance

#### 7.3.1 Introduction

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance, see TS 36.321 [17] clause 5.2.

#### 7.3.2 Requirements

#### 7.3.2.1 Timing Advance adjustment delay

UE shall adjust the timing of its uplink transmission timing at sub-frame n+6 for a timing advance command received in sub-frame n.

#### 7.3.2.2 Timing Advance adjustment accuracy

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to  $\pm 4*$  T<sub>S</sub> seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiples of 16\* T<sub>S</sub> and is relative to the current uplink timing.

## 7.4 Cell phase synchronization accuracy (TDD)

#### 7.4.1 Definition

Cell phase synchronization accuracy is defined as the maximum absolute deviation in frame start timing between any pair of cells on the same frequency that have overlapping coverage areas.

## 7.4.2 Minimum requirements

For Wide Area BS, the cell phase synchronization accuracy measured at BS antenna connectors shall be better than the requirement specified in table 7.4.2-1. If a cell's coverage area overlaps with another cell with different cell radius then the cell phase synchronization accuracy corresponding to the larger of the two cell sizes applies to the overlapping cells with different radii.

Table 7.4.2-1 Cell phase synchronization requirement for wide area BS (TDD)

Cell Type	Cell Radius	Requirement
Small cell	≤ 3 km	≤ 3 μs
Large cell	> 3 km	≤ 10 μs

For Home BS, the cell phase synchronization accuracy measured at BS antenna connectors shall be better than the requirement specified in table 7.4.2-2.

Table 7.4.2-2 Cell phase synchronization requirement for Home BS (TDD)

Source Cell Type	Propagation Distance	Requirement
Small cell	≤ 500 m	≤ 3 μs
Large cell	> 500 m	$\leq 1.33 + T_{propagation} \mu s$

NOTE 1:  $T_{propagation}$  is the propagation delay between the Home BS and the cell selected as the network listening synchronization source. In terms of the network listening synchronization source selection, the best accurate synchronization source to GNSS should be selected.

NOTE 2: If the Home BS obtains synchronization without using network listening, the small cell requirement applies.

## 7.5 Synchronization Requirements for E-UTRAN to 1xRTT and HRPD Handovers

#### 7.5.1 Introduction

This clause contains the synchronization requirements for eNodeB capable of supporting E-UTRAN to CDMA 1xRTT and HRPD handovers. To facilitate E-UTRAN to CDMA 1xRTT and HRPD handovers, the CDMA System Time reference needs to be provided to the UE in order for the UE to report the pilot PN phases of the target 1xRTT or HRPD cells. This is achieved through the SIB8 message broadcasted by the serving eNodeB:

If the eNodeB is synchronized to the GPS time and the LTE system frame is aligned with the start of CDMA System Time, then the size of CDMA System Time information is 39 bits and the unit is 10 ms based on a 1.2288 Mcps chip rate.

If the eNodeB is not synchronized to the GPS time or if the eNodeB is synchronized to the GPS time but its LTE system frame not aligned with the start of CDMA System time, then the size of CDMA System Time information is 49 bits and the unit is 8 CDMA chips based on 1.2288 Mcps chip rate.

The CDMA system time reference provided by the serving eNodeB has to be within a certain level of accuracy in order to facilitate accurate reporting of the pilot PN phases of the target 1xRTT or HRPD cells and enable reliable handover to the 1xRTT or HRPD networks.

## 7.5.2 eNodeB Synchronization Requirements

#### 7.5.2.1 Synchronized E-UTRAN

The eNodeB shall be synchronized to the GPS time. With external source of CDMA System Time disconnected, the eNodeB shall maintain the timing accuracy within  $\pm 10~\mu s$  of CDMA System Time for a period of not less than 8 hours.

The timing deviation between the SFN boundary at or immediately after the ending boundary of the SI-window in which *SystemInformationBlockType8* is transmitted and the broadcasted CDMA System Time shall be within 10 μs.

#### 7.5.2.2 Non-Synchronized E-UTRAN

The timing deviation between the SFN boundary at or immediately after the end of the boundary of the SI-window in which SystemInformationBlockType8 is transmitted and the broadcasted CDMA System Time shall be within 10  $\mu$ s. With external source of CDMA System Time disconnected the SFN boundary at or immediately after the broadcasted CDMA System Time in the SIB8 message shall maintain the timing accuracy within  $\pm 10~\mu s$  of CDMA System Time for a period of not less than 8 hours.

## 7.6 Radio Link Monitoring

#### 7.6.1 Introduction

The UE shall monitor the downlink link quality based on the cell-specific reference signal in order to detect the downlink radio link quality of the PCell and PSCell as specified in [3].

The UE shall estimate the downlink radio link quality and compare it to the thresholds  $Q_{out}$  and  $Q_{in}$  for the purpose of monitoring downlink radio link quality of the PCell and PSCell.

The threshold  $Q_{out}$  is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.6.1-1.

The threshold  $Q_{in}$  is defined as the level at which the downlink radio link quality can be significantly more reliably received than at  $Q_{out}$  and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.6.1-2.

When higher-layer signalling indicates certain subframes for restricted radio link monitoring, the radio link quality shall be monitored as specified in [3].

The requirements in sections 7.6.2.1, 7.6.2.2 and 7.6.2.3 shall also apply when a time domain measurement resource restriction pattern for performing radio link monitoring measurements is configured by higher layers (TS 36.331 [2]), with or without CRS assistance information, provided that also the following additional condition is fulfilled:

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the radio link monitoring measurements,

When the CRS assistance information is provided, the transmission bandwidth [30] in all intra-frequency cells in the CRS assistance information [2] is the same or larger than the transmission bandwidth of the PCell for which radio link monitoring is performed.

When the CRS assistance information is provided, the requirements in Section 7.6 shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the cell for which radio link monitoring is performed.

NOTE: If the UE is not provided with the CRS assistance information (TS 36.331 [2]) or the CRS assistance data is not valid throughout the entire evaluation period, then similar Release 8 and 9 requirements apply for time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes.

Table 7.6.1-1 PDCCH/PCFICH transmission parameters for out-of-sync

Attribute	Value
DCI format	1A
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz
	3; 3 MHz ≤ Bandwidth ≤ 10 MHz
	4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4; Bandwidth = 1.4 MHz
	8; Bandwidth ≥ 3 MHz
Ratio of PDCCH RE energy to	4 dB; when single antenna port is used for cell-
average RS RE energy	specific reference signal transmission by the
	PCell or PSCell.
	1 dB: when two or four antenna ports are used
	for cell-specific reference signal transmission by
	the PCell or PSCell.
Ratio of PCFICH RE energy to	4 dB; when single antenna port is used for cell-
average RS RE energy	specific reference signal transmission by the PCell or PSCell.
	1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by
	the PCell or PSCell.
NOTE 1: DCI format 1A is defined in clause 5.3.3.1.3 in TS 36.212 [21].	
	ansmission corresponding to the number of
control symbols shall be assumed.	
Control Symbols shall be a	accumou.

Table 7.6.1-2 PDCCH/PCFICH transmission parameters for in-sync

Attribute	Value
DCI format	1C
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz
	3; 3 MHz ≤ Bandwidth ≤ 10 MHz
	4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4
Ratio of PDCCH RE energy to average RS RE energy	0 dB; when single antenna port is used for cell- specific reference signal transmission by the PCell or PSCell.
	-3 dB; when two or four antenna ports are used for cell-specific reference signal transmission by the PCell or PSCell.
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell- specific reference signal transmission by the PCell or PSCell.
	1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell or PSCell.
NOTE 1: DCI format 1C is defined in clause 5.3.3.1.4 in TS 36.212 [21].	
	ansmission corresponding to the number of
control symbols shall be assumed.	

## 7.6.2 Requirements

#### 7.6.2.1 Minimum requirement when no DRX is used

When the downlink radio link quality of the PCell or PSCell estimated over the last 200 ms period becomes worse than the threshold  $Q_{out}$ , Layer 1 of the UE shall send an out-of-sync indication for the PCell or PSCell to the higher layers within 200 ms  $Q_{out}$  evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell or PSCell estimated over the last 100 ms period becomes better than the threshold  $Q_{in}$ , Layer 1 of the UE shall send an in-sync indication for the PCell or PSCell to the higher layers within 100 ms  $Q_{in}$  evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

When the UE creates autonomous gaps for identification the CGI of an E-UTRA intra-frequency cell or an E-UTRA inter-frequency cell and when higher-layer signalling indicates certain subframes for restricted radio link monitoring, the UE shall also perform radio link monitoring. In this case, the  $Q_{out}$  evaluation period ( $T_{Evaluate}Q_{out}$ ) is 200 ms, and the  $Q_{in}$  evaluation period ( $T_{Evaluate}Q_{in}$ ) is 100 ms  $^{NOTE\ 1}$ .

NOTE 1: This RLM requirement does not need to be tested.

The out-of-sync and in-sync evaluations of the PCell or PSCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer and the transmitter power of PSCell if configured shall be turned off within 40 ms after expiry of T313 timer as specified in clause 5.3.11 in TS 36.331 [2].

#### 7.6.2.2 Minimum requirement when DRX is used

When DRX is used the  $Q_{out}$  evaluation period ( $T_{Evaluate}Q_{out\_DRX}$ ) and the  $Q_{in}$  evaluation period ( $T_{Evaluate}Q_{in\_DRX}$ ) is specified in Table 7.6.2.2-1 will be used.

When higher-layer signalling indicates certain subframes for restricted radio link monitoring, the  $Q_{out}$  evaluation period ( $T_{Evaluate}Q_{out\_DRX}$ ) and the  $Q_{in}$  evaluation period ( $T_{Evaluate}Q_{in\_DRX}$ ) specified in Table 7.6.2.2-2 will be used.

When the UE creates autonomous gaps for identification the CGI of an E-UTRA intra-frequency cell or an E-UTRA inter-frequency cell and when higher-layer signalling indicates certain subframes for restricted radio link monitoring, the UE shall also perform radio link monitoring. In this case, the  $Q_{out}$  evaluation period ( $T_{Evaluate}Q_{out\_DRX}$ ) and the  $Q_{in}$  evaluation period ( $T_{Evaluate}Q_{in\_DRX}$ ) specified in Table 7.6.2.2-2 will be used

NOTE 1: This RLM requirement does not need to be tested.

When the downlink radio link quality of the PCell or PSCell estimated over the last  $T_{\text{Evaluate}} Q_{\text{out\_DRX}}$  [s] period becomes worse than the threshold  $Q_{\text{out}}$ , Layer 1 of the UE shall send out-of-sync indication for the PCell or PSCell to the higher layers within  $T_{\text{Evaluate}} Q_{\text{out\_DRX}}$  [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell or PSCell estimated over the last  $T_{Evaluate}$ \_ $Q_{in\_DRX}$  [s] period becomes better than the threshold  $Q_{in}$ , Layer 1 of the UE shall send in-sync indications for the PCell or PSCell to the higher layers within  $T_{Evaluate}$ \_ $Q_{in\_DRX}$  [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell or PSCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX\_cycle\_length).

Upon start of T310 timer or T313 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link of PCell or PSCell for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer or T313 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer and the transmitter power of PSCell if configured shall be turned off within 40 ms after expiry of T313 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.6.2.2-1: Qout and Qin Evaluation Period in DRX

DRX	cycle length (s)	T <sub>Evaluate</sub> _Q <sub>out_DRX</sub> _and	
		T <sub>Evaluate_</sub> Q <sub>in_DRX</sub> (s) (DRX cycles)	
	≤ 0.01	Non-DRX requirements in	
		clause 7.6.2.1 are applicable.	
0.01 <	DRX cycle ≤0.04	NOTE 1 (20)	
0.04 <	DRX cycle ≤ 0. 64	NOTE 1 (10)	
0.64 < DRX cycle ≤ 2.56 NOTE 1 (5)		NOTE 1 (5)	
NOTE 1: Evaluation period length in time depends on the length of			
	the DRX cycle in use		
NOTE 2:	NOTE 2: MCG's DRX configuration is applied for PCell RLM		
	evaluation and SCG's DRX configuration is applied for		
PSCell RLM evaluation			

Table 7.6.2.2-2: Q<sub>out</sub> and Q<sub>in</sub> Evaluation Period in DRX when higher-layer signalling restricted measurement resource

DRX cycle length (s)	T <sub>Evaluate</sub> _Q <sub>out_DRX</sub> and
	T <sub>Evaluate</sub> _Q <sub>in_DRX</sub> (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in
	clause 7.6.2.1 are applicable.
0.01 < DRX cycle ≤0.04	NOTE 1 (40)
0.04 < DRX cycle ≤ 0. 16	NOTE 1 (20)
0. 16 < DRX cycle ≤ 0.64	NOTE 1 (10)
0.64 < DRX cycle ≤ 2.56	NOTE 1 (5)
NOTE 1: Evaluation period length in time depends on the length of	
the DRX cycle in use	
NOTE 2: MCG's DRX configuration is applied for PCell RLM	
evaluation and SCG's DRX configuration is applied for	
PSCell RLM evaluation	

#### 7.6.2.3 Minimum requirement at transitions

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, MCG\_DRX\_cycle\_length). The out-of-sync and in-sync evaluations of the PSCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, SCG\_DRX\_cycle\_length).

When the UE transitions between DRX and non-DRX or when DRX cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the PCell and PSCell.

#### 7.6.2.4 Minimum requirement during SI Acquisition with autonomous gaps

For E-UTRAN FDD-UTRAN FDD measurements with autonomous gaps, for identification of the CGI of a UTRA FDD cell (clause 8.1.2.4.17), the UE shall also perform radio link monitoring. In this case the out-of sync and in-sync evaluation periods can be longer than those defined in sections 7.6.2.1-7.6.2.3.

For E-UTRAN TDD-UTRAN FDD measurements with autonomous gaps, for identification of the CGI of a UTRA FDD cell (clause 8.1.2.4.18), the UE shall also perform radio link monitoring. In this case the out-of sync and in-sync evaluation periods can be longer than those defined in sections 7.6.2.1-7.6.2.3.

#### 7.6.2.5 Minimum requirement under IDC Interference

When the UE is provided with IDC solution, the UE shall also perform radio link monitoring and meet the corresponding requirements in clause 7.6.2.

# 7.7 SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation

#### 7.7.1 Introduction

This section defines requirements for the delay within which the UE shall be able to activate a deactivated SCell and deactive an activated SCell in E-UTRA carrier aggregation. The requirements are applicable to an E-UTRA carrier aggregation capable UE which has been configured with one or two downlink SCells. The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

If multiple downlink SCells are activated or deactivated in the same MAC control element as defined in [17], the requirements shall apply to each of the SCells in the MAC control element.

## 7.7.2 SCell Activation Delay Requirement for Deactivated SCell

The requirements in this section shall apply for the UE configured with one downlink SCell.

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in subframe n, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command as specified in [17] for the SCell being activated no later than in subframe n+24 provided the following conditions are met for the SCell:

- During the period equal to max(5 measCycleSCell, 5 DRX cycles) before the reception of the SCell activation command:
  - the UE has sent a valid measurement report for the SCell being activated and
  - the SCell being activated remains detectable according to the cell identification conditions specified in section 8.3.3.2,
- SCell being activated also remains detectable during the SCell activation delay according to the cell identification conditions specified in section 8.3.3.2.

Otherwise upon receiving the SCell activation command in subframe n, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command as specified in [17] for the SCell being activated no later than in subframe n+34 provided the SCell can be successfully detected on the first attempt.

If there is no reference signal received for the CSI measurement over the delay corresponding to the minimum requirements specified above, then the UE shall report corresponding valid CSI for the activated SCell on the next available uplink reporting resource after receiving the reference signal.

If there are no uplink resources for reporting the valid CSI in subframe n+24 or n+34 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

The valid CSI is based on the UE measurement and corresponds to any CQI value specified in [3] with the exception of CQI index = 0 (out of range) provided:

- the conditions in section 7.7 are met over the entire SCell activation delay and
- the conditions for CQI reporting defined in Section 7.2.3 of [3] are met.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in [17] for an SCell at the first opportunities for the corresponding actions once the SCell is activated.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe n+9 when PCell belongs to E-UTRA FDD.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe n+11 when PCell belongs to E-UTRA TDD.

Starting from the subframe specified in section 4.3 of [3] and until the UE has completed the SCell activation, the UE shall report CQI index = 0 (out of range) if the UE has available uplink resources to report CQI for the SCell.

### 7.7.3 SCell Deactivation Delay Requirement for Activated SCell

The requirements in this section shall apply for the UE configured with one downlink SCell.

Upon receiving SCell deactivation command or upon expiry of the *sCellDeactivationTimer* in subframe n, the UE shall accomplish the deactivation actions specified in [17] for the SCell being deactivated no later than in subframe n+8.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe n+9 when PCell belongs to E-UTRA FDD.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe n+11 when PCell belongs to E-UTRA TDD.

## 7.7.4 SCell Activation Delay Requirement for Deactivated SCell with Multiple Downlink SCells

The requirements in this section shall apply for the UE configured with two downlink SCells.

While activating a SCell if the UE does not receive any command to activate, deactivate, configure or deconfigure the other SCell during the SCell activation delay then the UE shall meet the SCell activation delay requirements specified in section 7.7.2.

While activating a SCell if the other SCell is activated, deactivated, configured or deconfigured by the UE then the UE shall meet the SCell activation delay requirements ( $T_{activate\_total}$ ) according to the following expression:

$$T_{activate total} = T_{activate basic} + K*5$$

Where:

T<sub>activate total</sub> is the total time to activate a SCell and is expressed in subframes.

T<sub>activate\_basic</sub> is the SCell activation delay specified in section 7.7.2;

K ( $1 \le K \le [3]$ ) is the number of times the other SCell is activated, deactivated, configured or deconfigured while the SCell is being activated;

While activating a SCell:

- The interruption on the PCell and/or on the activated SCell due to the SCell activation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+11 if:
  - the PCell and/or the activated SCell being interrupted and the SCell being activated belong to E-UTRA TDD, or
  - the activated SCell being interrupted and the SCell being activated belong to E-UTRA FDD and the PCell belongs to E-UTRA TDD.
- Otherwise, the interruption on PCell and/or on the activated SCell due to the SCell activation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+9.

Starting from the subframe specified in section 4.3 of [3] and until the UE has completed the SCell activation, the UE shall report CQI index = 0 (out of range) if the UE has available uplink resources to report CQI for an SCell.

## 7.7.5 SCell Deactivation Delay Requirement for Activated SCell with Multiple Downlink SCells

The requirements in this section shall apply for the UE configured with two downlink SCells.

The UE shall deactivate a SCell and meet the SCell deactivation delay requirements specified in section 7.7.3 regardless of whether the other SCell is activated, deactivated, configured or deconfigured or not by the UE during the SCell deactivation delay.

While deactivating a SCell:

- The interruption on the PCell and/or on the activated SCell due to the SCell deactivation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+11 if:
  - the PCell and/or the activated SCell being interrupted and the SCell being deactivated belong to E-UTRA TDD or
  - the activated SCell being interrupted and the SCell being deactivated belong to E-UTRA FDD and the PCell belongs to E-UTRA TDD.
- Otherwise, the interruption on PCell and/or the activated SCell due to the SCell deactivation specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe n+9.

## 7.8 Interruptions with Carrier Aggregation

#### 7.8.1 Introduction

This section contains the requirements related to the interruptions on PCell and activated SCell if configured, when one or two SCells are configured, deconfigured, activated or deactivated. The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

NOTE: interruptions at SCell addition/release, activation/deactivation and during measurements on SCC may not be required by all UEs.

Editor's Note: The interruptions shall not interrupt RRC signalling or ACK/NACKs related to RRC reconfiguration procedure [2] for SCell addition/release or MAC control signalling [17] for SCell activation/deactivation command. How to specify this is FFS.

#### 7.8.2 Requirements

#### 7.8.2.1 Interruptions at SCell addition/release for intra-band CA

When an intra-band SCell is added or released as defined in [2] the UE is allowed an interruption of up to 5 subframes on PCell during the RRC reconfiguration procedure [2]. This interruption is for both uplink and downlink of PCell.

#### 7.8.2.2 Interruptions at SCell addition/release for inter-band CA

When an inter-band SCell is added or released as defined in [2] the UE that requires interruption is allowed an interruption of up to 1 subframe on PCell during the RRC reconfiguration procedure [2]. This interruption is for both uplink and downlink of PCell.

#### 7.8.2.3 Interruptions at SCell activation/deactivation for intra-band CA

When an intra-band SCell is activated or deactivated as defined in [2] the UE is allowed an interruption of up to 5 subframes on PCell during the activation/deactivation delay defined in Section 7.7. This interruption is for both uplink and downlink of PCell.

#### 7.8.2.4 Interruptions at SCell activation/deactivation for inter-band CA

When an inter-band SCell is activated or deactivated as defined in [2] the UE that requires interruption is allowed an interruption of up to 1 subframe on PCell during the activation/deactivation delay defined in Section 7.7. This interruption is for both uplink and downlink of PCell.

#### 7.8.2.5 Interruptions during measurements on SCC for intra-band CA

PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer.

If indicated by the network using IE *allowInterruptions* [2], PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2].

Each interruption shall not exceed 5 subframes.

#### 7.8.2.6 Interruptions during measurements on SCC for inter-band CA

PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer.

If indicated by the network using IE *allowInterruptions* [2], PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2].

Each interruption shall not exceed 1 subframe.

#### 7.8.2.7 Interruptions at SCell addition/release with multiple downlink SCells

When one SCell is added or released as defined in [2], the UE is allowed during the RRC reconfiguration procedure

- an interruption on PCell
  - o of up to 1 subframes, if the PCell is not in the same band as the SCell, or
  - o of up to 5 subframes, if the PCell is in the same band as the SCell;
- an interruption on another activated SCell if configured,
  - o of up to 1 subframes, if the activated SCell is not in the same band as the SCell, or
  - o of up to 5 subframes, if the activated SCell is in the same band as the SCell;

When two SCells are added or released in the same *RRCConnectionReconfiguration* message as defined in [2], the UE is allowed during the RRC reconfiguration procedure

- an interruption on PCell of up to 5 subframes if PCell is in the same band as any of the two SCells being added or released.
- an interruption on PCell of up to 1 subframes if PCell is not in the same band as any of the two SCells being added or released.

#### 7.8.2.8 Interruptions at SCell activation/deactivation with multiple downlink SCells

When an SCell is activated or deactivated as defined in [17], the UE is allowed during the activation/deactivation procedure [2]

- an interruption on PCell
  - o of up to 1 subframes, if the PCell is not in the same band as the SCell, or
  - o of up to 5 subframes, if the PCell is in the same band as the SCell;
- an interruption on another activated SCell if configured,
  - o of up to 1 subframes, if the activated SCell is not in the same band as the SCell, or
  - o of up to 5 subframes, if the activated SCell is in the same band as the SCell;

When two SCells are activated or deactivated in the same MAC control element as defined in [17], the UE is allowed during the activation/deactivation procedure

• an interruption on PCell of up to 5 subframes if PCell is in the same band as any of the two SCells being activated/deactivated.

• an interruption on PCell of up to 1 subframes if PCell is not in the same band as any of the two SCells being activated/deactivated.

#### 7.8.2.9 Interruptions during measurements on SCC with multiple downlink SCells

If one SCell is activated and the other SCell is deactivated, the UE is allowed due to measurements on the SCC with deactivated SCell:

- an interruption on PCell with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] for the deactivated SCell is 640 ms or longer.
- an interruption on PCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated SCell if indicated by the network using IE *allowInterruptions* [2],

Each interruption shall not exceed:

- 1 subframes if the PCell is not in the same band as the deactivated SCell
- 5 subframes if the PCell is in the same band as the deactivated SCell
- an interruption on the activated SCell with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] for the deactivated SCell is 640 ms or longer .
- an interruption on the activated SCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated SCell if indicated by the network using IE *allowInterruptions* [2].

Each interruption shall not exceed:

- 1 subframes if the activated SCell is not in the same band as the deactivated SCell
- 5 subframes if the activated SCell is in the same band as the deactivated SCell

If both SCells are deactivated, the UE is allowed due to measurements on the SCCs with deactivated SCells:

- an interruption on PCell with up to 0.5% probability of missed ACK/NACK when any of the configured *measCycleSCell* [2] for the two deactivated SCells is 640 ms or longer.
- an interruption on PCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the two deactivated SCells if indicated by the network using IE *allowInterruptions* [2].

Each interruption shall not exceed:

- 1 subframes if the PCell is not in the same band as any of the deactivated SCells
- 5 subframes if the PCell is in the same band as any of the deactivated SCells

## 7.8.2.10 Interruptions at overlapping addition/release/activation/deactivation of SCells

If a UE is commanded by the network to sequentially add/release/activate/deactivate SCells, and a new procedure of addition/release/activation/deactivation of SCell(s) takes place before the completion of previous procedure of addition/release/activation/deactivation of SCell(s), the interruptions on PCell due to sequential addition/release/activation/deactivation of SCells shall not exceed the sum of the allowed interruptions on the PCell caused by each of the addition/release/activation/deactivation procedures, and the interruptions on already activated SCell due to sequential addition/release/activation/deactivation of SCells shall not exceed the sum of the allowed interruptions on the SCell caused by each of the addition/release/activation/deactivation procedures, as defined in above sections.

# 7.9 Maximum Transmission Timing Difference in Carrier Aggregation

#### 7.9.1 Introduction

A UE shall be capable of handling a relative received time difference between the PCell and SCell to be aggregated in inter-band CA and intra-band non-contiguous CA.

## 7.9.2 Minimum Requirements for Interband Carrier Aggregation

The UE shall be capable of handling at least a relative received time difference between the signals received from the PCell and the SCell at the UE receiver of up to 30.26 µs when one SCell is configured.

When two SCells are configured, the UE shall be capable of handling at least a relative propagation delay difference between the signals received from the PCell and any of the SCells at the UE receiver of up to  $30.26 \mu s$ .

The UE shall be capable of handling a maximum uplink transmission timing difference between the pTAG and the sTAG of at least 32.47µs provided that the UE is:

- configured with inter-band CA and
- configured with the pTAG and the sTAG,

A UE configured with pTAG and sTAG may stop transmitting on the SCell if after timing adjusting due to received TA command the uplink transmission timing difference between PCell and SCell exceeds the maximum value the UE can handle as specified above.

## 7.9.3 Minimum Requirements for Intraband non-contiguous Carrier Aggregation

The UE shall be capable of handling at least a relative received time difference between the signals received from the PCell and the SCell at the UE receiver of up to  $30.26 \,\mu s$ .

The UE shall be capable of handling a maximum uplink transmission timing difference between the pTAG and the sTAG of at least 32.47µs provided that the UE is:

- configured with intra-band non-contiguous CA and
- configured with the pTAG and the sTAG,

A UE configured with pTAG and sTAG may stop transmitting on the SCell if after timing adjusting due to received TA command the uplink transmission timing difference between PCell and SCell exceeds the maximum value the UE can handle as specified above.

# 7.10 Interruptions with RSTD Measurements with Carrier Aggregation

#### 7.10.1 Introduction

This section contains the requirements related to the interruptions on PCell and activated SCell if configured, when performing RSTD measurements on cells belonging to at least one SCC with deactivated SCell.

NOTE: Interruptions during RSTD measurements on PCell and activated SCell if configured may not be required by all UEs.

## 7.10.2 Requirements

When common DRX is used, no interruption is allowed for all carrier aggregation configurations while the On Duration timer is running.

The interruption requirement considers only missed ACK/NACK due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

## 7.10.2.1 Interruptions during RSTD measurements on SCC for intra-band CA with one downlink SCell

PCell interruptions due to RSTD measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the the PRS periodicity  $T_{\rm PRS}$  is 640 ms or longer. Each interruption shall not exceed 5 subframes.

## 7.10.2.2 Interruptions during RSTD measurements on SCC for inter-band CA with one downlink SCell

PCell interruptions due to RSTD measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the PRS periodicity  $T_{\rm PRS}$  is 640 ms or longer. Each interruption shall not exceed 1 subframe.

## 7.10.2.3 Interruptions during RSTD measurements on SCC with multiple downlink SCells

If one SCell is activated and the other SCell is deactivated, then due to RSTD measurements on the SCC with deactivated SCell the UE is allowed:

- ullet an interruption on PCell with up to 0.5% probability of missed ACK/NACK when when the PRS periodicity  $T_{\rm PRS}$  is 640 ms or longer. Each interruption shall not exceed:
  - o 1 subframe if the PCell is not in the same band as the deactivated SCell
  - o 5 subframes if the PCell is in the same band as the deactivated SCell
- an interruption on the activated SCell with up to 0.5% probability of missed ACK/NACK when the PRS periodicity  $T_{\rm PRS}$  is 640 ms or longer. Each interruption shall not exceed:
  - o 1 subframe if the activated SCell is not in the same band as the deactivated SCell
  - o 5 subframes if the activated SCell is in the same band as the deactivated SCell

If both SCells are deactivated, then due to RSTD measurements on one or both SCCs with deactivated SCells the UE is allowed:

- an interruption on PCell with up to 1.0% probability of missed ACK/NACK when the configure PRS periodicity  $T_{\rm PRS}$  is 640 ms or longer in any of the SCCs. Each interruption shall not exceed:
  - o 1 subframe if the PCell is not in the same band as any of the deactivated SCells
  - o 5 subframes if the PCell is in the same band as any of the deactivated SCells

#### 7.10.2.4 Interruptions at overlapping RSTD and inter-frequency measurements

If the UE is configured for RSTD measurements on cells belonging to a SCC with deactivated SCell(s) and also with a *measCycleSCell* for performing E-UTRA carrier aggregation measurements as defined in Section 8.3 on the same SCC as configured for the RSTD measurements, then the total allowed interruption on the active serving cell(s) is the

maximum of the interruption due to E-UTRA carrier aggregation measurements specified in Section 7. 8 and the interruption due to the RSTD measurements on SCC specified in this Section.

## 7.11 Radio Link Monitoring for UE Category 0

#### 7.11.1 Introduction

The UE category 0 applicability of the requirements for performing radio link monitoring in subclause 7.11 is defined in Section 3.6.1.

The UE shall monitor the downlink link quality based on the cell-specific reference signal in order to detect the downlink radio link quality of the PCell as specified in [3].

The UE shall estimate the downlink radio link quality and compare it to the thresholds  $Q_{out\_Cat0}$  and  $Q_{in\_Cat0}$  for the purpose of monitoring downlink radio link quality of the PCell.

The threshold  $Q_{out\_Cat0}$  is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.11.1-1.

The threshold  $Q_{in\_Cat0}$  is defined as the level at which the downlink radio link quality can be significantly more reliably received than at  $Q_{out\_Cat0}$  and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.11.1-2.

Table 7.11.1-1 PDCCH/PCFICH transmission parameters for out-of-sync for UE category 0

Attribute	Value
DCI format	1A
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz
	3; 3 MHz ≤ Bandwidth < 10 MHz
	4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4; Bandwidth = 1.4 MHz
	8; Bandwidth ≥ 3 MHz
Ratio of PDCCH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell. 4 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell.  1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.
NOTE 1: DCI format 1A is defined in clause 5.3.3.1.3 in TS 36.212 [21].  NOTE 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.	

Table 7.11.1-2 PDCCH/PCFICH transmission parameters for in-sync for UE category 0

Attribute	Value		
DCI format	1C		
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz		
	3; 3 MHz ≤ Bandwidth < 10 MHz		
	4; Bandwidth = 1.4 MHz		
Aggregation level (CCE)	4		
Ratio of PDCCH RE energy to average RS RE energy	dB; when single antenna port is used for cell-specific reference signal transmission by the PCell.     dB; when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.		
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell.  1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.		
NOTE 1: DCI format 1C is defined in clause 5.3.3.1.4 in TS 36.212 [21].  NOTE 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.			

#### 7.11.2 Requirements for FD-FDD and TDD

#### 7.11.2.1 Minimum requirement when no DRX is used

When the downlink radio link quality of the PCell estimated over the last 200 ms period becomes worse than the threshold  $Q_{out\_Cat0}$ , Layer 1 of the UE shall send an out-of-sync indication for the PCell to the higher layers within 200ms  $Q_{out\_Cat0}$  evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last 100 ms period becomes better than the threshold  $Q_{in\_Cat0}$ , Layer 1 of the UE shall send an in-sync indication for the PCell to the higher layers within 100 ms  $Q_{in\_Cat0}$  evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10ms.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

#### 7.11.2.2 Minimum requirement when DRX is used

When DRX is used for FD-FDD and TDD category 0 UEs, the  $Q_{out\_Cat0}$  evaluation period ( $T_{Evaluate}\_Q_{out\_DRX\_Cat0}$ ) and the  $Q_{in\_Cat0}$  evaluation period ( $T_{Evaluate}\_Q_{in\_DRX\_Cat0}$ ) is specified in Table 7.11.2.2-1 will be used.

When the downlink radio link quality of the PCell estimated over the last  $T_{Evaluate}$ \_ $Q_{out\_DRX\_Cat0}$  [s] period becomes worse than the threshold  $Q_{out\_Cat0}$ , Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within  $T_{Evaluate}$ \_ $Q_{out\_DRX\_Cat0}$  [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last  $T_{Evaluate}$ \_ $Q_{in\_DRX\_Cat0}$  [s] period becomes better than the threshold  $Q_{in\_Cat0}$ , Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within  $T_{Evaluate}$ \_ $Q_{in\_DRX\_Cat0}$  [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX\_cycle\_length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.11.2.2-1: Qout and Qin Evaluation Period in DRX for FD-FDD and TDD UE category 0

DRX cycle length (s)	T <sub>Evaluate</sub> Q <sub>out_DRX_Cat0</sub> and T <sub>Evaluate</sub> Q <sub>in_DRX_Cat0</sub> (s) (DRX cycles)		
≤ 0.01	Non-DRX requirements in clause 7.11.2.1 are applicable.		
0.01 < DRX cycle ≤0.04	NOTE (20)		
0.04 < DRX cycle ≤ 0. 64	NOTE (10)		
0.64 < DRX cycle ≤ 2.56	NOTE (5)		
NOTE: Evaluation period length in time depends on the length of the DRX cycle in use			

#### 7.11.2.3 Minimum requirement at transitions

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX\_cycle\_length).

When the UE transitions between DRX and non-DRX or when DRX cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the PCell.

## 7.11.3 Requirements for HD-FDD

#### 7.11.3.1 Minimum requirement when no DRX is used

The HD-FDD category 0 UE shall meet all applicable requirements specified in clause 7.11.2.1 under the following conditions

- at least 1 DL subframe per radio frame of PCell is available at the UE during  $Q_{in\_Cat0}$  and  $Q_{out\_Cat0}$  evaluation periods.

#### 7.11.3.2 Minimum requirement when DRX is used

When DRX is used for HD-FDD category 0 UEs, the  $Q_{out}$  evaluation period ( $T_{Evaluate} = Q_{out} = Q_$ 

When the downlink radio link quality of the PCell estimated over the last  $T_{Evaluate} = Q_{out\_DRX\_Cat0}$  [s] period becomes worse than the threshold  $Q_{out\_Cat0}$ , Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within  $T_{Evaluate} = Q_{out\_DRX\_Cat0}$  [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last  $T_{Evaluate}$ \_Q<sub>in\_DRX\_Cat0</sub> [s] period becomes better than the threshold Q<sub>in\_Cat0</sub>, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within  $T_{Evaluate}$ \_Q<sub>in\_DRX\_Cat0</sub> [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX\_cycle\_length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.11.3.2-1: Qout and Qin Evaluation Period in DRX for HD-FDD UE category 0

DRX cycle length (s)	T <sub>Evaluate</sub> _Q <sub>out_DRX</sub> and T <sub>Evaluate</sub> _Q <sub>in_DRX</sub> (s) (DRX cycles)		
≤ 0.01	Non-DRX requirements in		
	clause 7.11.2.1 are applicable.		
0.01 < DRX cycle ≤0.04	NOTE (40)		
0.04 < DRX cycle ≤ 0. 16	NOTE (20)		
0. 16 < DRX cycle ≤ 0.64	NOTE (10)		
0.64 < DRX cycle ≤ 2.56	NOTE (5)		
NOTE: Evaluation period length in time depends on the length of			
the DRX cycle in use			

#### 7.11.3.3 Minimum requirement at transitions

The minimum requirements at transitions defined in clause 7.11.2.3 also apply for this section under the following conditions:

at least 1 DL subframe per radio frame of PCell is available at the UE during  $Q_{in\_Cat0}$  and  $Q_{out\_Cat0}$  evaluation periods.

## 7.12 Interruptions with Dual Connectivity

#### 7.12.1 Introduction

This section contains the requirements related to the interruptions on PCell and PSCell, when

PSCell is added and released, or

transitions between active and non-active during DRX, or

transitions from non-DRX to DRX.

The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

#### 7.12.2 Requirements

### 7.12.2.1 Interruptions at PSCell addition/release

When a PSCell is added or released as defined in [2] the UE is allowed an interruption of up to 1 subframe on PCell during the RRC reconfiguration procedure [2] in synchronous dual connectivity. This interruption is for both uplink and downlink of PCell.

The UE is allowed an interruption of up to 2 subframes on PCell during the RRC reconfiguration procedure [2] in asynchronous dual connectivity. This interruption is for both uplink and downlink of PCell.

#### 7.12.2.2 Interruptions at transitions between active and non-active during DRX

When PCell is in non-DRX and PSCell is in DRX, PCell interruptions due to transitions from active to non-active and from non-active to active during PSCell DRX are allowed with up to 1% probability of missed ACK/NACK when the configured PSCell DRX cycle is less than 640 ms, and 0.625% probability of missed ACK/NACK is allowed when the configured PSCell DRX cycle is 640 ms or longer. Each interruption shall not exceed 1 subframe.

When PSCell is in non-DRX and PCell is in DRX, PSCell interruptions due to transitions from active to non-active and from non-active to active during PCell DRX are allowed with up to 1 % probability of missed ACK/NACK when the configured PCell DRX cycle is less than 640 ms, and 0.625% probability of missed ACK/NACK is allowed when the configured PCell DRX cycle is 640 ms or longer. Each interruption shall not exceed 1 subframe.

When both PCell and PSCell are in DRX, no interruption is allowed.

#### 7.12.2.3 Interruptions at transitions from non-DRX to DRX

PCell interruption due to PSCell transitions from non-DRX to DRX when PCell is in non-DRX shall not exceed 1subframe.

PSCell interruption due to PCell transitions from non-DRX to DRX when PSCell is in non-DRX shall not exceed 1subframe.

# 7.13 Cell phase synchronization accuracy (Synchronized mode of dual connectivity)

#### 7.13.1 Definition

Cell phase synchronization accuracy is defined as the maximum absolute timing mismatch between subframes which are transmitted by MeNB and SeNB and are scheduled for the same UE. The cell phase synchronization accuracy is defined only for synchronized mode of dual connectivity operation.

## 7.13.2 Minimum requirements

The cell phase synchronization accuracy shall not exceed the sum of absolute timing accuracy values declared by the manufacturer(s) for each BS. The cell phase synchronization accuracy requirement is optional.

NOTE: The sum of absolute timing accuracy values in synchronized mode of dual connectivity is assumed to be related to MRTD according to the following inequality:

 $T_{CPSA} + T_{RPTD} \le MRTD$  at the UE

Where:

T<sub>CPSA</sub> is the sum of absolute timing accuracy values declared by the manufacturer(s).

T<sub>RPTD</sub> is the absolute propagation time difference between MeNB and SeNB, which serve the same UE.

MRTD is the Maximum Received Timing Difference at the UE. MRTD is equal to 33 µs.

## 7.14 PSCell Addition and Release Delay for E-UTRA Dual Connectivity

#### 7.14.1 Introduction

This section defines requirements for the delay within which the UE shall be able to configure a PSCell in E-UTRA dual connectivity. The requirements are applicable to an E-UTRA dual connectivity capable UE. The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

## 7.14.2 PSCell Addition Delay Requirement

The requirements in this section shall apply for the UE configured with only PCell.

Upon receiving PSCell addition in subframe n, the UE shall be capable to transmit PRACH preamble towards PSCell no later than in subframe n+  $T_{config}$  PSCell:

Where:

$$T_{config\_PSCell} = 20ms + T_{activation\_time} + 50ms + T_{PCell\_DU} + T_{PSCell\_DU}$$

 $T_{activation\_time}$  is the PSCell activation delay. If the PSCell is known, then  $T_{activation\_time}$  is 20ms. If the PSCell is unknown, then  $T_{activation\_time}$  is 30ms provided the PSCell can be successfully detected on the first attempt.

 $T_{PCell\_DU}$  is the delay uncertainty due to PCell PRACH preamble transmission.  $T_{PCell\_DU}$  is up to 20ms if PSCell activation is interrupted by a PCell PRACH preamble transmission, otherwise it is 0.

 $T_{PSCell\_DU}$  is the delay uncertainty in acquiring the first available PRACH occasion in the PSCell.  $T_{PSCell\_DU}$  is up to 30ms.

PSCell is known if it has been meeting the following conditions:

During the last [5] seconds before the reception of the PSCell configuration command:

- the UE has sent a valid measurement report for the PSCell being configured and
- the PSCell being configured remains detectable according to the cell identification conditions specified in section 8.8,
- PSCell being configured also remains detectable during the PSCell configuration delay according to the cell identification conditions specified in section 8.8.

otherwise it is unknown. The PCell interruption specified in section 7.12 is allowed only during the RRC reconfiguration procedure [2].

## 7.14.3 PSCell Release Delay Requirement

The requirements in this section shall apply for a UE configured with PCell and one PSCell.

Upon receiving PSCell release in subframe n, the UE shall accomplish the release actions specified in [2] no later than in subframe n+20.

The PCell interruption specified in section 7.12 is allowed only during the RRC reconfiguration procedure [2].

## 7.15 Maximum Receive Timing Difference in Dual Connectivity

#### 7.15.1 Introduction

A UE shall be capable of handling a relative receive timing difference between subframe timing boundaries of the PCell and PSCell to be aggregated in dual connectivity.

### 7.15.2 Minimum Requirements for Inter-band Dual Connectivity

The UE shall be capable of handling at least a relative receive timing difference between the subframe timing of the signals received from the PCell and the PSCell at the UE receiver of up to 33  $\mu$ s provided the UE indicates that it is capable of synchronous dual connectivity [2]. The requirements for synchronous dual connectivity are only applicable for TDD-TDD and FDD-FDD inter-band dual connectivity.

The UE shall be capable of handling at least a relative receive timing difference between the subframe timing of the signals received from the PCell and the PSCell at the UE receiver of up of 500 µs provided the UE indicates that it is capable of asynchronous dual connectivity [2]. The requirements for asynchronous dual connectivity are only applicable for FDD-FDD inter-band dual connectivity.

## 7.16 Proximity-based Services

#### 7.16.1 Introduction

The requirements in this clause are applicable for UE performing transmissions and/or reception for ProSe Direct Discovery and/or ProSe Direct Communication in both RRC\_IDLE and RRC\_CONNECTED state. The ProSe requirements shall apply provided that the sidelink used by the UE for ProSe direct communication and/or ProSe direct discovery is on the carrier of the serving cell (RRC\_IDLE) or PCell (RRC\_CONNECTED).

### 7.16.2 Requirements

#### 7.16.2.1 ProSe UE transmission timing

The requirements in this clause are applicable when the ProSe transmission timing is derived using the serving cell (RRC\_IDLE) or PCell (RRC\_CONNECTED) as reference. For ProSe transmission of sidelink channels and signals, UE shall have the capability to follow the timing change of the reference synchronization source.

#### 7.16.2.1.1 Serving cell or PCell as timing reference

The requirements in this subclause are applicable when the reference timing used for ProSe transmissions is the serving cell (RRC\_IDLE) or PCell (RRC\_CONNECTED). The sidelink transmissions takes place  $(N_{TA,SL} + N_{TA \text{ offset}}) \cdot T_s$  before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell, where  $N_{TA \text{ offset}}$  is specified in Section 8.1 of [16]. The value of  $N_{TA,SL}$  differs between sidelink channels and signals, and is either  $N_{TA,SL} = N_{TA}$  or  $N_{TA,SL} = 0$  as specified in Section 9.9 of [16].

#### 7.16.2.1.1.1 Requirements when $N_{TA.SL} = 0$

For ProSe transmission of sidelink channels and signals employing  $N_{\rm TA,SL}=0$ , the requirements in Section 7.1 as specified for PRACH transmissions shall apply.

#### 7.16.2.1.1.2 Requirements when $N_{TA.SL} = N_{TA}$

For ProSe transmission of sidelink channels and signals while employing  $N_{\rm TA,SL} = N_{\rm TA}$ , the requirements in Section 7.1 as specified for PUSCH shall apply.

When it is the first sidelink transmission in a DRX cycle, the requirements in Section 7.1 as specified for the first PUSCH transmission in a DRX cycle shall apply. The reference point for the UE initial transmit timing control requirement shall be  $(N_{\text{TA},\text{SL\_ref}} + N_{\text{TA offset}}) \cdot T_s$  seconds before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell.  $(N_{\text{TA},\text{SL\_ref}} + N_{\text{TA offset}})$  (in  $T_s$  units) for sidelink transmissions is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in Section 7.3 was applied.

When it is not the first sidelink transmission in a DRX cycle or there is no DRX cycle, the requirements as specified in Section 7.1 for PUSCH transmissions when the PUSCH transmission is not the first transmissions in a DRX cycle shall apply.

## 7.16.3 Interruptions with ProSe

This section contains the requirements related to the interruptions on PCell due ProSe Direct Discovery and ProSe Direct Communication. The requirements in this subclause are applicable only to ProSe on E-UTRA FDD bands.

When a UE capable of ProSe Direct Communication and/or ProSe Direct Discovery is configured with DRX and DRX is in use, interruptions specified in this section are not allowed while the *onDurationTimer*[17] is running.

#### 7.16.3.1 Interruptions at ProSe Direct Discovery configuration

A UE capable of ProSe Direct Discovery may indicate its interest (initiation or termination) in ProSe Direct Discovery to the connected eNodeB using IE *SidelinkUEInformation* [2].

The UE is allowed an interruption of up to 1 subframe on PCell during the RRC reconfiguration procedure that includes the ProSe Direct Discovery configuration message *sl-DiscConfig* [2] (setup and release). This interruption is for both uplink and downlink of PCell.

#### 7.16.3.2 Interruptions at ProSe Direct Communication configuration

A UE capable of ProSe Direct Communication may indicate its interest (initiation or termination) in ProSe Direct Communication to the connected eNodeB using IE *SidelinkUEInformation* [2].

The UE is allowed an interruption of up to 1 subframe on PCell during the RRC reconfiguration procedure that includes the ProSe Direct Communication configuration message *sl-CommConfig* [2] (setup and release). This interruption is for both uplink and downlink of PCell.

#### 7.16.3.3 Interruptions during ProSe Direct Discovery

The UE is allowed an interruption of up to 1 subframe that is *N* subframes before and after a UL subframe configured for ProSe Direct Discovery by the eNodeB.

The value of N is ceil(w1/1ms) subframes when the parameter discSyncWindow[2] is configured with value w1 in the sidelink synchronization resource configuration associated with the ProSe Direct Discovery subframe.

The value of *N* is 1 subframe otherwise.

The interruptions are for both uplink and downlink of PCell. The interruption for the ProSe UE may occur:

- while switching a receiver chain ON/OFF for ProSe Direct Discovery if the UE has a dedicated receiver chain for discovery.

# 7.17 Maximum Transmission Timing Difference in Dual Connectivity

#### 7.17.1 Introduction

A UE shall be capable of handling a relative transmission timing difference between subframe timing boundaries of the PCell and PSCell to be aggregated for E-UTRA FDD-FDD and E-UTRA TDD-TDD dual connectivity.

## 7.17.2 Minimum Requirements for maximum transmission timing difference Inter-band Dual Connectivity

The UE shall be capable of handling a maximum uplink transmission timing difference between PCell and PSCell of at least  $35.21~\mu s$  provided the UE indicates that it is capable of synchronous dual connectivity [2]. The requirements for synchronous dual connectivity are only applicable for TDD-TDD and FDD-FDD inter-band dual connectivity.

The UE shall be capable of handling a maximum uplink transmission timing difference between PCell and PSCell of at least 500 µs provided the UE indicates that it is capable of asynchronous dual connectivity [2]. The requirements for asynchronous dual connectivity are only applicable for FDD-FDD and inter-band dual connectivity.

If the UE is configured with higher layer parameter powerControlMode<1>, then the UE may stop transmission on the PSCell if the UL transmission timing difference exceeds 35.21µs. If a UE supports both synchronous and asynchronous dual connectivity and if the UE is configured with higher layer parameter powerControlMode<2>, then the UE needs to constitute new subframes pair if the UL transmission timing difference exceeds 500µs.

# 8 UE Measurements Procedures in RRC CONNECTED State

## 8.1 General Measurement Requirements

#### 8.1.1 Introduction

This clause contains requirements on the UE regarding measurement reporting in RRC\_CONNECTED state. The requirements are split in E-UTRA intra frequency, E-UTRA inter frequency, Inter-RAT UTRA FDD, UTRA TDD and GSM measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracies are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

When the UE is provided with IDC solution, the UE shall also perform RRM measurements and meet the corresponding requirements in clause 8.

In the requirements of Section 8.1 for the UE capable of CA and the UE configured with one or two SCells, the applicable exceptions for side conditions are specified in Annex B, Sections B.4.2 and B.4.3, respectively.

In the requirements of Section 8.1 for the UE capable of DC and the UE configured with one PSCell, the applicable exceptions for side conditions are specified in Annex B, Sections B.4.2 and B.4.3, respectively.

The requirements in Section 9 are applicable for a UE performing measurements according to Section 8.1.

## 8.1.2 Requirements

#### 8.1.2.1 UE measurement capability

If the UE requires measurement gaps to identify and measure inter-frequency and/or inter-RAT cells, in order for the requirements in the following subsections to apply the E-UTRAN must provide a single measurement gap pattern with constant gap duration for concurrent monitoring of all frequency layers and RATs.

During the measurement gaps the UE:

- shall not transmit any data
- is not expected to tune its receiver on any of the E-UTRAN carrier frequencies of PCell and any SCell.
- is not expected to tune its receiver on any of the E-UTRAN carrier frequencies of PCell and PSCell.

If the UE supporting dual connectivity is configured with PSCell, during the total interruption time as shown in Figure 8.1.2.1-1, the UE shall not transmit and receive any data in SCG.

In the uplink subframe occurring immediately after the measurement gap,

- if the following conditions are met then it is up to UE implementation whether or not the UE can transmit data:
  - all the serving cells belong to E-UTRAN TDD;
  - if the subframe occurring immediately before the measurement gap is an uplink subframe.

- Otherwise the UE shall not transmit any data.

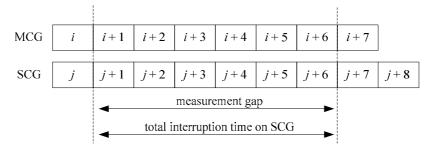
In determining the above UE behaviour in the uplink subframe occurring immediately after the measurement gap the UE shall treat a special subframe as an uplink subframe if the special subframe occurs immediately before the measurement gap, Inter-frequency and inter-RAT measurement requirements within this clause rely on the UE being configured with one measurement gap pattern unless the UE has signaled that it is capable of conducting such measurements without gaps. UEs shall only support those measurement gap patterns listed in Table 8.1.2.1-1 that are relevant to its measurement capabilities.

ProSe capable UE is allowed to perform ProSe transmissions during the measurement gaps that are not used for measurements if the requirements specified in section 8 for inter-frequency and inter-RAT measurements are fulfilled.

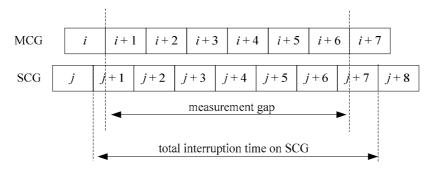
Table 8.1.2.1-1: Gap Pattern Configurations supported by the UE

Gap Pattern Id	MeasurementGap Length (MGL, ms)	Measurement Gap Repetition Period (MGRP, ms)	Minimum available time for inter-frequency and inter-RAT measurements during 480ms period (Tinter1, ms)	Measurement Purpose
0	6	40	60	Inter-Frequency E-UTRAN FDD and TDD, UTRAN FDD, GERAN, LCR TDD, HRPD, CDMA2000 1x
1	6	80	30	Inter-Frequency E-UTRAN FDD and TDD, UTRAN FDD, GERAN, LCR TDD, HRPD, CDMA2000 1x

- NOTE 1: When inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, only Gap Pattern 0 can be used. For defining the inter-frequency and inter-RAT requirements  $T_{inter1}$ =30ms shall be assumed.
- NOTE 2: A measurement gap starts at the end of the latest subframe occurring immediately before the measurement gap among MCG serving cells subframes.
- NOTE 3: MGL is the time from start of tuning to end of retuning, which is aligned between MCG and SCG.
- NOTE 4: The total interruption time on SCG is 6 subframes for synchronous dual connectivity, and the total interruption time on SCG is 7 subframes for asyncrhonous dual connectivity. As shown in Figure 8.1.2.1-1, MCG subframes from i+1 to i+6 are included in total interruption time together with SCG subframes from j+1 to j+6 for synchronous dual connectivity and j+1 to j+7 for asyncrhonous dual connectivity.
- NOTE 5: For asynchronous dual connectivity as shown in Figure 8.1.2.1-1 (b), subframe j is regarded as the subframe occurring immediately before the measurement gap for SCG, similarly, subframe j+8 is regarded as the subframe occurring immediately after the measurement gap for SCG.



(a) measurement GAP for synchronous dual connectivity



(b) measurement GAP for asynchronous dual connectivity

Figure 8.1.2.1-1: Measurement GAP and total interruption time on MCG and SCG

A UE that is capable of identifying and measuring inter-frequency and/or inter-RAT cells without gaps shall follow requirements as if Gap Pattern Id #0 had been used and the minimum available time Tinter1 of 60 ms shall be assumed for the corresponding requirements.

If the UE supporting E-UTRA carrier aggregation when configured with one or two SCCs is performing measurements on cells on PCC, inter-frequency measurements, or inter-RAT measurements, and interruption occurs on PCell or any activated SCell or both due to measurements performed on cells on an SCC with a deactivated SCell according to section 8.3, then the UE shall meet the requirements specified for each measurement in Section 8 and Section 9.

If the UE supporting E-UTRA dual connectivity when configured with a PSCell is performing measurements on cells on PCC, inter-frequency measurements, or inter-RAT measurements, then the UE shall meet the requirements specified for each measurement in Section 8 and Section 9.

A UE which indicate support for Increased UE carrier monitoring E-UTRA according to the capabilities in [2, 31] and which is capable of identifying and measuring inter-frequency and/or inter-RAT cells without gaps, shall be able to monitor maximum number of layers as defined in 8.1.2.1.1.1a, and apply the *MeasScaleFactor* [2] defining the relaxation to the requirements for the configured carriers according to section 8.1.2.1.1a.

#### 8.1.2.1.1 Monitoring of multiple layers using gaps

When monitoring of multiple inter-frequency E-UTRAN and inter-RAT (UTRAN, GSM) using gaps (or without using gaps provided the UE supports such capability) is configured, the UE shall be capable of performing one measurement of the configured measurement type (RSRP, RSRQ, RSTD, UTRAN TDD P-CCPCH RSCP, UTRAN FDD CPICH measurements, GSM carrier RSSI, etc.) of detected cells on all the layers

The effective total number of frequencies excluding the frequencies of the PCell, SCells, and PSCell being monitored is  $N_{\text{freq}}$ , which is defined as:

$$N_{freq} = N_{freq, \; E\text{-}UTRA} + N_{freq, \; UTRA} + M_{gsm} + N_{freq, \; cdma2000} + N_{freq, \; HRPD}$$

where

 $N_{\text{freq, E-UTRA}}$  is the number of E-UTRA carriers being monitored (FDD and TDD)

N<sub>freq, UTRA</sub> is the number of UTRA carriers being monitored (FDD and TDD)

 $M_{GSM}$  is an integer which is a function of the number of GSM carriers on which measurements are being performed.  $M_{GSM}$  is equal to 0 if no GSM carrier is being monitored. For a MGRP of 40 ms,  $M_{GSM}$  is equal to 1 if cells on up to 32 GSM carriers are being measured. For a MGRP of 80 ms,  $M_{GSM}$  is equal to ceil( $N_{carriers,GSM}$ /20) where  $N_{carriers,GSM}$  is the number of GSM carriers on which cells are being measured.

 $N_{\text{freq. cdma}2000}$  is the number of cdma2000 1x carriers being monitored.

N<sub>freq, HRPD</sub> is the number of HRPD carriers being monitored.8.1.2.1.1.1 Maximum allowed layers for multiple monitoring

The UE shall be capable of monitoring at least per RAT group:

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 1 FDD E-UTRA inter-frequency carrier for RSTD measurements, and
- Depending on UE capability, 3 TDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 1 TDD E-UTRA inter-frequency carrier for RSTD measurements, and
- Depending on UE capability, 3 FDD UTRA carriers, and
- Depending on UE capability, 3 TDD UTRA carriers, and
- Depending on UE capability, 32 GSM carriers (one GSM layer corresponds to 32 carriers), and
- Depending on UE capability, 5 cdma2000 1x carriers, and
- Depending on UE capability, 5 HRPD carriers

In addition to the requirements defined above, the UE shall be capable of monitoring a total of at least 7 effective carrier frequency layers comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 carriers), cdma2000 1x and HRPD layers.

#### 8.1.2.1.1.1a Maximum allowed layers for multiple monitoring (Increased UE carrier monitoring)

UE which indicate support for Increased UE carrier monitoring E-UTRA according to the capabilities in [2,31] shall be capable of monitoring at least

- Depending on UE capability, 8 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 8 TDD E-UTRA inter-frequency carriers

UE which indicate support for increased UE carrier monitoring UTRA according to the capabilities in [2,31] shall be capable of monitoring at least

- Depending on UE capability, 6 FDD UTRA carriers, and
- Depending on UE capability, 7 TDD UTRA carriers, and

In addition to the requirements defined above, the UE which indicate support for Increased UE carrier monitoring E-UTRA or increased UE carrier monitoring UTRA according to the capabilities in [2,31]shall be capable of monitoring a total of at least 12 carrier frequency layers comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA TDD, UTRA TDD, GSM (one GSM layer corresponds to 32 carriers), cdma2000 1x and HRPD layers

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring E-UTRA [2,31] are calculated assuming all E-UTRA carriers which the UE is required to monitor, are having normal performance, i.e.  $N_{freq, E-UTRA, reduced} = 0$ . The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring UTRA [2,31] are calculated assuming all UTRA carriers which the UE is required to monitor, are having normal performance, i.e.  $N_{freq, UTRA, reduced} = 0$ . Capabilities for number of carriers to monitor for UE which do not support increased carrier monitoring E-UTRA or increased carrier monitoring UTRA are specified in section 8.1.2.1.1.1. A UE which do not indicate support for Increased UE carrier monitoring E-UTRA or UTRAN [2,31] does not have any reduced performance carrier requirements and  $K_n=1$ .

#### 8.1.2.1.1a Monitoring of multiple layers using gaps (Increased UE carrier monitoring)

For UE which support increased carrier monitoring E-UTRA or increased carrier monitoring UTRA, the measurement performance for different carriers may be configured by higher layers to be either normal or reduced performance. A measurement scaling factor, *MeasScaleFactor* [2], defining the relaxation to be applied to the requirements for carriers measured with reduced measurement performance is signalled by higher layers and has the possible settings shown in table 8.1.2.1.1-1.

Table 8.1.2.1.1-1: Measurement Scaling factor Configurations supported by the UE

	MeasScaleFactor information element settting	K <sub>n</sub>	K <sub>r</sub>
sf-EUTRA-cf1	8	8/7	8
sf-EUTRA-cf2	16	16/15	16

If no reduced performance group carrier is configured, the UE shall consider all carriers to have normal performance

If no *MeasScaleFactor* is configured, a UE indicating support for increased carrier monitoring E-UTRA or increased carrier monitoring UTRA shall monitor at least the number of carriers specified in section 8.1.2.1.1.1 and is not required to monitor the increased number of carriers specified in section 8.1.2.1.1.1a.

The following definitions are used in the performance requirements:

$$N_{freq} = N_{freq,n} + N_{freq,r}$$

#### Where:

 $N_{\text{freq, n}} = N_{\text{freq, E-UTRA, normal}} + N_{\text{freq, UTRA, normal}} + M_{\text{gsm}} + N_{\text{freq, cdma2000}} + N_{\text{freq, HRPD}} : Total \ number \ of \ interfrequency carriers to be monitored with normal measurement performance}$ 

 $N_{\text{freq,r}} = N_{\text{freq, E-UTRA, reduced}} + N_{\text{freq, UTRA, reduced}}: Total \ number \ of \ interfrequency \ carriers \ to \ be \ monitored \ with \ reduced \ measurement \ performance$ 

#### Where:

 $N_{\text{freq, E-UTRA,normal}}$ : Number of interfrequency carriers to be monitored with normal performance

N<sub>freq, E-UTRA,normal,FDD</sub>: Number of interfrequency FDD carriers to be monitored with normal performance

N<sub>freq. E-UTRA,normal,TDD</sub>: Number of interfrequency TDD carriers to be monitored with normal performance

N<sub>freq. E-UTRA.reduced</sub>: Number of interfrequency carriers to be monitored with reduced performance

 $N_{\text{freq, UTRA,normal}}$ : Number of UTRA carriers (FDD and TDD) to be monitored with normal performance

 $N_{\text{freq, E-UTRA,normal,FDD}}$ : Number of interfrequency FDD carriers to be monitored with normal performance

 $N_{\text{freq. E-UTRA,normal,TDD}}$ . Number of interfrequency TDD carriers to be monitored with normal performance

 $N_{\text{freq, UTRA,reduced}}$ : Number of UTRA carriers (FDD and TDD) to be monitored with reduced performance

For interfrequency carriers, if  $N_{\text{freq, E-UTRA,reduced}}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.1.2.1.1-1. Otherwise  $K_n$ =1 and all interfrequency layers have normal performance.

For UTRAN carriers, if  $N_{freq, UTRA, reduced}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.1.2.1.1-1. Otherwise  $K_n=1$  and all UTRA frequency layers have normal performance.

The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring E-UTRA [2, 31] are calculated as defined in sections 8.1.2.3.1 and 8.1.2.3.2 provided that  $N_{\text{freq, E-UTRA,normal}} \leq 3$  for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or  $N_{\text{freq, E-UTRA,normal}} \leq 6$  for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided  $N_{\text{freq, E-UTRA,normal,FDD}} \leq 3$  E-UTRA carriers and  $N_{\text{freq, E-UTRA,normal,TDD}} \leq 3$  TDD E-UTRA carriers or if  $N_{\text{freq,n}} = N_{\text{freq,n}}$ . The minimum performance requirements for a UE which

indicates support for Increased UE carrier monitoring UTRA [2, 31] are calculated as defined in sections 8.1.2.4.1, 8.1.2.4.3, 8.1.2.4.7 and 8.1.2.4.13 provided that  $N_{freq,\ UTRA,normal} \leq 3$  for UE capable of either FDD UTRA carrier monitoring or TDD UTRA carrier monitoring or  $N_{freq,\ UTRA,normal} \leq 6$  for a UE capable of both FDD and TDD UTRA carrier monitoring provided  $N_{freq,\ UTRA,normal,FDD} \leq 3$  FDD UTRA carriers and  $N_{freq,\ UTRA,normal,TDD} \leq 3$  TDD UTRA carriers or if  $N_{freq,n} = N_{freq}$ . Capabilities for number of carriers to monitor for a UE which supports Increased carrier monitoring E-UTRA or Increased carrier monitoring UTRA are specified in section 8.1.2.1.1.1a.

#### 8.1.2.2 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC\_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

#### 8.1.2.2.1 E-UTRAN FDD intra frequency measurements

#### 8.1.2.2.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

$$T_{identify\ intra} = T_{basic\_identify\_E-UTRA\_FDD,\,intra} \cdot \frac{T_{Measurement\_Period,\,Intra}}{T_{Intra}} \quad \textit{ms}$$

where

T<sub>basic\_identify\_E-UTRA\_FDD, intra</sub> is 800 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

 $T_{Intra}$ : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\ Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRPand RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least  $Y_{\text{measurement intra}}$  cells , where  $Y_{\text{measurement intra}}$  is defined in the following equation. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of at least 8 identified intra- frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement intra}} = Floor \left\{ X_{\text{basic measurement FDD}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period, Intra}}} \right\} \text{cells}$$

where

 $X_{basic measurement FDD} = 8 (cells)$ 

 $T_{\text{Measurement\_Period, Intra}} = 200 \text{ ms.}$  The measurement period for Intra frequency RSRP and RSRQ measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

# 8.1.2.2.1.1.1 Measurement Reporting Requirements

### 8.1.2.2.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

#### 8.1.2.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.1.1.1.3.

# 8.1.2.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\ intra}$  defined in Clause 8.1.2.2.1.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra}$  defined in clause 8.1.2.2.1.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period, Intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.2.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra}$  as shown in table 8.1.2.2.1.2-1

Table 8.1.2.2.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

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DRX cycle length (s)		T <sub>identify_intra</sub> (s) (DRX cycles)
≤0.04	ļ	0.8 (NOTE1)
0.04 <df< td=""><td>٦X-</td><td>NOTE2 (40)</td></df<>	٦X-	NOTE2 (40)
cycle≤0	.08	
0.128	3	3.2 (25)
0.128 <d< td=""><td>RX-</td><td>NOTE2(20)</td></d<>	RX-	NOTE2(20)
cycle≤2	.56	
NOTE1:	Num	ber of DRX cycle
	depe	ends upon the DRX
	cycle	e in use
NOTE2:	Time	depends upon the
	DRX	cvcle in use

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra}$  as shown in table 8.1.2.2.1.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra}$ .

Table 8.1.2.2.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)		T <sub>measure_intra</sub> (s) (DRX cycles)
≤0.04	1	0.2 (NOTE1)
0.04 <di< td=""><td>RX-</td><td>NOTE2 (5)</td></di<>	RX-	NOTE2 (5)
cycle≤2		
NOTE1:	Num	ber of DRX cycle
	depe	ends upon the DRX
	cycle	e in use
Note2:	Time	depends upon the
	DRX	cycle in use

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

# 8.1.2.2.1.2.1 Measurement Reporting Requirements

# 8.1.2.2.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

# 8.1.2.2.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.1.2.1.3.

# 8.1.2.2.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra}$  defined in Clause 8.1.2.2.1.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra}$  defined in clause 8.1.2.2.1.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.2.2 E-UTRAN TDD intra frequency measurements

### 8.1.2.2.2.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within

$$T_{\text{identify intra}} = T_{\text{basic identify }E-UTRA\_TDD, intra} \cdot \frac{T_{\text{Measurement Period, Intra}}}{T_{\text{Intra}}} \quad \textit{ms}$$

where

T<sub>basic\_identify\_E-UTRA\_TDD, intra</sub> is 800 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

 $T_{Intra}$ : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\ Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least  $Y_{\text{measurement intra}}$  cells , where  $Y_{\text{measurement intra}}$  is defined in the following equation. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement intra}} = Floor \left\{ X_{\text{basic measurement TDD}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period, Intra}}} \right\} \text{cells}$$

where

 $X_{\text{basic measurement TDD}} = 8 \text{ (cells)}$ 

T<sub>Measurement Period Intra</sub> = 200 ms. The measurement period for Intra frequency RSRP and RSRQ measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

#### 8.1.2.2.2.1.1 Measurement Reporting Requirements

### 8.1.2.2.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

# 8.1.2.2.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.2.1.1.3.

#### 8.1.2.2.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\ intra}$  defined in Clause 8.1.2.2.2.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra}$  defined in clause 8.1.2.2.2.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\ Intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

#### 8.1.2.2.2.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within  $T_{identify\_intra}$  as shown in table 8.1.2.2.2.2-1

Table 8.1.2.2.2.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)		T <sub>identify_intra</sub> (s) (DRX cycles)
≤0.04	ļ	0.8 (NOTE1)
0.04 <df< td=""><td>₹X-</td><td>NOTE2 (40)</td></df<>	₹X-	NOTE2 (40)
cycle≤0	.08	
0.128	3	3.2 (25)
0.128 <d< td=""><td>RX-</td><td>NOTE2(20)</td></d<>	RX-	NOTE2(20)
cycle≤2.56		
NOTE1:	Num	ber of DRX cycle
	depe	ends upon the DRX
	cycle	e in use
NOTE2:	Time	depends upon the
	DRX	cycle in use

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra}$  as shown in table 8.1.2.2.2.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra}$ .

Table 8.1.2.2.2.2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)		T <sub>measure_intra</sub> (s) (DRX cycles)
≤0.04	ļ	0.2 (NOTE1)
0.04 <di< td=""><td>٦X-</td><td>NOTE2 (5)</td></di<>	٦X-	NOTE2 (5)
cycle≤2		
NOTE1: Num		ber of DRX cycle
	depe	ends upon the DRX
	cycle	e in use.
NOTE2:	Time	depends upon the
	DRX	cycle in use.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

# 8.1.2.2.2.1 Measurement Reporting Requirements

# 8.1.2.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

# 8.1.2.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.2.2.1.3.

# 8.1.2.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra}$  defined in Clause 8.1.2.2.2.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra}$  defined in clause 8.1.2.2.2.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.2.3 E-UTRAN FDD intra frequency measurements with autonomous gaps

### 8.1.2.2.3.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify CGI, intra}} = T_{\text{basic identify CGI, intra}}$$
 ms

Where

 $T_{basic\_identify\_CGI,\;intra} = 150\;ms.$  This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI,intra}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{identify\_CGI, intra}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least 60 ACK/NACKs on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,

- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

# 8.1.2.2.3.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.2.4 E-UTRAN TDD intra frequency measurements with autonomous gaps

# 8.1.2.2.4.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI, intra} = T_{basic\_identify\_CGI, intra}$$
 ms

#### Where

 $T_{basic\_identify\_CGI, intra} = 150$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable when the following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI, intra}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{\text{identify\_CGI, intra}}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.1.2.2.4.1-1 on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.1.2.2.4.1-1: Requirement on minimum number of ACK/NACKs to transmit during T<sub>basic\_identify\_CGI, intra</sub>.

UL/DL configuration	Minimum number of transmitted ACK/NACKs		
0 (NOTE 1)	18		
1	35		
2	43		
3	36		
4	39		
5	42		
6	30		
NOTE 1: When a UE is configured with EIMTA-			

NOTE 1: When a UE is configured with EIMTA-MainConfigServCell via RRC signalling [2] only this requirement shall apply.

# 8.1.2.2.4.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.3 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency cells and perform RSRP and RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided.

# 8.1.2.3.1 E-UTRAN FDD – FDD inter frequency measurements

# 8.1.2.3.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency within  $T_{Identify\ Inter}$  according to the following expression:

$$\mathbf{T}_{\text{Identify\_Inter}} = \mathbf{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathbf{T}_{\text{Inter1}}} \cdot N_{\textit{freq},n} \cdot K_{\textit{n}} \quad \textit{ms} \, (\text{normal performance}) \, \text{and} \, \frac{1}{2} \left( \frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \sum_{i=1}^$$

$$\mathbf{T}_{\text{Identify\_Inter}} = \mathbf{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathbf{T}_{\text{Interl}}} \cdot N_{freq,r} \cdot K_r \quad \textit{ms} \, (\text{reduced performance})$$

Where:

 $T_{Basic\_Identify\_Inter} = 480$  ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new FDD inter-frequency cell is defined.

 $N_{freq,n}$   $N_{freq,r}$   $K_n$  and  $K_r$  are defined in clause 8.1.2.1.1 and  $T_{inter1}$  is defined in clause 8.1.2.1

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band
- other RSRP related side conditions given in Sections 9.1.3.1 and 9.1.3.2 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled.
- $SCH_RP|_{dBm}$  and SCH  $\hat{E}s/Iot$  according to Annex B.2.3 for a corresponding Band

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively, with measurement period given by table 8.1.2.3.1.1-1.

Table 8.1.2.3.1.1-1: Measurement period and measurement bandwidth

Configuration	Physical Layer Measurement period: T <sub>Measurement_Period_Inter_FDD</sub> [ms] (normal performance)	Physical Layer Measurement period:  T <sub>Measurement_Period_Inter_FDD</sub> [ms]  (reduced performance)	Measurement bandwidth [RB]		
	$480 \times K_n \times N_{freq,n}$	480 x K <sub>r</sub> x N <sub>freq,r</sub>	6		
0					
1 (NOTE)	$240 \times K_n \times N_{freq,n}$	240 x K <sub>r</sub> x N <sub>freq,r</sub>	50		
NOTE: This configuration is optional					

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies or 8 FDD interfrequencies if the UE supports Increased UE carrier monitoring E-UTRA and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in Table 8.1.2.3.1.1-1.

# 8.1.2.3.1.1.1 Measurement Reporting Requirements

# 8.1.2.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

#### 8.1.2.3.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.1.1.1.3.

# 8.1.2.3.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify - inter}$  defined in clause 8.1.2.3.1.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_inter}$  defined in clause 8.1.2.3.1.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_Inter\_FDD}$  defined in clause 8.1.2.3.1.1 provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

#### 8.1.2.3.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency cell within  $T_{identify\ inter}$  as shown in table 8.1.2.3.1.2-1

T<sub>identify\_inter</sub> (s) (DRX cycles), normal Tidentify\_inter (s) (DRX cycles), reduced DRX performance performance cycle length (s) Gap period = Gap period = Gap period = 40Gap period = 80 ms 80 ms 40 ms ms ≤0.16 Non DRX Non DRX Non DRX Non DRX Requirements in Requirements in Requirements in Requirements in clause 8.1.2.3.1.1 clause 8.1.2.3.1.1 clause 8.1.2.3.1.1 clause 8.1.2.3.1.1 are applicable are applicable are applicable are applicable 0.256  $5.12*K_n*N_{freq,n}$ 7.68\*K<sub>n</sub> \*N<sub>freq,n</sub> 5.12\*K<sub>r</sub>\*N<sub>freq,r</sub> 7.68\*K<sub>r</sub> \*N<sub>freq,r</sub> (30\*K<sub>n</sub> \*N<sub>freq,n</sub>)  $(20*K_n*N_{freq,n})$  $(20*K_r*N_{freq,r})$  $(30*K_r *N_{freq,r})$ 0.32 7.68\*K<sub>r</sub> \*N<sub>freq,r</sub> 6.4\*K<sub>n</sub> \*N<sub>freq,n</sub>  $7.68*K_n*N_{freq,nl}$ 6.4\*K<sub>r</sub> \*N<sub>freq,r</sub>  $(20^*K_r *N_{freq,r})$  $(24*K_n*N_{freq,n})$  $(24*K_r*N_{freq,r})$  $(20*K_n*N_{freq,n})$ Note (20\*K<sub>r</sub> 0.32< Note (20\*K<sub>n</sub> Note (20\*K<sub>n</sub> Note (20\*K<sub>r</sub> DRX-\*N<sub>freq,n</sub>) \*N<sub>freq,n</sub>) \*N<sub>freq,r</sub>) \*N<sub>freq,r</sub>) cycle≤2.56 Note: Time depends upon the DRX cycle in use

Table 8.1.2.3.1.2-1: Requirement to identify a newly detectable FDD interfrequency cell

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A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP|dBm RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band
- other RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled.
- SCH\_RP|<sub>dBm</sub> SCH Ês/Iot according to Annex B.2.3 for a corresponding Band,

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per FDD inter-frequency and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.1.2.3.1.2-2 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

DRX cycle length (s)	T <sub>measure_inter</sub> (s) (DRX cycles) (normal performance)	T <sub>measure_inter</sub> (s) (DRX cycles) (reduced performance)		
≤0.08	Non DRX	Non DRX		
	Requirements in	Requirements in		
	clause 8.1.2.3.1.1	clause 8.1.2.3.1.1		
	are applicable	are applicable		
0.08 <drx-< td=""><td>Note (5*K<sub>n</sub>*N<sub>freq,n</sub>)</td><td>Note (5*K<sub>r</sub>*N<sub>freq,r</sub>)</td></drx-<>	Note (5*K <sub>n</sub> *N <sub>freq,n</sub> )	Note (5*K <sub>r</sub> *N <sub>freq,r</sub> )		
cycle≤2.56				
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.3.1.2-2: Requirement to measure FDD interfrequency cells

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.3.1 and 9.1.3.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.6.1 and 9.1.6.2.

# 8.1.2.3.1.2.1 Measurement Reporting Requirements

#### 8.1.2.3.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

# 8.1.2.3.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.1.2.1.3.

# 8.1.2.3.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times \text{TTI}_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_inter}$  defined in clause 8.1.2.3.1.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_inter}$  defined in clause 8.1.2.3.1.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{measure\_inter}$  defined in clause 8.1.2.3.1.2 provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.3.2 E-UTRAN TDD – TDD inter frequency measurements

# 8.1.2.3.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new TDD inter-frequency within  $T_{Identify\_Inter}$  according to the following expression:

- When configuration 0 or configuration 1 in Table 8.1.2.3.2.1-1 is applied,

$$\mathbf{T}_{\text{Identify\_Inter}} = \mathbf{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathbf{T}_{\text{Inter}}} \cdot \mathbf{N}_{\textit{freq}} \quad \textit{ms} \,,$$

- When configuration 2 or configuration 3 in Table 8.1.2.3.2.1-1 is applied,

$$T_{\text{Identify\_Inter}} = T_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{T_{\text{Inter}}} \cdot N_{\text{freq}} + 240 \cdot N_{\text{freq}} \quad \textit{ms} \; .$$

 $T_{Basic\_Identify\_Inter} = 480$  ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new TDD inter-frequency cell is defined.

 $N_{\text{freq}}$  is defined in clause 8.1.2.1.1 and  $T_{\text{inter1}}$  is defined in clause 8.1.2.1

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP<sub>dBm</sub> and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band,
- other RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively, with measurement period ( $T_{\text{Measurement Period TDD Inter}$ ) given by table 8.1.2.3.2.1-1:

Table 8.1.2.3.2.1-1: T<sub>Measurement Period TDD Inter</sub> for different configurations

Configuration	Measurement bandwidth [RB]		UL/DL sub- If frame (5 ms)			T <sub>Measurement_Period</sub> _TDD_Inter [ms]     (normal performance)	T <sub>Measurement_Period_T</sub> DD_Inter [ms]  (reduced performance)
		DL	UL	Normal CP	Extended CP		
0	6	2	2	19760 · T <sub>s</sub>	20480·T <sub>s</sub>	480 x K <sub>n</sub> x N <sub>freq,n</sub>	480 x K <sub>r</sub> x N <sub>freq,r</sub>
1 (Note 1)	50	2	2	19760 · T <sub>s</sub>	20480·T <sub>s</sub>	240 x K <sub>n</sub> x N <sub>freq,n</sub>	240 x K <sub>r</sub> x N <sub>freq,r</sub>
2	6	1	3	19760 · T <sub>s</sub>	20480·T <sub>s</sub>	720 x K <sub>n</sub> x N <sub>freq,n</sub>	720 x K <sub>r</sub> x N <sub>freq,r</sub>
3 (Note 1)	50	1	3	19760 · T <sub>s</sub>	20480·T <sub>s</sub>	480 x K <sub>n</sub> x N <sub>freq,n</sub>	480 x K <sub>r</sub> x N <sub>freq,r</sub>
Note 1: This configuration is optional Note 2: $T_s$ is defined in TS 36.211 [16] Note 3: N/A.							

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per TDD inter-frequency and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period  $T_{\text{Measurement\_Period\_TDD\_Inter}}$ .

# 8.1.2.3.2.1.1 Measurement Reporting Requirements

#### 8.1.2.3.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

#### 8.1.2.3.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.2.1.1.3.

# 8.1.2.3.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{Identify\_Inter}$  defined in clause 8.1.2.3.2.1. When L3 filtering is used or IDC autonomous denial or the UE is performing reception and/or

transmission for ProSe Direct Discovery and/or ProSe Direct Communication, is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{Identify\_Inter}$  defined in clause 8.1.2.3.2.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_TDD\_Inter}$  defined in clause 8.1.2.3.2.1 provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

#### 8.1.2.3.2.2 E-UTRAN TDD – TDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency cell within  $T_{identify\_inter}$  as shown in table 8.1.2.3.2.2-1

Tidentify\_inter (s) (DRX cycles) (normal Tidentify\_inter (s) (DRX cycles) DRX cycle length (s) performance) (reduced performance) Gap period = Gap period = Gap period = Gap period = 80 ms 40 ms 40 ms 80 ms ≤0.16 Non DRX Non DRX Non DRX Non DRX Requirements in Requirements in Requirements in Requirements in clause 8.1.2.3.2.1 clause 8.1.2.3.2.1 clause 8.1.2.3.2.1 clause 8.1.2.3.2.1 are applicable are applicable are applicable are applicable 0.256 5.12\*K<sub>n</sub>\*N<sub>freq,n</sub> 7.68\*K<sub>n</sub> \*N<sub>freq,n</sub> 5.12\*Kr\*Nfreq,r 7.68\*K<sub>r</sub> \*N<sub>freq,r</sub> (30\*K<sub>n</sub> \*N<sub>freq,n</sub>)  $(20*K_r*N_{freq,r})$ (20\*K<sub>n</sub> \*N<sub>freq,n</sub>) (30\*K<sub>r</sub> \*N<sub>freq,r</sub>) 0.32 6.4\*K<sub>n</sub> \*N<sub>freq,n</sub> 7.68\*K<sub>n</sub> \*N<sub>freq,n</sub> 6.4\*K<sub>r</sub> \*N<sub>freq,r</sub> 7.68\*K<sub>r</sub> \*N<sub>freq,r</sub>  $(24 * K_r * N_{freq,r})$ (20\*K<sub>n</sub> \*N<sub>freq,n</sub>) (24\*K<sub>n</sub> \*N<sub>freq,n</sub>) (20\*Kr \*Nfreq,r) 0.32<DRX-Note (20\*K<sub>n</sub> Note (20\*K<sub>n</sub> Note (20\*K<sub>r</sub> Note (20\*K<sub>r</sub> cycle≤2.56  $*N_{freq,n}$ \*N<sub>freq,n</sub>) \*N<sub>freg,r</sub>)  $*N_{freq,r}$ ) Note: Time depends upon the DRX cycle in use

Table 8.1.2.3.2.2-1: Requirement to identify a newly detectable TDD interfrequency cell

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP<sub>dBm</sub> and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band
- RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band,

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in Table 8.1.2.3.2.2-2 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

DRX cycle T<sub>measure\_inter</sub> (s) T<sub>measure\_inter</sub> (s) (DRX cycles) (DRX cycles) length (s) (normal (reduced requirement) requirement) ≤0.08 Non DRX Non DRX Requirements in Requirements in clause 8.1.2.3.2.1 clause 8.1.2.3.2.1 are applicable are applicable When configuration When configuration 0.128 2 non DRX 2 non DRX Requirements in Requirements in clause 8.1.2.3.2.1 clause 8.1.2.3.2.1 are applicable, are applicable, Otherwise Otherwise Note (5\*K<sub>n</sub>\*N<sub>freq,n</sub>) Note (5\*K<sub>r</sub>\*N<sub>freq,r</sub>) 0.128<DRX-Note  $(5*K_n*N_{freq,n})$ Note  $(5*K_r*N_{freq,r})$ cycle≤2.56 Time depends upon the DRX cycle in use Note:

Table 8.1.2.3.2.2-2: Requirement to measure TDD interfrequency cells

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.3.1 and 9.1.3.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.6.1 and 9.1.6.2.

# 8.1.2.3.2.2.1 Measurement Reporting Requirements

#### 8.1.2.3.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

#### 8.1.2.3.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.2.2.1.3.

# 8.1.2.3.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in clause 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times \text{TTI}_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{Identify\_Inter}$  defined in Clause 8.1.2.3.2.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{Identify\_Inter}$  in clause 8.1.2.3.2.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{measure\_inter}$  in clause 8.1.2.3.2.2 provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or

the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.3.3 E-UTRAN TDD – FDD inter frequency measurements

# 8.1.2.3.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.1.2.3.1.1 also apply for this section.

### 8.1.2.3.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.1.2.3.1.2 also apply for this section.

# 8.1.2.3.4 E-UTRAN FDD – TDD inter frequency measurements

# 8.1.2.3.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.1.2.3.2.1 also apply for this section.

# 8.1.2.3.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.1.2.3.2.2 also apply for this section.

#### 8.1.2.3.5 E-UTRAN FDD-FDD inter frequency measurements with autonomous gaps

# 8.1.2.3.5.1 Identification of a new CGI of E-UTRA FDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify CGI, inter}} = T_{\text{basic identify CGI, inter}}$$
 ms

Where

 $T_{basic\_identify\_CGI, inter} = 150$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI,inter}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{identify\_CGI, intra}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least 60 ACK/NACKs on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

# 8.1.2.3.5.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.3.6 E-UTRAN TDD-FDD inter frequency measurements using autonomous gaps

The requirements in this clause shall apply to UE supporting FDD and TDD.

# 8.1.2.3.6.1 Identification of a new CGI of E-UTRA FDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify CGI inter}} = T_{\text{basic identify CGI inter}}$$
 ms

Where

 $T_{basic\_identify\_CGI, inter} = 150$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.4 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI,inter}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{identify\_CGI,inter}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.1.2.3.6.1-1 on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,

- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.1.2.3.6.1-1: Requirement on minimum number of ACK/NACKs to transmit during T<sub>basic\_identify\_CGI, inter</sub>.

TDD UL/DL configuration for serving cell		Minimum number of transmitted ACK/NACKs	
0 (Note 1	)	18	
1		30	
Note 1:	When a UE is configured with EIMTA- MainConfigServCell via RRC signalling [2] only this requirement shall apply.		
Note 2:	The requirement for configuration is TBD		

#### 8.1.2.3.6.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.3.7 E-UTRAN TDD-TDD inter frequency measurements with autonomous gaps

### 8.1.2.3.7.1 Identification of a new CGI of E-UTRA TDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI, inter} = T_{basic\_identify\_CGI, inter}$$
 ms

Where

 $T_{basic\_identify\_CGI, inter} = 150$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.4 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within T<sub>basic\_identify\_CGI,inter</sub> is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{identify\_CGI,inter}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.1.2.3.7.1-1 on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,

- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.1.2.3.7.1-1: Requirement on minimum number of ACK/NACKs to transmit during  $T_{\text{basic\_identify\_CGI, inter}}$ .

TDD UL/DL configuration for serving cell		Minimum number of transmitted ACK/NACKs
0 (Note 1)		18
1		30
Note 1:		figured with <i>EIMTA-</i> ell via RRC signalling [2] only hall apply cell.
Note 2:	The requirement f	or other TDD UL/DL

### 8.1.2.3.7.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.3.8 E-UTRAN FDD-TDD inter frequency measurements using autonomous gaps

The requirements in this clause shall apply to UE supporting FDD and TDD.

# 8.1.2.3.8.1 Identification of a new CGI of E-UTRA TDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify CGI, inter}} = T_{\text{basic identify CGI, inter}}$$
 ms

Where

 $T_{basic\_identify\_CGI, inter} = 150$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.4 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI,inter}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{identify\_CGI,inter}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall have more than 60 ACK/NACKs transmitted on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

# 8.1.2.3.8.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.4 Inter RAT measurements

### 8.1.2.4.1 E-UTRAN FDD – UTRAN FDD measurements

#### 8.1.2.4.1.1 E-UTRAN FDD – UTRAN FDD measurements when no DRX is used

#### 8.1.2.4.1.1.1 Identification of a new UTRA FDD cell

When explicit neighbour list is provided and no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, UTRA\_FDD}} = T_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{interl}}} \cdot K_n \cdot N_{freq,n} \quad ms \text{ (normal performance)},$$

and

$$T_{\text{identify, UTRA\_FDD}} = T_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot K_r \cdot N_{\textit{freq,r}} \quad \textit{ms} \; (\text{reduced performance})$$

A cell shall be considered detectable when

- CPICH Ec/Io  $\geq$  -20 dB,
- SCH\_Ec/Io ≥ -17 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

# 8.1.2.4.1.1.1a Enhanced UTRA FDD cell identification requirements

When explicit neighbour list is provided and no DRX is used or when DRX cycle length  $\leq$  40 ms, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within  $T_{identify,\,enhanced\_UTRA\_FDD}$ :

$$T_{\text{identify, enhanced\_UTRA\_FDD}} = (T_{\text{basic\_identify\_enhanced\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{interl}}} + 480) \ K_n N_{freq,n} \quad \textit{ms} \text{ (normal performance)}$$

and

$$T_{\text{identify, enhanced\_UTRA\_FDD}} = (T_{\text{basic\_identify\_enhanced\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{inter1}}} + 480) \ \textit{K}_{\textit{r}} N_{\textit{freq,r}} \quad \textit{ms} \ (\text{reduced performance})$$

A cell shall be considered detectable when:

- CPICH Ec/Io  $\geq$  -15 dB,
- SCH\_Ec/Io ≥ -15 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

# 8.1.2.4.1.1.2 UE UTRA FDD CPICH measurement capability

When measurement gaps are scheduled for UTRA FDD inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Clause 9.2 with measurement period given by

$$T_{\text{measurement\_UTRA\_FDD}} = Max \left\{ T_{\text{Measurement\_Period UTRA\_FDD}}, T_{\text{basic\_measurement\_UTRA\_FDD}}, \frac{480}{T_{\text{interl}}} \cdot K_n \cdot N_{freq,n} \right\} ms \text{ (normal performance)},$$

and

$$T_{\text{measurement\_UTRA\_FDD}} = Max \left\{ T_{\text{Measurement\_Period UTRA\_FDD}}, T_{\text{basic\_measurement\_UTRA\_FDD}} \cdot \frac{480}{T_{\text{interl}}} \cdot K_r \cdot N_{\text{freq},r} \right\} ms \text{ (reduced to the property of the property o$$

performance

The UE shall be capable of performing UTRA FDD CPICH measurements for  $X_{basic\ measurementUTRA\_FDD}$  inter-frequency cells per FDD frequency and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\_UTRA\_FDD}$ .

$$X_{basic\ measurement\ UTRA\_FDD} = 6$$

 $T_{Measurement\_Period\ UTRA\_FDD}$  = 480 ms. The period used for calculating the measurement period  $T_{measurement\_UTRA\_FDD}$  for UTRA FDD CPICH measurements.

 $T_{basic\_identify\_UTRA\_FDD} = 300$  ms. This is the time period used in the inter RAT equation in clause 8.1.2.4.1.1.1 where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

 $T_{basic\_identify\_enhanced\_UTRA\_FDD} = 60 \ ms. \ This \ is \ the \ time \ period \ used \ in \ the \ inter \ RAT \ equation \ in \ clause \ 8.1.2.4.1.1.1a \ where \ the \ maximum \ allowed \ time \ for \ the \ UE \ to \ identify \ a \ new \ UTRA \ FDD \ cell \ is \ defined.$ 

 $T_{basic\_measurement\_UTRA\_FDD} = 50$  ms. This is the time period used in the equation for defining the measurement period for inter RAT CPICH measurements.

 $N_{freq.n}$ ,  $N_{freq.r}$ ,  $K_n$  and  $K_r$  are defined in clause 8.1.2.1.1 and  $T_{inter1}$  is defined in clause 8.1.2.1

#### 8.1.2.4.1.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

# 8.1.2.4.1.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify,\,UTRA\_FDD}$  defined in Clause 8.1.2.4.1.1.1 for the minimum requirements or  $T_{identify,\,enhanced\_UTRA\_FDD}$  defined in Clause 8.1.2.4.1.1.1a for the enhanced requirements When L3 filtering is used or IDC autonomous denial or the UE is performing reception

and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify,\;UTRA\_FDD}$  defined in clause 8.1.2.4.1.1.1 for the minimum requirements or  $T_{identify,\;enhanced\_UTRA\_FDD}$  defined in Clause 8.1.2.4.1.1.1a for the enhanced requirements and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{measurement\_UTRA\_FDD}$  defined in clause 8.1.2.4.1.1.2 provided the timing to that cell has not changed more than  $\pm$  32 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

#### 8.1.2.4.1.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.1.1.4.

#### 8.1.2.4.1.2 E-UTRAN FDD – UTRAN FDD measurements when DRX is used

When explicit neighbour list is provided and DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within T<sub>identify,UTRA\_EDD</sub> as shown in table 8.1.2.4.1.2-1

T<sub>identify\_UTRA\_FDD</sub> (s) (DRX cycles) Tidentify UTRA FDD (s) (DRX cycles) reduced requirement DRX normal requirement cycle length (s) Gap period = Gap period = Gap period = 40 ms Gap period = 80 ms 40 ms 80 ms ≤0.04 Non DRX Non DRX Non DRX Requirements in Non DRX Requirements in Requirements in Requirements in clause 8.1.2.4.1.1 are clause 8.1.2.4.1.1 are clause 8.1.2.4.1.1 clause 8.1.2.4.1.1 applicable applicable are applicable are applicable 2.56\*K<sub>r</sub>\* N<sub>freq,r</sub> (40 K<sub>r</sub>\* Nf<sub>freq,r</sub>) 4.8\* K<sub>n</sub>\* N<sub>freq,n</sub> 0.064  $2.56^*K_n^*\;N_{freq,n}$  $4.8* K_r* N_{freq,r} (75* K_r* N_{freq,r})$ (40\* Nf<sub>freq,n</sub>) (75\* K<sub>n</sub>\* N<sub>freq,n</sub>) 3.2\* K<sub>r</sub>\* N<sub>freq,r</sub> (40\* K<sub>r</sub>\* N<sub>freq,r</sub>) 4.8\* K<sub>r</sub>\* N<sub>freq,r</sub> (60\* K<sub>r</sub>\* N<sub>freq,r</sub>) 0.08 3.2\* Kn\* Nfreq,n 4.8\* Kn\* Nfreq,n (40\* K<sub>n</sub>\* N<sub>frea.n</sub>) (60\* K<sub>n</sub>\* N<sub>freg.n</sub>) 3.2\* K<sub>n</sub>\* N<sub>freq,n</sub> (25\* K<sub>n</sub>\* Nfreq) 4.8\* K<sub>n</sub>\* N<sub>freq,n</sub> (37.5\* K<sub>n</sub>\* N<sub>freq,n</sub>) 3.2\* K<sub>r</sub>\* N<sub>freq,n</sub> (25\* K<sub>r</sub>\* N<sub>freq,r</sub>) 0.128 4.8\* Kr\* Nfreq,r (37.5\* Kr\*  $N_{freq,r}$ 4.8\* K<sub>r</sub>\* N<sub>freq.r</sub> (30\* K<sub>r</sub>\* N<sub>freq.r</sub>) 0.16 3.2\* Kn\* Nfreq.n 4.8\* Kn\* Nfreq.n 3.2\* K<sub>r</sub>\* N<sub>freq.n</sub> (20\* K<sub>r</sub>\* N<sub>freq.r</sub>) (20\* K<sub>n</sub>\* N<sub>freq.n</sub>) (30\* K<sub>n</sub>\* N<sub>freq.n</sub>) 0.16<DRX-Note (20\* K<sub>n</sub>\* Note Note (20\* Kr\* Nfreg,r) Note (20\* K<sub>r</sub>\* N<sub>freq,r</sub>) cvcle≤2.56  $N_{freq,n}$ (20\* K<sub>n</sub>\* N<sub>freq,n</sub>) Note: Time depends upon the DRX cycle in use

Table 8.1.2.4.1.2-1: Requirement to identify a newly detectable UTRA FDD cell

A cell shall be considered detectable provided following conditions are fulfilled: A cell shall be considered detectable when

- CPICH Ec/Io > -20 dB,
- SCH\_Ec/Io ≥ -17 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

The UE shall be capable of performing RSCP and Ec/Io measurements of at least 6 UTRA cells per UTRA FDD carrier for up to 3 UTRA FDD carriers and the UE physical layer shall be capable of reporting RSCP and Ec/Io measurements to higher layers with the measurement period defined in table 8.1.2.3.1.2-2 when DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps. UE supporting Increased UE carrier monitoring UTRA shall be capable of performing RSCP and Ec/Io measurements of at least 6 UTRA cells per UTRA FDD carrier for up to 6 UTRA FDD carriers with maximum of 80 cells consisting of at most 32 cells per frequency layer in the neighbour cell list

T<sub>measure\_UTRA\_FDD</sub> (s) (DRX cycles) normal requirement T<sub>measure\_UTRA\_FDD</sub> (s) (DRX cycles) DRX cycle length (s) normal requirement Gap period = Gap period = Gap period = 40 ms Gap period = 80 ms 40 ms 80 ms ≤0.04 Non DRX Non DRX Non DRX Requirements in Non DRX Requirements in Requirements in Requirements in clause 8.1.2.4.1.1 are clause 8.1.2.4.1.1 are clause 8.1.2.4.1.1 clause 8.1.2.4.1.1 applicable applicable are applicable are applicable  $\overline{0.8^*} \, \overline{\text{K}_{\text{n}}^*} \, N_{\text{freq,n}}$ 0.8\* K<sub>r</sub>\* N<sub>freq,r</sub> 0.064  $0.48*K_n*N_{freq,n}$ 0.48\* K<sub>r</sub>\* N<sub>freq,r</sub> (7.5\* K<sub>r</sub>\* N<sub>freq,r</sub>) (12.5\* K<sub>r</sub>\* N<sub>freq,r</sub>) (12<u>.5\* Kn\* N<sub>freq,n</sub>)</u> (7.5\* K<sub>n</sub>\* N<sub>freq,n</sub>) 0.48\* K<sub>n</sub>\* N<sub>freq,n</sub> (6\* K<sub>n</sub>\* N<sub>freq,n</sub>) 0.48\* K<sub>r</sub>\* N<sub>freq,r</sub> 0. 8\* K<sub>n</sub>\* N<sub>freq,n</sub> 0. 8\* K<sub>r</sub>\* N<sub>freq,r</sub> (10\* K<sub>r</sub>\* N<sub>freq,r</sub>) 0.08 (6\* K<sub>r</sub>\* N<sub>freq,r</sub>) (10\* N<sub>freq,n</sub>) 0. 8\* K<sub>r</sub>\* N<sub>freq,r</sub> (6.25\* N<sub>freq,r</sub>) 0.128 0.64\* K<sub>n</sub>\* N<sub>freq,n</sub> 0. 8\* K<sub>n</sub>\* N<sub>freq,n</sub> 0.64\* K<sub>r</sub>\* N<sub>freq,r</sub> (6.2<u>5</u>\* N<sub>freq,n</sub>) (5\* K<sub>n</sub>\* N<sub>freq,n</sub>)  $(5^* K_r^* N_{freq,r})$ Note (5\* K<sub>n</sub>\* 0.128<DRX-Note (5\* K<sub>n</sub>\* Note (5\* K<sub>r</sub>\* N<sub>freg,r</sub>) Note (5\* K<sub>r</sub>\* N<sub>freq,r</sub>) cycle≤2.56  $N_{freq,n}$  $N_{freq,n}$ Note: Time depends upon the DRX cycle in use

Table 8.1.2.4.1.2-2: Requirement to measure UTRA FDD cells

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

# 8.1.2.4.1.2.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

# 8.1.2.4.1.2.2 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify,UTRA\_FDD}$  defined in Clause 8.1.2.4.1.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify,\ UTRA\_FDD}$  defined in clause 8.1.2.4.1.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{measurement\_UTRA\_FDD}$  defined in clause 8.1.2.4.1.2 provided the timing to that cell has not changed more than  $\pm$  32 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

### 8.1.2.4.1.2.3 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.1.2.2.

### 8.1.2.4.2 E-UTRAN TDD – UTRAN FDD measurements

The requirements in clause 8.1.2.4.1 also apply for this section.

- 8.1.2.4.2.1 E-UTRAN TDD UTRAN FDD measurements when no DRX is used
- 8.1.2.4.2.2 E-UTRAN TDD UTRAN FDD measurements when DRX is used

### 8.1.2.4.3 E-UTRAN TDD – UTRAN TDD measurements

#### 8.1.2.4.3.1 E-UTRAN TDD – UTRAN TDD measurements when no DRX is used

# 8.1.2.4.3.1.1 Identification of a new UTRA TDD cell

When explicit neighbour list is provided and no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, UTRA\_TDD}} = Max \left\{ 5000, T_{\text{basic identify UTRA\_TDD}} \cdot \frac{480}{T_{\text{interl}}} \cdot K_n \cdot N_{freq,n} \right\} ms \text{ (normal performance)},$$

and

$$T_{\text{identify, UTRA\_TDD}} = Max \left\{ 5000, T_{\text{basic identify UTRA\_TDD}} \cdot \frac{480}{T_{\text{interl}}} \cdot K_r \cdot N_{freq,r} \right\} ms \text{ (reduced performance)}$$

A cell shall be considered detectable when

- P-CCPCH Ec/Io  $\geq$  -8 dB,
- DwPCH\_Ec/Io  $\geq$  -5 dB.

When L3 filtering is used an additional delay can be expected.

#### 8.1.2.4.3.1.1a Enhanced UTRA TDD cell identification requirements

When explicit neighbour list is provided and no DRX is used or when DRX cycle length  $\leq$  40 ms, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within  $T_{identify,\,enhanced\,\,UTRA\,\,TDD}$ :

$$T_{\text{identify, enhanced\_UTRA\_TDD}} = (T_{\text{basic\_identify\_enhanced\_UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} + 480) \cdot K_n \cdot N_{freq,n} \quad \textit{ms} \text{ (normal performance)},$$

and

$$\mathbf{T}_{\text{identify, enhanced\_UTRA\_TDD}} = (\mathbf{T}_{\text{basic\_identify\_enhanced\_UTRA\_TDD}} \cdot \frac{480}{\mathbf{T}_{\text{interl}}} + 480) \cdot K_r \cdot N_{\textit{Freq,r}} \quad \textit{ms} \text{ (reduced performance)}.$$

A cell shall be considered detectable when:

- P-CCPCH\_Ec/Io > -6 dB,
- DwPCH\_Ec/Io  $\geq$  -1 dB

When L3 filtering is used an additional delay can be expected.

# 8.1.2.4.3.1.2 UE UTRA TDD P-CCPCH RSCP measurement capability

When measurement gaps are scheduled for UTRA TDD inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Clause 9.3 with measurement period given by

$$T_{\text{measurement UTRA\_TDD}} = Max \left\{ T_{\text{Measurement\_Period UTRA\_TDD}}, T_{\text{basic measurement UTRA\_TDD}}, T_{\text{inter1}} \cdot K_n \cdot N_{freq,n} \right\} ms$$
(normal performance)

and

$$T_{\text{measurement UTRA\_TDD}} = Max \left\{ T_{\text{Measurement\_Period UTRA\_TDD}}, T_{\text{basic measurement UTRA\_TDD}}, \frac{480}{T_{\text{inter1}}} \cdot K_r \cdot N_{freq,r} \right\} ms \text{ (reduced performance)}$$

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements for  $X_{basic\ measurementUTRA\_TDD}$  interfrequency cells per TDD frequency of the monitored set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\ UTRA\ TDD}$ .

$$X_{basic\ measurement UTRA\ TDD} = 6$$

 $T_{\text{Measurement\_Period UTRA\_TDD}}$  = 480 ms is the period used for calculating the measurement period  $T_{\text{measurement\_UTRA\_TDD}}$  for UTRA TDD P-CCPCH RSCP measurements.

 $T_{basic\_identify\_UTRA\_TDD} = 800$  ms is the time period used in the inter RAT equation in clause 8.1.2.4.3.1.1 where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

 $T_{basic\_identify\_enhanced\_UTRA\_TDD} = 80$  ms is the time period used in the inter RAT equation in clause 8.1.2.4.3.1.1a where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

 $T_{basic\_measurement\_UTRA\_TDD}$  = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

 $N_{freq,n}$ ,  $N_{freq,r}$ ,  $K_n$  and  $K_r$  are defined in clause 8.1.2.1.1 and  $T_{inter1}$  is defined in clause 8.1.2.1

### 8.1.2.4.3.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

# 8.1.2.4.3.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify,\,UTRA\_TDD}$  defined in Clause 8.1.2.4.3.1.1 for the minimum requirements or  $T_{identify,\,enhanced\_UTRA\_TDD}$  defined in Clause 8.1.2.4.3.1.1a for the enhanced requirements. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify,\,UTRA\_TDD}$  defined in clause 8.1.2.4.3.1.1 for the minimum requirements and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{measurement\_UTRA\_TDD}$  defined in clause 8.1.2.4.3.1.2 provided the timing to that cell has not changed more than  $\pm$  10 chips while measurement gap has not been available and the L3 filter has not been used.

When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

#### **Event-triggered Periodic Reporting** 8.1.2.4.3.1.5

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.3.1.4.

#### 8.1.2.4.3.2 E-UTRAN TDD - UTRAN TDD measurements when DRX is used

When explicit neighbour list is provided and DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within T<sub>identify,UTRA\_TDD</sub> as shown in table 8.1.2.4.3.2-1

DRX cycle length (s)		(s) (DRX cycles) quirement)	T <sub>identify_UTRA_TDD</sub> (s) (DRX cycles) (reduced requirement)		
length (s)	Gap period = 40	Gap period = 80	Gap period = 40	Gap period = 80	
	ms ms		ms	ms	
≤0.32	Non DRX	Non DRX	Non DRX	Non DRX	
	Requirements in Requirements in		Requirements in	Requirements in	
	clause 8.1.2.4.3.1	clause 8.1.2.4.3.1	clause 8.1.2.4.3.1	clause 8.1.2.4.3.1	
	are applicable	are applicable	are applicable	are applicable	
0.32 <drx-< td=""><td>Note (20*K<sub>n</sub>*</td><td>Note (25*K<sub>n</sub> *</td><td>Note (20*K<sub>r</sub>*</td><td>Note (25*K<sub>r</sub> *</td></drx-<>	Note (20*K <sub>n</sub> *	Note (25*K <sub>n</sub> *	Note (20*K <sub>r</sub> *	Note (25*K <sub>r</sub> *	
cycle≤0.512	$N_{freq,n}$ )	N <sub>freq,n</sub> )	$N_{freq,r}$ )	$N_{freq,r}$ )	
0.512 <drx-< td=""><td>Note (20*K<sub>n</sub> *</td><td>Note</td><td>Note (20*K<sub>r</sub> *</td><td>Note</td></drx-<>	Note (20*K <sub>n</sub> *	Note	Note (20*K <sub>r</sub> *	Note	
cycle≤2.56	$N_{freq,n}$ (20*K <sub>n</sub> * $N_{freq,n}$ )		N <sub>freq,r</sub> )	(20*K <sub>r</sub> * N <sub>freq,r</sub> )	
Note: Time depends upon the DRX cycle in use					

Table 8.1.2.4.3.2-1: Requirement to identify a newly detectable UTRA TDD cell

A cell shall be considered detectable provided following conditions are fulfilled: A cell shall be considered detectable when

P-CCPCH Ec/Io  $\geq$  -8 dB,

DwPCH\_Ec/Io  $\geq$  -5 dB.

When L3 filtering is used an additional delay can be expected.

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements of at least 6 UTRA cells per UTRA TDD carrier for up to 3 UTRA TDD carriers and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period defined in table 8.1.2.4.3.2-2 when DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps. UE supporting Increased UE carrier monitoring UTRA shall be capable of performing UTRA TDD P-CCPCH RSCP measurements of at least 6 UTRA cells per UTRA TDD carrier for up to 7 UTRA TDD carriers with maximum of 80 cells consisting of at most 32 cells per frequency layer in the neighbour cell list.

DRX cycle length (s)	T <sub>measure_UTRA_TDD</sub> (s) (DRX cycles) (normal requirement)		T <sub>measure_UTRA_TDD</sub> (s) (DRX cycles) (reduced requirement)		
	Gap period = 40 Gap period = 80		Gap period = 40	Gap period = 80	
	ms	ms	ms	ms	
≤0.04	Non DRX	Non DRX	Non DRX	Non DRX	
	Requirements in	Requirements in	Requirements in	Requirements in	
	clause 8.1.2.4.3.1	clause 8.1.2.4.3.1	clause 8.1.2.4.3.1	clause 8.1.2.4.3.1	
	are applicable	are applicable	are applicable	are applicable	
0.064	0.48*K <sub>n</sub> *N <sub>freq,n</sub>	$0.8*K_n*N_{freq,n}$	0.48* K <sub>r</sub> * N <sub>freq,r</sub>	0.8* K <sub>r</sub> * N <sub>freq,r</sub>	
	$(7.5*K_n *N_{freq,n})$	$(12.5*K_n *N_{freq,n})$	(7.5* K <sub>r</sub> * N <sub>freq,r</sub> )	(12.5* K <sub>r</sub> * N <sub>freq,r</sub> )	
0.08	0.48*K <sub>n</sub> *N <sub>freq,n</sub>	0. 8*K <sub>n</sub> *N <sub>freq,n</sub>	0.48* K <sub>r</sub> * N <sub>freq,r</sub>	0. 8* K <sub>r</sub> * N <sub>freq,r</sub>	
	(6*K <sub>n</sub> *N <sub>freq,n</sub> )	(10*K <sub>n</sub> *N <sub>freq,n</sub> )	(6* K <sub>r</sub> * N <sub>freq,r</sub> )	(10* K <sub>r</sub> * N <sub>freq,r</sub> )	
0.128	0.64*K <sub>n</sub> *N <sub>freq,n</sub>	0. 8*K <sub>n</sub> *N <sub>freq,n</sub>	0.64* K <sub>r</sub> * N <sub>freq,r</sub>	0. 8* K <sub>r</sub> * N <sub>freq,r</sub>	
	(5*K <sub>n</sub> *N <sub>freq,n</sub> )	(6.25*K <sub>n</sub> *N <sub>freq,n</sub> )	(5* K <sub>r</sub> * N <sub>freq,r</sub> )	(6.25* N <sub>freq,r</sub> )	
0.	Note (5*K <sub>n</sub>	Note (5*K <sub>n</sub>	Note (5* K <sub>r</sub> *	Note (5* K <sub>r</sub> *	
128 <drx-< td=""><td>*N<sub>freq,n</sub>)</td><td>*N<sub>freq,n</sub>)</td><td><math>N_{freq,r}</math>)</td><td>N<sub>freq,r</sub>)</td></drx-<>	*N <sub>freq,n</sub> )	*N <sub>freq,n</sub> )	$N_{freq,r}$ )	N <sub>freq,r</sub> )	
cycle≤2.56	, .	, .	, .	, .	
Note: Time depends upon the DRX cycle in use					

Table 8.1.2.4.3.2-2: Requirement to measure UTRA TDD cells

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

# 8.1.2.4.3.2.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

# 8.1.2.4.3.2.2 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify,\,UTRA\_TDD}$  defined in Clause 8.1.2.4.3.2 When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify,\, UTRA\_TDD}$  defined in clause 8.1.2.4.3.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{measurement\_UTRA\_TDD}$  defined in clause 8.1.2.4.3.2 provided the timing to that cell has not changed more than  $\pm$  10 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.4.3.2.3 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.3.2.2.

#### 8.1.2.4.4 E-UTRAN FDD – UTRAN TDD measurements

The requirements in clause 8.1.2.4.3 also apply for this section.

# 8.1.2.4.5 E-UTRAN FDD – GSM measurements

### 8.1.2.4.5.1 E-UTRAN FDD – GSM measurements when no DRX is used

The requirements in this clause apply only to UE supporting E-UTRAN FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified.

In RRC\_CONNECTED state when a supported measurement gap pattern sequence according to Table 8.1.2.1-1 is configured by E-UTRAN, or the UE supports capability of conducting such measurements without gaps, the UE shall continuously measure GSM cells, search for new GSM cells given in the monitored set and re-confirm the BSIC for already detected cells.

#### 8.1.2.4.5.1.1 GSM carrier RSSI

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in clause 8.1.2.1. A UE supporting GSM measurements shall measure minimum number of 10 GSM carrier RSSI measurement samples ( $N_{GSM\ carrier\ RSSI}$ ) per measurement gap. In RRC\_CONNECTED state the measurement period,  $T_{Measurement\ Period,\ GSM}$ , for the GSM carrier RSSI measurement is  $K_n*N_{freq,n}*480$  ms. The parameters  $N_{freq,n}$  and  $K_n$  are defined in clause 8.1.2.1.1.

The UE shall meet the measurement accuracy requirements stated for RXLEV in [8], when the given measurement time allows the UE to take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

In case the UE is not able to acquire the required number of samples per GSM carrier during one measurement period, the UE shall measure as many GSM carriers as possible during that measurement period using at least 3 samples per GSM carrier. The GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

# 8.1.2.4.5.1.2 BSIC verification

Measurements on a GSM cell can be requested with BSIC verified. The UE shall be able to report the GSM cells with BSIC verified for those cells where the verification of BSIC has been successful.

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

- **Initial BSIC identification:** Includes searching for the BSIC and decoding the BSIC for the first time when there is no knowledge about the relative timing between the E-UTRAN FDD and GSM cells. The UE shall trigger the initial BSIC identification within the available measurement gap pattern sequence. The requirements for BSIC re-confirmation can be found in clause 8.1.2.4.5.1.2.1.
- **BSIC re-confirmation:** Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The UE shall trigger the BSIC re-confirmation within the available measurement gap pattern. The requirements for BSIC re-confirmation can be found in clause 8.1.2.4.5.1.2.2.

If the network requests measurements on a GSM cell the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to clause 8.1.2.4.5.1 when a measurement gap pattern sequence is activated, or the UE supports capability of conducting such measurements without gaps.

The UE shall perform measurement reporting as defined in TS 36.331 [2].

- The UE shall perform BSIC identification. The UE shall use the most recently available GSM carrier RSSI measurement results for arranging GSM cells in signal strength order for performing BSIC identification.
- The UE shall perform BSIC re-confirmation on all the GSM cells that have been successfully identified.

- The UE shall perform all configured event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the most recently available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting.
- Event-triggered and periodic reports shall be triggered according to TS 36.331 [2].

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification). Once a GSM cell has been identified the BSIC shall be re-confirmed at least once every  $8*T_{re-confirm,GSM}$  seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified". If a measurement gap pattern sequence is deactivated by the network after BSIC has been identified or verified, the UE shall consider the BSIC as non-verified.

 $T_{identify,GSM}$  indicates the maximum time allowed for the UE to decode the unknown BSIC of the GSM cell in one GSM BCCH carrier in the initial BSIC identification procedure.

 $T_{\text{re-confirm,GSM}}$  indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure.

The UE shall be able to decode a BSIC within a measurement gap when the time difference between the middle of the received GSM synchronisation burst at the UE and the middle of the effective measurement gap is within the limits specified in table 8.1.2.4.5.1.2-1.

Table 8.1.2.4.5.1.2-1: The gap length and maximum time difference for BSIC verification

Gap length [ms]	Maximum time difference [μs]
6	± 2350 µs

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in [9].

### 8.1.2.4.5.1.2.1 Initial BSIC identification

This measurement shall be based on the measurement gaps used for Initial BSIC identification as described in clause 8.1.2.4.5.1.2.

The UE shall continuously attempt to decode the BSIC of SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the Inter-RAT cell info list. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BCCH carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value.

If the BSIC of the GSM BCCH carrier has been successfully decoded the UE shall immediately continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within  $T_{identify,GSM}$  ms, the UE shall abort the BSIC identification attempts for that GSM BCCH carrier. The UE shall continue to try to perform BSIC identification of the next GSM BCCH carrier in signal strength order. The GSM BCCH carrier for which the BSIC identification failed shall not be re-considered for BSIC identification until BSIC identification attempts have been made for all the rest of the 8 strongest GSM BCCH carriers in the monitored set with unknown BSIC.

 $T_{identify,GSM}$  values are given for a set of reference gap patterns in table 8.1.2.4.5.1.2.1-1. The requirements in the table represent the time required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier. If interfrequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then  $T_{identify,GSM}$  shall be based on the 80ms gap configuration.

Table 8.1.2.4.5.1.2.1-1

	T <sub>identify,gsm</sub> (ms)		T <sub>reconfirm,gsm</sub> (ms)	
ceil(N <sub>freq,n</sub> * K <sub>n</sub> - M <sub>gsm</sub> )	40ms gap configuration (ID 0)	80ms gap configuration (ID 1)	40ms gap configuration (ID 0)	80ms gap configuration (ID 1)
0	2160	5280	1920	5040
1	5280	21760	5040	17280
2	5280	31680	5040	29280
3	19440	No requirement	13320	No requirement
4	31680	No requirement	29280	No requirement
5	31680	No requirement	29280	No requirement

#### 8.1.2.4.5.1.2.2 BSIC re-confirmation

The UE shall maintain the timing information of up to 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For each measurement gap used for GSM BSIC reconfirmation as described in clause 8.1.2.4.5.1.2, the UE shall attempt to decode the BSIC falling within the measurement gap according to table 8.1.2.4.5.1.2.1-1. If more than one BSIC can be decoded within the same measurement gap, priority shall be given to the least recently decoded BSIC. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then  $T_{\text{re-confirm},GSM}$  shall be based on the 80ms gap configuration.

If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within  $T_{re-confirm,GSM}$  seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see clause 8.1.2.4.5.1.2.1.

#### 8.1.2.4.5.1.2a Enhanced BSIC verification

In addition to the BSIC verification requirements in clause 8.1.2.4.5.1.2, when the UE receives the GSM cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in [9] the BSIC identification requirement in table 8.1.2.4.5.1.2a-1 applies. The BSIC verification requirements in table 8.1.2.4.5.1.2a-1 shall apply when no DRX is used or when DRX cycle length  $\leq 40 \text{ ms}$ .

Table 8.1.2.4.5.1.2a-1

	T <sub>enhanced_identify,gsm</sub> (ms)		T <sub>enhanced_reco</sub>	Tenhanced_reconfirm,gsm(ms)	
				40ms gap	
		40ms gap		configuration	
		configuration		when	
		when		interfrequency	
		interfrequency		RSTD	
		RSTD		measurement	
		measurement		is also	
		is also		configured	
		configured and		and the UE	
		the UE requires		requires	
		measurement		measurement	
		gaps for		gaps for	
ceil(N <sub>freq,n</sub>	40ms gap	performing	40ms gap	performing	
* K <sub>n</sub> –	configuration	such	configuration	such	
M <sub>gsm</sub> )	(ID 0)	measurements	(ID 0)	measurements	
0	1320	2160	1080	1920	

#### 8.1.2.4.5.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

### 8.1.2.4.5.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period  $T_{Measurement\ Period,\ GSM}$  (see clause 8.1.2.4.5.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC, measured without L3 filtering shall be less than  $2*T_{Measurement\ Period,\ GSM}$ , where  $T_{Measurement\ Period,\ GSM}$  is defined in clause 8.1.2.4.5.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

# 8.1.2.4.5.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.5.1.4.

### 8.1.2.4.5.2 E-UTRAN FDD – GSM measurements when DRX is used

The requirements in this clause apply only to UE supporting E-UTRAN FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified.

In RRC\_CONNECTED state when a supported measurement gap pattern sequence according to Table 8.1.2.1-1 is configured by E-UTRAN, or the UE supports capability of conducting such measurements without gaps, the UE shall continuously measure GSM cells, search for new GSM cells given in the monitored set and re-confirm the BSIC for already detected cells. During DRX periods the UE may use other periods of time outside the specified measurement gap patterns. The UE is not required to make measurements of GSM cells during DRX periods if a measurement gap pattern has not been configured, unless the UE supports capability of conducting such measurements without gaps.

# 8.1.2.4.5.2.1 GSM carrier RSSI

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in clause 8.1.2.1. A UE supporting GSM measurements shall measure minimum number of 10 GSM carrier RSSI measurement samples ( $N_{GSM\ carrier\ RSSI}$ ) per DRX cycle. In RRC\_CONNECTED state the measurement period,  $T_{Measurement\ Period,\ GSM}$ , for the GSM carrier RSSI measurement is shown in table 8.1.2.4.5.2.1-1. The parameters  $N_{freq,n}$  and  $K_n$  are defined in clause 8.1.2.1.1.

Table 8.1.2.4.5.2.1-1: GSM measurement period for large DRX

DRX cycle length (s)	T <sub>measure,GSM</sub> (s) (DRX cycles)		
≤0.064	Non DRX Requirements are		
	applicable		
0.064 <drx-cycle≤< td=""><td>Note (6*K<sub>n</sub>*N<sub>freq,n</sub>)</td></drx-cycle≤<>	Note (6*K <sub>n</sub> *N <sub>freq,n</sub> )		
0.08			
0.08 <drx-cycle≤ 2.56<="" td=""><td>Note <math>(5*K_n*N_{freq,n})</math></td></drx-cycle≤>	Note $(5*K_n*N_{freq,n})$		
Note: Time depends upon the DRX cycle in use			

The UE shall meet the measurement accuracy requirements stated for RXLEV in [8], when the given measurement time allows the UE to take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

In case the UE is not able to acquire the required number of samples per GSM carrier during one measurement period, the UE shall measure as many GSM carriers as possible during that measurement period using at least 3 samples per GSM carrier. The GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

# 8.1.2.4.5.2.2 BSIC verification

Measurements on a GSM cell can be requested with BSIC verified. The UE shall be able to report the GSM cells with BSIC verified for those cells where the verification of BSIC has been successful.

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

- **Initial BSIC identification:** Includes searching for the BSIC and decoding the BSIC for the first time when there is no knowledge about the relative timing between the E-UTRAN FDD and GSM cells.
- **BSIC re-confirmation:** Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The UE shall trigger the BSIC re-confirmation within the available measurement gap pattern

If the network requests measurements on a GSM cell, the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to clause 8.1.2.4.5.2.1 when a measurement gap pattern sequence is activated, or the UE supports capability of conducting such measurements without gaps.

The UE shall perform measurement reporting as defined in TS 36.331 [2].

- The UE shall perform BSIC identification. The UE shall use the most recently available GSM carrier RSSI measurement results for arranging GSM cells in signal strength order for performing BSIC identification.
- The UE shall perform BSIC re-confirmation on all the GSM cells that have been successfully identified.
- The UE shall perform all configured event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the most recently available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting.
- Event-triggered and periodic reports shall be triggered according to TS 36.331 [2].

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification). Once a GSM cell has been identified the BSIC shall be re-confirmed at least once every 30 seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified".

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in [9].

#### 8.1.2.4.5.2.2.1 Initial BSIC identification

This measurement shall be made on GSM cells that are requested with BSIC verified.

For DRX cycle length  $\leq$  40 ms, the initial GSM BSIC identification requirements corresponding to the non DRX requirements as specified in clause 8.1.2.4.5.1.2.1 shall apply.

For DRX cycle length > 40 ms, the UE shall make at least one attempt every  $K_n*N_{freq,n}*30s$  to decode the BSIC of SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the Inter-RAT cell info list. If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within  $K_n*N_{freq,n}*60s$ , the UE shall abort the BSIC identification attempts for that GSM BCCH carrier. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BCCH carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value. The parameters  $N_{freq,n}$  and  $K_n$  are defined in clause 8.1.2.1.1.

If the BSIC of the GSM BCCH carrier has been successfully decoded the UE shall continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

#### 8.1.2.4.5.2.2.2 BSIC re-confirmation

The UE shall maintain the timing information of up to 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For DRX cycle length  $\leq$  40 ms, the GSM BSIC re-conformation requirements corresponding to the non DRX requirements as specified in clause 8.1.2.4.5.1.2.2 shall apply.

For DRX cycle length > 40 ms, at least every  $K_n*N_{freq,n}*30$  seconds, the UE shall attempt to decode the BSIC of each identified GSM cell. If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within  $K_n*N_{freq,n}*60$  seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see clause 8.1.2.4.5.2.2.1. The parameters  $N_{freq,n}$  and  $k_n$  are defined in clause 8.1.2.1.1.

# 8.1.2.4.5.2.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

### 8.1.2.4.5.2.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period  $T_{Measurement\ Period,\ GSM}$  (see clause 8.1.2.4.5.2.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC , measured without L3 filtering shall be less than  $2*T_{Measurement\ Period,\ GSM}$ , where  $T_{Measurement\ Period,\ GSM}$  is defined in clause 8.1.2.4.5.2.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

### 8.1.2.4.5.2.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.5.2.4.

# 8.1.2.4.6 E-UTRAN TDD – GSM measurements

The requirements in clause 8.1.2.4.5 also apply for this section.

# 8.1.2.4.7 E-UTRAN FDD – UTRAN FDD measurements for SON

# 8.1.2.4.7.1 Identification of a new UTRA FDD cell for SON

No explicit neighbour list is provided to the UE for identifying a UTRA cell for SON. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON.

# 8.1.2.4.7.1.1 Requirements when no DRX is used

When no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within:

$$T_{\text{identify, UTRA\_FDD}} = T_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{\text{Tinter1}} \cdot K_n N_{\text{freq,n}} \quad \textit{ms} \text{ (normal performance)}$$

and

$$\mathbf{T}_{\text{identify, UTRA\_FDD}} = \mathbf{T}_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{\text{Tinter1}} \cdot K_r N_{\textit{freq,r}} \quad \textit{ms} \, (\text{reduced performance})$$

 $T_{basic\_identify\_UTRA\_FDD} = 300$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- CPICH Ec/Io  $\geq$  -20 dB,
- SCH\_Ec/Io ≥ -17 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within 8\*T<sub>identify, UTRA\_FDD</sub> ms, the UE may stop searching UTRA cells for SON.

# 8.1.2.4.7.1.2 Requirements when DRX is used

When DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within  $T_{identify,\,UTRA\_FDD}$  as defined in table 8.1.2.4.7.1.2-1.

DRX cycle length (s)	T <sub>identify, UTRA_FDD</sub> (s) (DRX cycles) (normal requirement)		T <sub>identify, UTRA_FDD</sub> (s) (DRX cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX	Non DRX	Non DRX	Non DRX
	Requirements in	Requirements in	Requirements in	Requirements in
	clause 8.1.2.4.7.1.1are	clause 8.1.2.4.7.1.1	clause 8.1.2.4.7.1.1are	clause 8.1.2.4.7.1.1
	applicable	are applicable	applicable	are applicable
0.04 <drx< td=""><td>Note (45*K<sub>n</sub>* N<sub>freq,n</sub>)</td><td>Note (95<math>^*</math>K<sub>n</sub> <math>^*</math> N<sub>freq,n</sub>)</td><td>Note (45*K<sub>r</sub>* N<sub>freq,r</sub>)</td><td>Note (95*K<sub>r</sub> * N<sub>freq,r</sub>)</td></drx<>	Note (45*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (95 $^*$ K <sub>n</sub> $^*$ N <sub>freq,n</sub> )	Note (45*K <sub>r</sub> * N <sub>freq,r</sub> )	Note (95*K <sub>r</sub> * N <sub>freq,r</sub> )
cycle≤0.08			·	·
0.128	3.84*K <sub>n</sub> * N <sub>freq,n</sub> (30*K <sub>n</sub>	8.0*K <sub>n</sub> * N <sub>freq,n</sub>	3.84*K <sub>r</sub> * N <sub>freq,r</sub> (30*K <sub>r</sub> *	8.0*K <sub>r</sub> * N <sub>freq,r</sub> (62.5*K <sub>r</sub>
	* N <sub>freq,n</sub> )	(62.5*K <sub>n</sub> * N <sub>freq,n</sub> )	N <sub>freq,r</sub> )	* N <sub>freq,r</sub> )
0.16	4.0*K <sub>n</sub> * N <sub>freq,n</sub> (25*K <sub>n</sub> *	8.0*K <sub>n</sub> * N <sub>freq,n</sub> (50*K <sub>n</sub>	4.0*K <sub>r</sub> * N <sub>freq,r</sub> (25*K <sub>r</sub> *	8.0*K <sub>r</sub> * N <sub>freq,r</sub> (50*K <sub>r</sub> *
	N <sub>freq,n</sub> )	* N <sub>freq,n</sub> )	N <sub>freq,r</sub> )	N <sub>freq,r</sub> )
0.256	6.4*K <sub>n</sub> * N <sub>freq,n</sub> (25*K <sub>n</sub> *	8.96*K <sub>n</sub> * N <sub>freq,n</sub>	6.4*K <sub>r</sub> * N <sub>freq,r</sub> (25*K <sub>r</sub> *	8.96*K <sub>r</sub> * N <sub>freq,r</sub> (35*K <sub>r</sub>
	N <sub>freq,n</sub> )	(35*K <sub>n</sub> * N <sub>freq,n</sub> )	N <sub>freq,r</sub> )	* N <sub>freq,r</sub> )
0.32	8*K <sub>n</sub> * N <sub>freq,n</sub> (25*K <sub>n</sub> *	8.96*K <sub>n</sub> * N <sub>freq,n</sub>	8*K <sub>r</sub> * N <sub>freq,r</sub> (25*K <sub>r</sub> *	8.96*K <sub>r</sub> * N <sub>freq,r</sub> (28*K <sub>r</sub>
	N <sub>freq,n</sub> )	(28*K <sub>n</sub> * N <sub>freq,n</sub> )	N <sub>freq,r</sub> )	* N <sub>freq,r</sub> )
0.32 <drx< td=""><td>Note (25*K<sub>n</sub> * N<sub>freq,n</sub>)</td><td>Note (25*K<sub>n</sub> * N<sub>freq,n</sub>)</td><td>Note (25*K<sub>r</sub> * N<sub>freq,r</sub>)</td><td>Note (25*K<sub>r</sub> * N<sub>freq,r</sub>)</td></drx<>	Note (25*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (25*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (25*K <sub>r</sub> * N <sub>freq,r</sub> )	Note (25*K <sub>r</sub> * N <sub>freq,r</sub> )
cycle≤2.56		, in the second		, ,
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.7.1.2-1: Requirement to identify a new UTRA FDD cell for SON

A cell shall be considered identifiable provided following conditions are fulfilled:

- CPICH Ec/Io  $\geq$  -20 dB,
- SCH\_Ec/Io ≥ -17 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within  $8*T_{identify, UTRA\_FDD}$  seconds, the UE may stop searching UTRA cells for SON;  $T_{identify, UTRA\_FDD}$  is defined in table 8.1.2.4.7.1.2-1.

#### 8.1.2.4.7.1.3 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON until the UE starts to transmit its physical cell identity over the Uu interface. This requirement assumes that the reporting of the physical cell identity is not delayed by other RRC signalling on the DCCH. This reporting delay excludes a delay uncertainty resulted when inserting the physical cell identity of the strongest cell for SON to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This reporting delay excludes any delay caused by unavailability of UL resources for UE sending the physical cell identity of the strongest cell for SON.

The reporting delay of the physical cell identity of the strongest cell for SON without L3 filtering shall be less than  $T_{identify,\,UTRA\_FDD}$  defined in clause 8.1.2.4.7.1.1 and in clause 8.1.2.4.7.1.2 for non DRX and DRX cases respectively. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.4.8 E-UTRAN TDD – UTRAN FDD measurements for SON

The requirements in clause 8.1.2.4.7 also apply for this section.

#### 8.1.2.4.9 E-UTRAN FDD – cdma2000 1xRTT measurements

UE shall perform cdma2000 1xRTT measurements according to the procedure defined in [15] on the cdma2000 1xRTT neighbor cells indicated by the serving eNode B. If measurement gaps are required, the UE shall perform cdma2000 1xRTT measurements only during the measurement gaps configured by the serving eNode B.

# 8.1.2.4.9.1A E-UTRAN FDD – cdma2000 1xRTT measurements when no DRX is used

When measurement gaps are scheduled for CDMA2000 1xRTT inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CDMA2000 1xRTT Pilot Strength measurements to higher layers with measurement accuracy as specified in Clause 9.5, corresponding to a 90% measurement success rate, with measurement period given by

$$\mathbf{T}_{\text{measurement\_CDMA2000\_1x}} = \mathbf{T}_{\text{basic\_measurement\_CDMA2000\_1x}} \cdot \boldsymbol{N}_{freq,n} \cdot \boldsymbol{K}_n \cdot \boldsymbol{S}_{gap}$$

where  $T_{basic\_measurement\_CDMA2000\_1x} = 100$  ms and the measurement gap specific scale factor  $S_{gap}$  is based on the measurement gap pattern in use as defined in Table 8.1.2.4.9.1-1. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then  $S_{gap}$  shall be based to the Gap Pattern Id 1.

Table 8.1.2.4.9.1-1: Gap Pattern Specific Scale Factor

Gap Pattern Id	S <sub>gap</sub>
0	32/3
1	64/3

# 8.1.2.4.9.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

The measurement reporting delay of each periodic report is defined as the time between the end of the last measurement period and the moment when the UE starts to transmit the measurement report over the Uu interface. This delay shall be less than  $T_{71m}$  defined in [15] for each periodic report. This measurement reporting delay excludes a delay which is caused by the unavailability of the uplink resources for the UE to send the measurement report.

# 8.1.2.4.10 E-UTRAN TDD – cdma2000 1xRTT measurements

The requirements in clause 8.1.2.4.9 also apply for this section.

#### 8.1.2.4.11 E-UTRAN FDD – HRPD measurements

UE shall perform HRPD measurements according to the procedure defined in [11] on the HRPD neighbor cells indicated by the serving eNode B. If measurement gaps are required, the UE shall perform HRPD measurements only during the measurement gaps configured by the serving eNode B.

# 8.1.2.4.12 E-UTRAN TDD – HRPD measurements

The requirements in clause 8.1.2.4.11 also apply for this section.

#### 8.1.2.4.13 E-UTRAN TDD – UTRAN TDD measurements for SON

# 8.1.2.4.13.1 Identification of a new UTRA TDD cell for SON

No explicit neighbour list is provided to the UE for identifying a UTRA TDD cell for SON. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON.

#### 8.1.2.4.13.1.1 Requirements when no DRX is used

When no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within:

$$T_{\text{identify, UTRA\_TDD}} = T_{\text{basic\_identify\_UTRA\_TDD}} \cdot \frac{480}{T_{\text{interl}}} \cdot K_n \cdot N_{freq,n} \quad ms \text{ (normal performance)}$$

and

$$\mathbf{T}_{\text{identify, UTRA\_TDD}} = \mathbf{T}_{\text{basic\_identify\_UTRA\_TDD}} \cdot \frac{480}{\mathbf{T}_{\text{interl}}} \cdot K_r \cdot N_{\textit{freq,r}} \quad \textit{ms} \; (\text{reduced performance})$$

 $T_{basic\_identify\_UTRA\_TDD} = 800$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- P-CCPCH Ec/Io  $\geq$  -8 dB,
- $DwPCH_Ec/Io > -5 dB$ .

When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA TDD cell for SON within  $8*T_{identify,\ UTRA\_TDD}$  ms, the UE may stop searching UTRA TDD cells for SON.

# 8.1.2.4.13.1.2 Requirements when DRX is used

When DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within  $T_{identify,\,UTRA\_TDD}$  as defined in table 8.1.2.4.13.1.2-1.

DRX cycle length (s)	T <sub>identify</sub> , UTRA_TDD (s) (DRX cycles)		T <sub>identify, UTRA_TDD</sub> (s) (DRX cycles)	T <sub>identify, UTRA_TDD</sub> (s) (DRX cycles)
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.16	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable
0.16 <drx cycle≤0.256</drx 	Note (25*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (50*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (25*K <sub>r</sub> * N <sub>freq,r</sub> )	Note (50*K <sub>r</sub> * N <sub>freq,r</sub> )
0.256 <drx cycle≤0.32</drx 	Note (25*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (45*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (25*K <sub>r</sub> * N <sub>freq,r</sub> )	Note (45*K <sub>r</sub> * N <sub>freq,r</sub> )
0.32 <drx cycle≤2.56</drx 	Note (25*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (25*K <sub>n</sub> * N <sub>freq,n</sub> )	Note (25*K <sub>r</sub> * N <sub>freq,r</sub> )	Note (25*K <sub>r</sub> * N <sub>freq,r</sub> )
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.13.1.2-1: Requirement to identify a new UTRA TDD cell for SON

A cell shall be considered identifiable provided following conditions are fulfilled:

- P-CCPCH Ec/Io > -8 dB,
- DwPCH Ec/Io > -5 dB.

When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA TDD cell for SON within  $8*T_{identify,\ UTRA\_TDD}$  seconds, the UE may stop searching UTRA TDD cells for SON;  $T_{identify,\ UTRA\_TDD}$  is defined in table 8.1.2.4.13.1.2-1.

#### 8.1.2.4.13.1.3 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON until the UE starts to transmit its physical cell identity over the Uu interface. This requirement assumes that the reporting of the physical cell identity is not delayed by other RRC signalling on the DCCH. This reporting delay excludes a delay uncertainty resulted when inserting the physical cell identity of the strongest cell for SON to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This reporting delay excludes any delay caused by unavailability of UL resources for UE sending the physical cell identity of the strongest cell for SON.

The reporting delay of the physical cell identity of the strongest cell for SON without L3 filtering shall be less than  $T_{identify,\,UTRA\_TDD}$  defined in clause 8.1.2.4.13.1.1 and in clause 8.1.2.4.13.1.2 for non DRX and DRX cases respectively. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.4.14 E-UTRAN FDD – UTRAN TDD measurements for SON

The requirements in clause 8.1.2.4.13 also apply for this section.

# 8.1.2.4.15 E-UTRAN FDD – cdma2000 1xRTT measurements for SON ANR

#### 8.1.2.4.15.1 Identification of a new cdma2000 1xRTT cell for SON ANR

No explicit neighbour list is provided to the UE for identifying a cdma2000 1xRTT cell for SON ANR. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON ANR.

# 8.1.2.4.15.1.1 Requirement when no DRX is used

When measurement gaps are scheduled for CDMA2000 1xRTT inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CDMA2000 1xRTT

Pilot Strength measurements to higher layers with measurement accuracy as specified in Clause 9.5, corresponding to a 90% measurement success rate, with measurement period given by

$$T_{\text{measurement\_CDMA2000\_1x}} = T_{\text{basic\_measurement\_CDMA2000\_1x}} \cdot N_{\text{freq,n}} \cdot K_n \cdot S_{\text{gap}}$$

where  $T_{basic\_measurement\_CDMA2000\_1x} = 100$  ms and the measurement gap specific scale factor  $S_{gap}$  is based on the measurement gap pattern in use as defined in Table 8.1.2.4.15.1.1-1. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then  $S_{gap}$  shall be based to the Gap Pattern Id 1.

Table 8.1.2.4.15.1.1-1: Gap Pattern Specific Scale Factor

Gap Pattern Id	S <sub>gap</sub>
0	32/3
1	64/3

If the UE is unable to identify the CDMA2000 1xRTT cell for SON ANR within [TBD] ms, the UE may stop searching CDMA2000 1xRTT cells for SON ANR.

#### 8.1.2.4.15.1.2 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON ANR as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON ANR until the UE starts to transmit its physical cell identity over the Uu interface. This delay shall be less than  $T_{71m}$  defined in [15]. This measurement reporting delay excludes a delay which is caused by the unavailability of the uplink resources for the UE to send the measurement report.

#### 8.1.2.4.16 E-UTRAN TDD – cdma2000 1xRTT measurements for SON ANR

The requirements in clause 8.1.2.4.15 also apply for this section.

#### 8.1.2.4.17 E-UTRAN FDD-UTRAN FDD measurements with autonomous gaps

The requirements in this clause apply only to UE supporting E-UTRA FDD and UTRA FDD.

#### 8.1.2.4.17.1 Identification of a new CGI of UTRA FDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of UTRA FDD cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for decoding SFN and receiving UTRAN MIB and SIB3 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, the UE shall be able to identify a new CGI of UTRA FDD cell within:

$$T_{\text{identify\_CGI, UTRAN FDD}} = 630 + 40 * SIB3\_REP \ ms$$

where SIB3\_REP is the repetition period at which the UTRAN cell schedules SIB3 blocks in units of frames specified in TS 25.331 [7], provided that the UTRAN cell has been already identified by the UE.

This requirement is applicable for UTRA FDD target cell configurations where the information required to make the SI report can be determined from the MIB and SIB3 alone, and MIB and SIB3 are not segmented into multiple TTIs. Additionally, for the requirement to be applicable, the reception conditions shall be such that the system frame number of the target UTRA FDD cell, the MIB and SIB3 can each be successfully decoded in no more than four attempts.

According to the reception conditions:

A cell shall be considered identifiable following conditions are fulfilled:

- CPICH Ec/Io  $\geq$  -20 dB,

SCH\_Ec/Io ≥ -17 dB for at least one channel tap and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected. The system frame number, the MIB and SIB3 of the target cell shall be considered decodable provided the BCH demodulation requirements are met according to [29].

The requirement for identifying a new CGI of an UTRA FDD cell within T<sub>identify\_CGI, UTRAN FDD</sub> is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

#### 8.1.2.4.17.2 CGI Reporting Delay

The CGI reporting delay occurs due to the delay uncertainty when inserting the CGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the CGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.4.18 E-UTRAN TDD-UTRAN FDD measurements with autonomous gaps

The requirements in this clause apply only to UE supporting E-UTRA TDD and UTRA FDD.

#### 8.1.2.4.18.1 Identification of a new CGI of UTRA FDD cell with autonomous gaps

The requirements in clause 8.1.2.4.17.1 also apply for this section.

#### 8.1.2.4.18.2 CGI Reporting Delay

The requirements in clause 8.1.2.4.17.2 also apply for this section.

#### 8.1.2.5 E-UTRAN OTDOA Intra-Frequency RSTD Measurements

All intra-frequency RSTD measurement requirements specified in Sections 8.1.2.5.1 and 8.1.2.5.2 shall apply without DRX as well as for all the DRX cycles specified in TS 36.331 [2].

#### 8.1.2.5.1 E-UTRAN FDD Intra-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure intra-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells, including the reference cell, on the same carrier frequency f1 as that of the reference cell within

 $T_{RSTD\ Intra Freq FDD,\ E-UTRAN}$  ms as given below (see also Figure 8.1.2.5.1-1):

$$T_{RSTD IntraFreqFDD. E-UTRAN} = T_{PRS} \cdot (M-1) + \Delta$$
 ms

where

 $T_{RSTD\ IntraFreoFDD.\ E-UTRAN}$  is the total time for detecting and measuring at least n cells,

 $T_{\text{PRS}}$  is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

M is the number of PRS positioning occasions as defined in Table 8.1.2.5.1-1, where each PRS positioning occasion comprises of  $N_{PRS}$  ( $1 \le N_{PRS} \le 6$ ) consecutive downlink positioning subframes defined in TS 36.211 [16], and

 $\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$  ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time.

Table 8.1.2.5.1-1: Number of PRS positioning occasions within  $T_{RSTD\;IntraFreqFDD,\;E-UTRAN}$ 

Positioning subframe	Number of PRS positioning occasions $M$	
configuration period $T_{ m PRS}$	f1 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16

Note 1: When only intra-frequency RSTD measurements are performed over cells belonging to the serving FDD carrier frequency f1.

Note 2: When intra-frequency RSTD and inter-frequency RSTD measurements are performed over cells belonging to the serving FDD carrier frequency f1 and one inter-frequency carrier frequency f2, respectively.

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells i out of at least (n-1) neighbor cells within  $T_{RSTD \, IntraFreoFDD, E-UTRAN}$  provided:

 $(PRS \hat{E}_s / Iot)_{ref} \ge -6 dB$  for all Frequency Bands for the reference cell,

 $(PRS \hat{E}_s / Iot)_i \ge 13 dB$  for all Frequency Bands for neighbour cell i,

 $\left( \text{PRS } \hat{\mathbf{E}}_{\text{s}} / \text{Iot} \right)_{\text{ref}}$  and  $\left( \text{PRS } \hat{\mathbf{E}}_{\text{s}} / \text{Iot} \right)_{i}$  conditions apply for all subframes of at least  $L = \frac{M}{2}$  PRS positioning

occasions,

PRP  $1,2|_{dBm}$  according to Annex B.2.5 for a corresponding Band

 $PRS \, \hat{E}_s$  / Iot is defined as the ratio of the average received energy per PRS RE during the useful part of the symbol to the average received power spectral density of the total noise and interference for this RE, where the ratio is measured over all REs which carry PRS.

The time  $T_{RSTD\,IntraFreqFDD,\,E-UTRAN}$  starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE as illustrated in Figure 8.1.2.5.1-1.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.1.

If the intra-frequency handover occurs while intra-frequency RSTD measurements are being performed then the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the intra-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period

(  $T_{\text{RSTD IntraFreqFDD, E-UTRAN, HO}}$  ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD IntraFreqFDD, E-UTRAN, HO}} = \mathbf{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad \textit{ms} \; ,$$

where:

K is the number of times the intra-frequency handover occurs during  $T_{\text{RSTD IntraFreqFDD, E-UTRAN, HO}}$ .

 $T_{\rm HO}$  is the time during which the intra-frequency RSTD measurement may not be possible due to intra-frequency handover; it can be up to 45 ms.

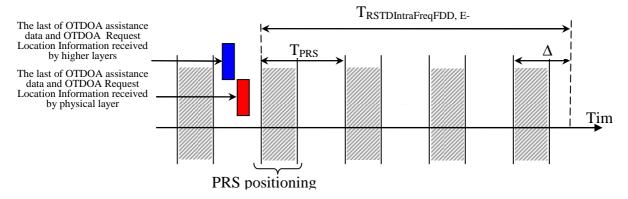


Figure 8.1.2.5.1-1. Illustration of the RSTD reporting time requirement in an FDD system.

Furthermore, due to the intra-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of all the PCells during the RSTD measurement period.

#### 8.1.2.5.1.1 RSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

#### 8.1.2.5.2 E-UTRAN TDD Intra-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure intra-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells, including the reference cell, on the same carrier frequency f1 as that of the reference cell within

 $T_{RSTD\ IntraFreqTDD,\ E-UTRAN}$  ms as given below:

$$T_{RSTD\ Intra} = T_{PRS} \cdot (M-1) + \Delta$$
 ms

where

 $T_{RSTD\ IntraFreqTDD,\ E-UTRAN}$  is the total time for detecting and measuring at least n cells,

 $T_{\rm PRS}$  is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

M is the number of PRS positioning occasions as defined in Table 8.1.2.5.2-1, where a PRS positioning occasion is as defined in Clause 8.1.2.5.1, and

 $\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$  ms is the measurement time for a single PRS positioning occasion which includes the sampling time

and the processing time.

Table 8.1.2.5.2-1: Number of PRS positioning occasions within  $T_{RSTD\;IntraFreqTDD,\;E-UTRAN}$ 

Positioning subframe	Number of PRS positioning occasions $M$	
configuration period $T_{ m PRS}$	f1 Note1	f1 and f2 <sup>Note2</sup>
160 ms	16	32
>160 ms	8	16

Note 1: When only intra-frequency RSTD measurements are performed over cells belonging to the serving TDD carrier frequency f1.

Note 2: When intra-frequency RSTD and inter-frequency RSTD measurements are performed over cells belonging to the serving TDD carrier frequency f1 and one inter-frequency carrier frequency f2 respectively.

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells i out of at least (n-1) neighbor cells within  $T_{RSTD \, IntraFreqTDD, \, E-UTRAN}$  provided:

 $(PRS \hat{E}_s / Iot)_{ref} \ge -6 \text{ dB for all Frequency Bands for the reference cell,}$ 

 $(PRS \hat{E}_s / Iot)_i \ge -13 \text{ dB for all Frequency Bands for neighbour cell } i$ ,

 $(PRS \hat{E}_s / Iot)_{ref}$  and  $(PRS \hat{E}_s / Iot)_i$  conditions apply for all subframes of at least  $L = \frac{M}{2}$  PRS positioning

occasions,

PRP 1,2|dBm according to Annex B.2.5 for a corresponding Band

PRS  $\hat{E}_s$  / Iot is as defined in Clause 8.1.2.5.1.

The time  $T_{RSTD\ IntraFreqTDD,\ E-UTRAN}$  starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

The RSTD measurement accuracy for all measured neighbor cells i shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.1.

If the intra-frequency handover occurs while intra-frequency RSTD measurements are being performed then the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the intra-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period

(  $T_{\text{RSTD IntraFreqTDD, E-UTRAN, HO}}$  ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD IntraFreqTDD, E-UTRAN, HO}} = \mathbf{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad \textit{ms} \; ,$$

where:

K is the number of times the intra-frequency handover occurs during  $T_{\text{RSTD Intra}FreqTDD, E-UTRAN, HO}$ ,

 $T_{
m HO}$  is the time during which the intra-frequency RSTD measurement may not be possible due to intra-frequency handover; it can be up to 45 ms.

Furthermore, due to the intra-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of all the PCells during the RSTD measurement period.

The intra-frequency requirements in this clause (8.1.2.5.2) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.5.2-2.

Table 8.1.2.5.2-2: TDD uplink-downlink subframe configurations applicable for TDD intra-frequency requirements

PRS Transmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations	
6, 15	1, 2, 3, 4 and 5	
25, 50, 75, 100	0, 1, 2, 3, 4, 5 and 6	
Note: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16].		

#### 8.1.2.5.2.1 RSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

#### 8.1.2.6 E-UTRAN Inter-Frequency OTDOA Measurements

All inter-frequency RSTD measurement requirements specified in Sections 8.1.2.6.1-8.1.2.6.4 shall apply, provided that

- the UE is capable of inter-frequency RSTD measurements for OTDOA [24], and
- either the measurement gap pattern ID # 0 specified in Clause 8.1.2.1 is used or the UE supports capability of conducting inter-frequency measurements without gaps.

All inter-frequency RSTD measurement requirements specified in Sections 8.1.2.6.1-8.1.2.6.4 shall apply without DRX as well as for all the DRX cycles specified in TS 36.331 [2].

#### 8.1.2.6.1 E-UTRAN FDD-FDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells, including the reference cell, within  $T_{\rm RSTD\ InterFreqFDD,\ E-UTRAN}$  ms as given below:

$$T_{RSTD InterFreqFDD, E-UTRAN} = T_{PRS} \cdot (M-1) + \Delta$$
 ms

where

 $T_{RSTD\ InterFreqFDD,\ E-UTRAN}$  is the total time for detecting and measuring at least n cells,

 $T_{\rm PRS}$  is the the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured n cells including the reference cell,

*M* is the number of PRS positioning occasions as defined in Table 8.1.2.6.1-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

$$\Delta = 160 \cdot \left[ \frac{n}{M} \right]$$
 ms is the measurement time for a single PRS positioning occasion which includes the sampling time

and the processing time, and

the n cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.1-1: Number of PRS positioning occasions within  $T_{RSTD\ InterFreqFDD,\ E-UTRAN}$ 

Positioning subframe	Number of PRS positioning occasions $M$	
configuration period $T_{ m PRS}$	f2 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16

Note 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the FDD inter-frequency carrier frequency f2.

Note 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving FDD carrier frequency f1 and the FDD inter-frequency carrier frequency f2 respectively.

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells i out of at least (n-1) neighbor cells within  $T_{\text{RSTD InterFreqFDD, E-UTRAN}}$  provided:

$$(PRS \hat{E}_s / Iot)_{ref} \ge -6 dB$$
 for all Frequency Bands for the reference cell,

 $(PRS \hat{E}_s / Iot)_i \ge 13 dB$  for all Frequency Bands for neighbour cell i,

$$\left( \text{PRS } \hat{\mathbf{E}}_{s} / \text{Iot} \right)_{ref}$$
 and  $\left( \text{PRS } \hat{\mathbf{E}}_{s} / \text{Iot} \right)_{i}$  conditions apply for all subframes of at least  $L = \frac{M}{2}$  PRS positioning

occasions

PRP 1,2|dBm according to Annex B.2.6 for a corresponding Band

PRS  $\hat{E}_s$  / Iot is as defined in Clause 8.1.2.5.1.

The time  $T_{RSTD\,InterFreqFDD,\,E-UTRAN}$  starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ( $T_{RSTD\ InterFreqFDD,\ E-UTRAN,\ HO}$ ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD InterFreqFDD, E-UTRAN, HO}} = \mathbf{T}_{\text{RSTD InterFreqFDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad \textit{ms} \; ,$$

where:

K is the number of times the inter-frequency handover occurs during  $T_{\text{RSTD InterFreqFDD, E-UTRAN, HO}}$ ,

 $T_{\rm HO}$  is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells i shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

#### 8.1.2.6.1.1 RSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

#### 8.1.2.6.2 E-UTRAN TDD-FDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells,

including the reference cell, within  $T_{RSTD\ InterFreqTDDFDD,\ E-UTRAN}$  ms as given below:

$$T_{RSTD InterFreqTDDFDD, E-UTRAN} = T_{PRS} \cdot (M - 1) + \Delta$$
 ms

where

 $T_{RSTD\ InterFreqTDDFDD,\ E-UTRAN}$  is the total time for detecting and measuring at least n cells,

 $T_{\rm PRS}$  is the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured n cells including the reference cell,

*M* is the number of PRS positioning occasions as defined in Table 8.1.2.6.2-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

 $\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$  ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time, and

the *n* cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.2-1: Number of PRS positioning occasions within  $T_{RSTD\ InterFreqTDDFDD,\ E-UTRAN}$ 

Positioning subframe	Number of PRS positioning occasions $\it M$	
configuration period $T_{ m PRS}$	f2 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16
NOTE 1: When inter-frequency PSTD measurements are performed over the reference cell and		

NOTE 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the FDD inter-frequency carrier frequency f2.

NOTE 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving TDD carrier frequency f1 and the FDD inter-frequency carrier frequency f2 respectively.

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells i out of at least (n-1) neighbor cells within  $T_{\text{RSTD InterFeqTDDFDD,E-UTRAN}}$ , provided:

 $(PRS \hat{E}_s / Iot)_{ref} \ge -6 dB$  for all Frequency Bands for the reference cell,

 $(PRS \hat{E}_s / Iot)_i \ge -13 dB$  for all Frequency Bands for neighbour cell i,

 $\left(\text{PRS }\hat{\mathbf{E}}_{s} / \text{Iot}\right)_{ref}$  and  $\left(\text{PRS }\hat{\mathbf{E}}_{s} / \text{Iot}\right)_{i}$  conditions apply for all subframes of at least  $L = \frac{M}{2}$  PRS positioning occasions,

PRP 1,2|dBm according to Annex B.2.6 for a corresponding Band,

PRS  $\hat{E}_s$  / Iot is as defined in Clause 8.1.2.5.1.

The time  $T_{RSTD\,InterFeqTDDFDD,E-UTRAN}$  starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ( $T_{RSTD\ InterFreqTDDFDD,\ E-UTRAN,\ HO}$ ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN, HO}} = \mathbf{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad \textit{ms}$$

where:

K is the number of times the inter-frequency handover occurs during  $T_{\text{RSTD InterFreqTDDFDD, E-UTRAN, HO}}$ ,

 $T_{\rm HO}$  is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells i shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

The inter-frequency requirements in this clause (8.1.2.6.2) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.6.2-2.

Table 8.1.2.6.2-2: TDD uplink-downlink subframe configurations applicable for TDD-FDD interfrequency requirements

PRS Transmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
6, 15	1, 2, 3, 4 and 5
25, 50, 75, 100	0, 1, 2, 3, 4, 5 and 6
NOTE: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16].	

#### 8.1.2.6.2.1 RSTD Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

#### 8.1.2.6.3 E-UTRAN TDD-TDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells, including the reference cell, within  $T_{RSTD InterFreqTDD, E-UTRAN}$  ms as given below:

$$T_{RSTD InterFreqTDD, E-UTRAN} = T_{PRS} \cdot (M-1) + \Delta$$
 ms

where

 $T_{RSTD\ InterFreeTDD\ E-UTRAN}$  is the total time for detecting and measuring at least n cells,

 $T_{\rm PRS}$  is the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured n cells including the reference cell,

M is the number of PRS positioning occasions as defined in Table 8.1.2.6.1-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

 $\Delta = 160 \cdot \left[ \frac{n}{M} \right]$  ms is the measurement time for a single PRS positioning occasion which includes the sampling time

and the processing time, and

the n cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.3-1: Number of PRS positioning occasions within  $T_{RSTD\;InterFreqTDD,\;E-UTRAN}$ 

Positioning subframe	Number of PRS positioning occasions $M$	
configuration period $T_{ m PRS}$	f2 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16

Note 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the TDD inter-frequency carrier frequency f2.

Note 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving TDD carrier frequency f1 and the TDD inter-frequency carrier frequency f2 respectively.

The inter-frequency requirements in this clause (8.1.2.6.3) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.6.3-2.

Table 8.1.2.6.3-2: TDD uplink-downlink subframe configurations applicable for inter-frequency requirements

PRS T	ransmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
	6, 15	3, 4 and 5
	25	1, 2, 3, 4, 5 and 6
	50, 75, 100	0, 1, 2, 3, 4, 5 and 6
Note 1:	Note 1: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16].	
Note2:		
	TDD uplink-downlink subframe configurations as specified in Table 8.1.2.5.2-2 shall apply.	

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells i out of at least (n-1) neighbor cells within  $T_{\text{RSTD InterFreqTDD, E-UTRAN}}$  provided:

 $(PRS \, \hat{E}_s / Iot)_{ref} \ge -6 \, dB$  for all Frequency Bands for the reference cell,  $(PRS \, \hat{E}_s / Iot)_i \ge -13 \, dB$  for all Frequency Bands for neighbour cell i,  $(PRS \, \hat{E}_s / Iot)_{ref}$  and  $(PRS \, \hat{E}_s / Iot)_i$  conditions apply for all subframes of at least  $L = \frac{M}{2}$  PRS positioning

PRP 1,2|dBm according to Annex B.2.6 for a corresponding Band

PRS  $\hat{E}_s$  / Iot is as defined in Clause 8.1.2.5.1.

The time  $T_{RSTD\,InterFreqTDD,\,E-UTRAN}$  starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ( $T_{RSTD\ InterFreqTDD,\ E-UTRAN,\ HO}$ ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD InterFreqTDD, E-UTRAN, HO}} = \mathbf{T}_{\text{RSTD InterFreqTDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad \textit{ms} \; ,$$

where:

occasions,

K is the number of times the inter-frequency handover occurs during  $T_{\text{RSTD InterFreqTDD, E-UTRAN, HO}}$ ,

 $T_{\mathrm{HO}}$  is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells i shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

#### 8.1.2.6.3.1 RSTD Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

#### 8.1.2.6.4 E-UTRAN FDD-TDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells, including the reference cell, within  $T_{\text{RSTD InterFeqFDDTDD,E-UTRAN}}$  ms as given below:

$$T_{RSTD InterFeqFDDTDD,E-UTRAN} = T_{PRS} \cdot (M-1) + \Delta$$
 ms ,

where

 $T_{RSTD\ InterFeqFDDTDD.E-UTRAN}$  is the total time for detecting and measuring at least n cells,

 $T_{\rm PRS}$  is the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured n cells including the reference cell,

M is the number of PRS positioning occasions as defined in Table 8.1.2.6.4-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

 $\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$  ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time, and

the n cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.4-1: Number of PRS positioning occasions within  $T_{RSTD\;InterFeqFDDTDD,E-UTRAN}$ 

Positioning subframe configuration period $T_{ m PRS}$		Number of PRS positioning occasions $M$	
		f2 <sup>Note1</sup>	f1 and f2 Note2
	160 ms	16	32
>160 ms		8	16
Note 1:	Note 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the TDD inter-frequency carrier frequency f2.		
Note 2:	Note 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving FDD carrier frequency f1 and the TDD inter-frequency carrier frequency f2 respectively.		

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells i out of at least (n-1) neighbor cells within  $T_{\text{RSTD InterFeqFDDTDD.E-UTRAN}}$ , provided:

 $(PRS \hat{E}_s / Iot)_{ref} \ge -6 dB$  for all Frequency Bands for the reference cell,

 $(PRS \hat{E}_s / Iot)_i \ge 13 \text{ dB for all Frequency Bands for neighbour cell } i$ ,

 $(PRS \hat{E}_s / Iot)_{ref}$  and  $(PRS \hat{E}_s / Iot)_i$  conditions apply for all subframes of at least  $L = \frac{M}{2}$  PRS positioning occasions,

PRP 1,2|dBm according to Annex B.2.6 for a corresponding Band

PRS  $\hat{E}_s$  / Iot is as defined in Clause 8.1.2.5.1.

The time  $T_{RSTD\,InterFeqFDDTDD,E-UTRAN}$  starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ( $T_{RSTD\ InterFreqFDDTDD,\ E-UTRAN,\ HO}$ ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD InterFreqFDDTDD, E-UTRAN, HO}} = \mathbf{T}_{\text{RSTD InterFreqFDDTDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad \textit{ms} \; ,$$

where:

K is the number of times the inter-frequency handover occurs during  $T_{\text{RSTD InterFreqFDDTDD, E-UTRAN, HO}}$ ,

 $T_{\rm HO}$  is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

The inter-frequency requirements in this clause (8.1.2.6.4) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.6.4-2.

Table 8.1.2.6.4-2: TDD uplink-downlink subframe configurations applicable for inter-frequency requirements

PRS Tr	ransmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
	6, 15	3, 4 and 5
	25	1, 2, 3, 4, 5 and 6
	50, 75, 100	0, 1, 2, 3, 4, 5 and 6
Note 1:	Note 1: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16].	
Note2:	Note2: For UEs capable of performing inter-frequency measurements without measurement gaps, TDD uplink-downlink subframe configurations as specified in Table 8.1.2.5.2-2 shall apply.	

#### 8.1.2.6.4.1 RSTD Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

#### 8.1.2.7 E-UTRAN E-CID Measurements

#### 8.1.2.7.1 E-UTRAN FDD UE Rx-Tx Time Difference Measurements

When no DRX is used the physical layer measurement period of the UE Rx-Tx time difference measurement shall be 200 ms.

When DRX is used in RRC\_CONNECTED state the physical layer measurement period ( $T_{measure\_FDD\_UE\_Rx\_Tx1}$ ) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.1-1.

Table 8.1.2.7.1-1: FDD UE Rx-Tx time difference measurement requirement when DRX is used

DRX cycle length (s)	T <sub>measure_FDD_UE_Rx_Tx1</sub> (s) (DRX cycles)	
≤0.04	0.2 (Note1)	
0.04 <drx-cycle≤2.56< td=""><td>Note2 (5)</td></drx-cycle≤2.56<>	Note2 (5)	
Note1: Number of DRX cycle depends upon the DRX cycle in use		
Note2: Time depends upon the DRX cycle in use		

If the UE is performing UE Rx-Tx time difference measurement while the PCell is changed due to the handover then the UE shall restart the Rx-Tx measurement on the new cell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed  $T_{measure\_FDD\_UE\_Rx\_Tx3}$  as defined in the following expression:

Where:

K is the number of times the PCell is changed over the measurement period (T<sub>measure FDD UE Rx Tx3</sub>),

T<sub>PCell</sub> change handover is the time necessary to change the PCell due to handover; it can be up to 45 ms.

If the UE supporting E-UTRA carrier aggregation when configured with the secondary component carrier is performing UE Rx-Tx time difference measurement while the PCell is changed regardless whether the primary component carrier is changed or not then the UE shall restart the Rx-Tx measurement on the new PCell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements corresponding to the new PCell. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed  $T_{measure\_FDD\_UE\_Rx\_Tx2}$  as defined in the following expression:

$$T_{\text{measure FDD UE Rx Tx2}} = (N+1)*(T_{\text{measure FDD UE Rx Tx1}}) + N*T_{\text{PCell change CA}}$$

Where:

N is the number of times the PCell is changed over the measurement period (T<sub>measure FDD UE Rx Tx2</sub>),

T<sub>PCell change CA</sub> is the time necessary to change the PCell; it can be up to 25 ms.

If IDC autonomous denial is configured then the UE shall also meet the requirements, provided not more than 30 IDC autonomous denial suframes are configured over an IDC autonomous denial validity period of at least 200 ms.

The measurement accuracy for the UE Rx-Tx time difference measurement when DRX is used as well as when no DRX is used shall be as specified in the sub-clause 9.1.9.

#### 8.1.2.7.1.1 UE Rx-Tx Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other RRC or LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in subclause 9.1.9.

#### 8.1.2.7.2 E-UTRAN TDD UE Rx-Tx Time Difference Measurements

When no DRX is used the physical layer measurement period of the UE Rx-Tx time difference measurement shall be 200 ms.

When DRX is used in RRC\_CONNECTED state the physical layer measurement period ( $T_{measure\_TDD\_UE\_Rx\_Tx1}$ ) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.2-1.

Table 8.1.2.7.2-1: TDD UE Rx-Tx time difference measurement requirement when DRX is used

DRX cycle length (s)	T <sub>measure_TDD_UE_Rx_Tx1</sub> (s) (DRX cycles)	
≤0.04	0.2 (Note1)	
0.04 <drx-cycle≤2.56< td=""><td>Note2 (5)</td></drx-cycle≤2.56<>	Note2 (5)	
Note1: Number of DRX cycle depends upon the DRX cycle in use		
Note2: Time depends upon the DRX cycle in use		

If the UE is performing UE Rx-Tx time difference measurement while the PCell is changed due to the handover then the UE shall restart the Rx-Tx measurement on the new cell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed  $T_{measure\_TDD\_UE\_Rx\_Tx3}$  as defined in the following expression:

Where:

K is the number of times the PCell is changed over the measurement period (T<sub>measure TDD UE Rx Tx3</sub>),

T<sub>PCell\_change\_handover</sub> is the time necessary to change the PCell due to handover; it can be up to 45 ms.

If the UE supporting E-UTRA carrier aggregation when configured with the secondary component carrier is performing UE Rx-Tx time difference measurement while the PCell is changed regardless whether the primary component carrier is changed or not then the UE shall restart the Rx-Tx measurement on the new PCell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements corresponding to the new PCell. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed  $T_{measure\_TDD\_UE\_Rx\_Tx2}$  as defined in the following expression:

$$T_{measure\_TDD\_UE\_Rx\_Tx2} = (N+1)*(T_{measure\_TDD\_UE\_Rx\_Tx1}) + N*T_{PCell\_change\_CA}$$

Where:

N is the number of times the PCell is changed over the measurement period (T<sub>measure TDD UE Rx Tx2</sub>),

T<sub>PCell change CA</sub> is the time necessary to change the PCell; it can be up to 25 ms.

If IDC autonomous denial is configured then the UE shall also meet the requirements, provided not more than 30 IDC autonomous denial suframes are configured over an IDC autonomous denial validity period of at least 200 ms.

The measurement accuracy for the UE Rx-Tx time difference measurement when DRX is used as well as when no DRX is used shall be as specified in the sub-clause 9.1.9.

For UE, which does not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and is compliant to the requirements for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx specified in TS 36.101 [5], the UE Rx-Tx time difference measurement requirements in Section 8.1.2.7.2 shall apply also with different TDD UL/DL subframe configurations and/or different special subframe configurations used in CCs of different bands, under the following additional conditions:

- UE is not simultaneously scheduled in UL and DL on the different CCs, and
- At least one downlink and one uplink subframes per radio frame are available for the UE Rx-Tx time difference measurement in the measured cell.

#### 8.1.2.7.2.1 UE Rx-Tx Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other RRC or LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in subclause 9.1.9.

#### 8.1.2.7.3 E-UTRAN FDD Intra-frequency E-CID RSRP and RSRQ Measurements

#### 8.1.2.7.3.1 Introduction

The requirements in section 8.1.2.7.3 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN FDD intra-frequency RSRP and RSRQ measurements [24].

#### 8.1.2.7.3.2 Measurement Requirements

The requirements in section 8.1.2.2.1 and section 8.1.2.8.1 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP and RSRQ are defined in section 8.1.2.7.3.3.

#### 8.1.2.7.3.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.2 and 9.1.5 respectively.

#### 8.1.2.7.4 E-UTRAN TDD Intra-frequency E-CID RSRP and RSRQ Measurements

#### 8.1.2.7.4.1 Introduction

The requirements in section 8.1.2.7.4 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN TDD intra-frequency RSRP and RSRQ measurements [24].

#### 8.1.2.7.4.2 Measurement Requirements

The requirements in section 8.1.2.2.2 and section 8.1.2.8.2 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP and RSRQ are defined in section 8.1.2.7.4.3.

#### 8.1.2.7.4.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.2 and 9.1.5 respectively.

# 8.1.2.8 E-UTRAN intra-frequency measurements under time domain measurement resource restriction

The requirements in sections 8.1.2.8.1 and 8.1.2.8.2 shall apply for cells for which time domain measurement resource restriction patterns for performing E-UTRAN FDD intra-frequency measurements and E-UTRAN TDD intra-frequency measurements, respectively, are configured by higher layers (TS 36.331 [2]), provided that also the following additional conditions are fulfilled:

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the intra-frequency measurements, and

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

For cells which are not configured for measurements in the subframes indicated by the time-domain measurement resource restriction pattern, the corresponding requirements specified in Clause 8.1.2.2 apply.

#### 8.1.2.8.1 E-UTRAN FDD intra-frequency measurements

#### 8.1.2.8.1.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra-frequency cell within

$$T_{\text{identify\_intra\_eICIC}} = T_{\text{basic\_identify\_E-UTRA\_FDD\_eICIC, intra}} \cdot \frac{T_{\text{Measurement\_Period\_eICIC, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

T<sub>basic identify E-UTRA FDD eICIC, intra</sub> is 1000 ms.

 $T_{Intra}$  is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_eICIC, Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least  $Y_{\text{measurement\_intra\_eICIC}}$  cells , where  $Y_{\text{measurement\_intra\_eICIC}}$  is defined in the following equation. If the UE has identified more than  $Y_{\text{measurement\_intra\_eICIC}}$  cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement\_intra\_eICIC}} = Floor \left\{ \boldsymbol{X}_{\text{basic\_measurement\_FDD\_eICIC}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period\_eICIC, Intra}} \right\} \text{ cells}$$

where

 $X_{\text{basic measurement FDD eICIC}} = 8 \text{ (cells)}$ 

 $T_{Measurement\_Period\_eICIC,\ Intra}$  = 200 ms is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.1.1.1 Measurement Reporting Requirements

#### 8.1.2.8.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.1.1.1.3.

#### 8.1.2.8.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_elCIC}$  defined in Clause 8.1.2.8.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_eICIC}$  defined in clause 8.1.2.8.1.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_eICIC, Intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.1.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra\_elCIC}$  as shown in table 8.1.2.8.1.2-1.

Table 8.1.2.8.1.2-1: Requirement to identify a newly detectable FDD intra-frequency cell

DRX cycle length (s)		T <sub>identify_intra_elClC</sub> (s) (DRX cycles)	
≤0.04		1 (Note1)	
0.04 <drx-< td=""><td>Note2 (52)</td></drx-<>		Note2 (52)	
cycle≤0	80.0		
0.128		4.22 (33)	
0.128 <drx-< td=""><td>Note2 (28)</td></drx-<>		Note2 (28)	
cycle≤2.56			
Note1:	Number of DRX cycle		
	depends upon the DRX		
	cycle in use		
Note2:	Time depends upon the		
DRX cycle in use			

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

In the RRC\_CONNECTED state the measurement period for intra-frequency measurements is  $T_{measure\_intra\_eICIC}$  as shown in table 8.1.2.8.1.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain

measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\_eICIC}$ .

Table 8.1.2.8.1.2-2: Requirement to measure FDD intra-frequency cells

DRX cycle length (s)		T <sub>measure_intra_elClC</sub> (s) (DRX cycles)
≤0.0≥	1	0.2 (Note1)
0.04 <drx-< td=""><td>Note2 (7)</td></drx-<>		Note2 (7)
cycle≤0.16		
0.16 <drx-< td=""><td>Note2 (5)</td></drx-<>		Note2 (5)
cycle≤2.56		
Note1: Number		ber of DRX cycle
	depends upon the DRX	
	cycle in use	
Note2: Time		depends upon the
	DRX	cycle in use

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.1.2.1 Measurement Reporting Requirements

#### 8.1.2.8.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.1.2.1.3.

#### 8.1.2.8.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra\_eICIC}$  defined in Clause 8.1.2.8.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_elCIC}$  defined in clause 8.1.2.8.1.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_elCIC}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.2 E-UTRAN TDD intra-frequency measurements

#### 8.1.2.8.2.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra-frequency cell within

$$T_{\text{identify\_intra\_eICIC}} = T_{\text{basic\_identify\_E-UTRA\_TDD\_eICIC, intra}} \cdot \frac{T_{\text{Measurement\_Period\_eICIC, Intra}}}{T_{\text{Intra}}} \quad \textit{ms}$$

where

 $T_{basic\_identify\_E\text{-}UTRA\_TDD\_eICIC,\,intra}$  is 1000 ms.

T<sub>Intra</sub> is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_eICIC, Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells , including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least  $Y_{\text{measurement\_intra\_eICIC}}$  cells , where  $Y_{\text{measurement\_intra\_eICIC}}$  is defined in the following equation. If the UE has identified more than  $Y_{\text{measurement\_intra\_eICIC}}$  cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement\_intra\_eICIC}} = Floor \left\{ X_{\text{basic\_measurement\_TDD\_eICIC}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period\_eICIC, Intra}}} \right\} \text{ cells}$$

where

 $X_{basic\_measurement\_TDD\_eICIC} = 8 \text{ (cells)}$ 

 $T_{Measurement\_Period\_eICIC,\ Intra} = 200\ ms$  is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.2.1.1 Measurement Reporting Requirements

#### 8.1.2.8.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.2.1.1.3.

#### 8.1.2.8.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra\_eICIC}$  defined in Clause 8.1.2.8.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_eICIC}$  defined in clause 8.1.2.8.2.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_eICIC, Intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.2.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within  $T_{identify\_intra\_elCIC}$  as shown in table 8.1.2.8.2.2-1.

Table 8.1.2.8.2.2-1: Requirement to identify a newly detectable TDD intra-frequency cell

DRX cycle length (s)		T <sub>identify_intra_elCIC</sub> (s) (DRX cycles)	
≤0.04		1 (Note1)	
0.04 <d< td=""><td>RX-</td><td>Note2 (52)</td></d<>	RX-	Note2 (52)	
cycle≤(	80.0		
0.128		4.22 (33)	
0.128 <drx-< td=""><td>Note2 (28)</td></drx-<>		Note2 (28)	
cycle≤2.56			
Note1:	Number of DRX cycle		
	depends upon the DRX		
	cycle in use		
Note2:	Time depends upon the		
	DRX cycle in use		

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra\_eICIC}$  as shown in table 8.1.2.8.2.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain

measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\_eICIC}$ .

Table 8.1.2.8.2.2-2: Requirement to measure TDD intra-frequency cells

DRX cycle length (s)		T <sub>measure_intra_elCIC</sub> (s) (DRX cycles)
≤0.04	4	0.2 (Note1)
0.04 <drx-< td=""><td>Note2 (7)</td></drx-<>		Note2 (7)
cycle≤0.16		
0.16 <drx-< td=""><td>Note2 (5)</td></drx-<>		Note2 (5)
cycle≤2.56		
Note1: Number of DRX cycle		
	depends upon the DRX	
	cycle in use.	
Note2: Time		depends upon the
	DRX	cycle in use.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.2.2.1 Measurement Reporting Requirements

#### 8.1.2.8.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

#### 8.1.2.8.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.2.2.1.3.

#### 8.1.2.8.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra\_eICIC}$  defined in Clause 8.1.2.8.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_elCIC}$  defined in clause 8.1.2.8.2.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_elCIC}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.3 E-UTRAN FDD intra-frequency measurements with CRS assistance information

The requirements in clause 8.1.2.8.3 shall apply for the UEs supporting the PSS/SSS and common channel interference handling, and CRS interference handling features. Moreover, the core requirements shall be satisfied provided that the following additional conditions are fulfilled:

- The UE is provided with the CRS assistance information via higher layers (TS 36.331 [2]),
- The CRS assistance information is valid during the entire measurement period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

#### 8.1.2.8.3.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra-frequency cell within:

$$T_{identify\_intra\_FeICIC} = T_{basic\_identify\_E-UTRA\_FDD\_FeICIC, intra} \cdot \frac{T_{Measurement\_Period\_FeICIC, Intra}}{T_{Intra}} \quad \textit{ms}$$

where

Tbasic identify E-UTRA FDD FeICIC, intra is 1000 ms.

 $T_{Intra}$  is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B, clause B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell, or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information.

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_FeICIC,\ Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cells indicated in the CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least

 $Y_{measurement\_intra\_FeICIC}$  cells , where  $Y_{measurement\_intra\_FeICIC}$  is defined in the following equation. If the UE has identified more than  $Y_{measurement\_intra}$  FeICIC cells, the UE shall perform measurements of at least 8 identified intra-

frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement\_intra\_FeICIC}} = Floor \left\{ X_{\text{basic\_measurement\_FDD\_FeICIC}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period\_FeICIC, Intra}}} \right\} \text{ cells}$$

where

 $X_{basic\_measurement\_FDD\_FeICIC} = 8 \; (cells).$ 

 $T_{Measurement\_Period\_FeICIC,\ Intra} = 200\ ms$  is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements with CRS assistance information shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.3.1.1 Measurement Reporting Requirements

#### 8.1.2.8.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.3.1.1.3.

#### 8.1.2.8.3.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T<sub>identify\_intra\_FeICIC</sub> defined in Clause 8.1.2.8.3.1. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_FeICIC}$  defined in clause 8.1.2.8.3.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_FeICIC,\ Intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.3.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra\_FeICIC}$  as shown in table 8.1.2.8.3.2-1.

Table 8.1.2.8.3.2-1: Requirement to identify a newly detectable FDD intra-frequency cell

DRX cycle length (s)	T <sub>identify_intra_FelCIC</sub> (s) (DRX cycles)	
≤0.04	1 (Note 1)	
0.04 <drx-cycle≤0.08< td=""><td>Note 2 (52)</td></drx-cycle≤0.08<>	Note 2 (52)	
0.128 4.22 (33)		
0.128 <drx-cycle≤2.56 (28]<="" 2="" note="" td=""></drx-cycle≤2.56>		
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use.		

NOTE 1: Number of DRX cycle depends upon the DRX cycle in use.

NOTE 2: Time depends upon the DRX cycle in use.

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B, clause B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell, or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information.

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

In the RRC\_CONNECTED state the measurement period for intra-frequency measurements is  $T_{measure\_intra\_FeICIC}$  as shown in table 8.1.2.8.3.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cell indicated in CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\_FeICIC}$ .

Table 8.1.2.8.3.2-2: Requirement to measure FDD intra-frequency cells

DRX cycle length (s)	T <sub>identify_intra_FelCIC</sub> (s) (DRX cycles)	
≤0.04	0.2 (Note 1)	
0.04 <drx-cycle≤0.16< td=""><td>Note 2 (7)</td></drx-cycle≤0.16<>	Note 2 (7)	
0.16 <drx-cycle≤2.56< td=""><td>Note 2 (5)</td></drx-cycle≤2.56<>	Note 2 (5)	
NOTE 1: Number of DPV cycle depends upon the DPV cycle in use		

NOTE 1: Number of DRX cycle depends upon the DRX cycle in use.

NOTE 2: Time depends upon the DRX cycle in use.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.3.2.1 Measurement Reporting Requirements

#### 8.1.2.8.3.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.3.2.1.3.

#### 8.1.2.8.3.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_FeICIC}$  defined in clause 8.1.2.8.3.2. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_FeICIC}$  defined in clause 8.1.2.8.3.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_FeICIC}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.4 E-UTRAN TDD intra-frequency measurements with CRS assistance infromation

The requirements in clause 8.1.2.8.3 shall apply for the UEs upporting the PSS/SSS and common channel interference handling, and CRS interference handling features. Moreover, the core requirements shall be satisfied provided that the following additional conditions are fulfilled:

- The UE is provided with the CRS assistance information via higher layers (TS 36.331 [2]),
- The CRS assistance information is valid during the entire measurement period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

#### 8.1.2.8.4.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra-frequency cell within

$$T_{\text{identify\_intra\_FeICIC}} = T_{\text{basic\_identify\_E-UTRA\_TDD\_FeICIC, intra}} \cdot \frac{T_{\text{Measurement\_Period\_FeICIC, Intra}}}{T_{\text{Intra}}} \quad \textit{ms}$$

where

Tbasic identify E-UTRA TDD eICIC, intra is 1000 ms.

 $T_{Intra}$  is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell, or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_FeICIC,\ Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cells indicated in the CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least

 $Y_{measurement\_intra\_FeICIC}$  cells , where  $Y_{measurement\_intra\_FeICIC}$  is defined in the following equation. If the UE has identified more than  $Y_{measurement\_intra\_FeICIC}$  cells, the UE shall perform measurements of at least 8 identified intrafrequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement\_intra\_FeICIC}} = Floor \left\{ X_{\text{basic\_measurement\_TDD\_FeICIC}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period\_FeICIC, Intra}} \right\} \text{ cells}$$

where

X<sub>basic</sub> measurement TDD FeICIC = 8 (cells)

 $T_{Measurement\_Period\_FeICIC,\ Intra} = 200 ms$  is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements with CRS assistance information shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.4.1.1 Measurement Reporting Requirements

#### 8.1.2.8.4.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.4.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.4.1.1.3.

#### 8.1.2.8.4.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T<sub>identify\_intra\_FeICIC</sub> defined in clause 8.1.2.8.4.1. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_FeICIC}$  defined in clause 8.1.2.8.4.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_FeICIC\_,Intra}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.1.2.8.4.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within T<sub>identify\_intra\_FeICIC</sub> as shown in table 8.1.2.8.4.2-1.

Table 8.1.2.8.4.2-1: Requirement to identify a newly detectable TDD intra-frequency cell

DRX cycle length (s)	T <sub>identify_intra_FelCiC</sub> (s) (DRX cycles)	
≤0.04	1 (Note 1)	
0.04 <drx-cycle≤0.08< td=""><td>Note 2 (52)</td></drx-cycle≤0.08<>	Note 2 (52)	
0.128	4.22 (33)	
0.128 <drx-cycle≤2.56 (28)<="" 2="" note="" td=""></drx-cycle≤2.56>		
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use.		
NOTE 2: Time depends upon the DRX cycle in use.		

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell, or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information.

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra\_FeICIC}$  as shown in table 8.1.2.8.4.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified

intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cell indicated in CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\_FeICIC}$ .

Table 8.1.2.8.4.2-2: Requirement to measure TDD intra-frequency cells

DRX cycle length (s)	T <sub>identify_intra_FelClC</sub> (s) (DRX cycles)	
≤0.04	0.2 (Note 1)	
0.04 <drx-cycle≤0.16< td=""><td>Note 2 (7)</td></drx-cycle≤0.16<>	Note 2 (7)	
0.16 <drx-cycle≤2.56 (5)<="" 2="" note="" td=""></drx-cycle≤2.56>		
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use.  NOTE 2: Time depends upon the DRX cycle in use.		

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.4.2.1 Measurement Reporting Requirements

#### 8.1.2.8.4.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

#### 8.1.2.8.4.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.2.2.1.3.

#### 8.1.2.8.4.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra\_FeICIC defined in clause 8.1.2.8.4.2. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_FeICIC}$  defined in clause 8.1.2.8.4.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_FeICIC}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.1.2.9 E-UTRAN E-CID Measurements when Time Domain Measurement Resource Restriction Pattern is Configured

#### 8.1.2.9.1 E-UTRAN FDD UE Rx-Tx Time Difference Measurements

The requirements in this clause apply for UE configured with a time-domain measurement resource restriction pattern for PCell measurements, provided that also the following additional conditions are fulfilled:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

When the UE is provided with a time-domain measurement resource restriction pattern for PCell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Clause 8.1.2.7.1 and accuracy requirements specified in Clause 9.1.9.3, where the condition  $\hat{E}s/Iot \ge -3dB$  in Table 9.1.9.3-1 corresponds to the CRS  $\hat{E}s/Iot$  in subframes indicated by the time-domain measurement resource restriction pattern for PCell measurements (TS 36.331 [2]).

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

#### 8.1.2.9.2 E-UTRAN TDD UE Rx-Tx Time Difference Measurements

The requirements in this clause apply for UE configured with a time-domain measurement resource restriction pattern for PCell measurements, provided that also the following additional conditions are fulfilled:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

When the UE is provided with a time-domain measurement resource restriction pattern for PCell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Clause 8.1.2.7.2 and accuracy requirements specified in Clause 9.1.9.3, where the condition  $\hat{E}s/Iot \geq -3dB$  in Table 9.1.9.3-1 corresponds to the CRS  $\hat{E}s/Iot$  in subframes indicated by the time-domain measurement resource restriction pattern for PCell measurements (TS 36.331 [2]).

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

## 8.1.2.9.3 E-UTRAN FDD UE Rx-Tx Time Difference Measurements with CRS Assistance Information

For UE configured with a time-domain measurement resource restriction pattern for PCell measurements, the requirements in this section apply under the following conditions:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, and
- The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

When the UE is provided with a time-domain measurement resource restriction pattern for serving cell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Section 8.1.2.7.1 and accuracy requirements specified in Section 9.1.9.4.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

### 8.1.2.9.4 E-UTRAN TDD UE Rx-Tx Time Difference Measurements with CRS Assistance Information

For UE configured with a time-domain measurement resource restriction pattern for PCell measurements, the requirements in this section apply under the following conditions:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, and
- The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

When the UE is provided with a time-domain measurement resource restriction pattern for serving cell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Section 8.1.2.7.2 and accuracy requirements specified in Section 9.1.9.4.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

# 8.2 Capabilities for Support of Event Triggering and Reporting Criteria

#### 8.2.1 Introduction

This clause contains requirements on UE capabilities for support of event triggering and reporting criteria. As long as the measurement configuration does not exceed the requirements stated in clause 8.2.2, the UE shall meet the performance requirements defined in clause 9.

The UE can be requested to make measurements under different measurement identities defined in TS 36.331 [2]. Each measurement identity corresponds to either event based reporting, periodic reporting, logged measurement reporting [2] or no reporting. In case of event based reporting, each measurement identity is associated with an event. In case of periodic reporting, a measurement identity is associated with one periodic reporting criterion. In case of logged measurement reporting, a measurement identity is associated with one logged measurement reporting criterion. In case of no reporting, a measurement identity is associated with one no reporting criterion.

The purpose of this clause is to set some limits on the number of different event, periodic, logged measurement and no reporting criteria the UE may be requested to track in parallel.

### 8.2.2 Requirements

In this clause a reporting criterion corresponds to either one event (in the case of event based reporting), or one periodic reporting criterion (in case of periodic reporting), or one logged measurement reporting criterion (in case of logged measurement reporting), or one no reporting criterion (in case of no reporting). For event based reporting, each instance of event, with the same or different event identities, is counted as separate reporting criterion in table 8.2.2-1.

The UE shall be able to support in parallel per category up to  $E_{cat}$  reporting criteria according to table 8.2.2-1. For the measurement categories belonging to measurements on: E-UTRA intra-frequency cells, E-UTRA inter-frequency cells,

and inter-RAT per supported RAT (i.e. without counting other categories that the UE shall always support in parallel), the UE need not support more than the total number of reporting criteria as follows:

- 26 reporting criteria in total if the UE is not configured with any SCell or PSCell carrier frequency,
- 35 reporting criteria in total if the UE is configured with one SCell carrier frequency,
- 44 reporting criteria in total if the UE is configured with two SCell carrier frequencies and
- 35 reporting criteria in total if the UE is configured with one PSCell carrier frequency.

A UE supporting increased number of carriers to monitor beyond 3 carriers shall be able to support up to 20 reporting criteria for inter-frequency measurement category according to table 8.2.2-1. Additionally such UE shall be able to support in parallel per category up to  $E_{cat}$  reporting criteria according to table 8.2.2-1. For the measurement categories belonging to measurements on: E-UTRA intra-frequency cells, E-UTRA inter-frequency cells, and inter-RAT per supported RAT, the UE need not support more than the total number of reporting criteria as follows:

- 39 reporting criteria in total if the UE is not configured with any SCell carrier frequency,
- 48 reporting criteria in total if the UE is configured with one SCell carrier frequency,
- 57 reporting criteria in total if the UE is configured with two SCell carrier frequencies,
- 48 reporting criteria in total if the UE is configured with one PSCell carrier frequency.

Table 8.2.2-1: Requirements for reporting criteria per measurement category

Measurement category	E <sub>cat</sub>	Note
Intra-frequency Note 1	9	E-UTRA intra-frequency cells
Intra-frequency UE Rx-Tx time difference	2	Intra-frequency UE Rx-Tx time difference measurements reported to E-UTRAN via RRC and to positioning server via LPP. Applies for UE supporting both LPP and UE Rx-Tx time difference measurement.
Intra-frequency RSTD Note 2	1	Intra-frequency RSTD measurement reporting for UE supporting OTDOA; 1 report capable of minimum 16 cell measurements for the intra-frequency
Intra-frequency RSRP and RSRQ measurements for E-CID	1	Intra-frequency RSRP and RSRQ measurements for E-CID reported to E-SMLC via LPP [24]. One report capable of at least in total 9 intra-frequency RSRP and RSRQ measurements. Applicable to UE capable of reporting RSRP and RSRQ to E-SMLC via LPP.
Inter-frequency	7/20	E-UTRA inter-frequency cells (see note 3)
Inter-frequency RSTD Note 2	1	Inter-frequency RSTD measurement reporting for UE supporting OTDOA; 1 report capable of minimum 16 cell measurements for at least one inter-frequency. Only applicable as specified in Section 8.1.2.6.
Inter-RAT (GSM, cdma2000 1 x RTT and HRPD)	5	Only applicable for UE with this (inter-RAT) capability. This requirement ( <b>E</b> <sub>cat</sub> = 5) is per supported RAT.
Inter-RAT (UTRAN FDD, UTRAN TDD)	5 or 11	Only applicable for UE with this (inter-RAT) capability. This requirement ( <b>E</b> <sub>cat</sub> = 5 or 11) is per supported RAT. For UE which indicate support for Increased UE carrier monitoring UTRA <b>E</b> <sub>cat</sub> = 11.
MBSFN measurements for MDT	1	MBSFN measurement reporting for UE supporting MBSFN measurements (MBSFN RSRP, MBSFN RSRQ, and MCH BLER) for MDT [2]; 1 report capable of minimum 1 MBSFN RSRP measurement [4], 1 MBSFN RSRQ measurement [4], and 1 MCH BLER measurement [4].
Note 1: When the UE is configured with SCell, Ps applied per serving frequency.	SCell or PCell	carrier frequency, E <sub>cat</sub> for Intra-frequency is
Note 2: When the UE is configured with one SCe least 2 reporting criteria for all RSTD means frequency, SCell carrier frequency and in carrier frequencies, the UE shall be capa measurements configured to be performed.	asurements co nter-frequency able of supporti ed on PCell ca	ency, the UE shall be capable of supporting at onfigured to be performed on PCell carrier carrier. When the UE is configured with two SCell ing at least 3 reporting criteria for all RSTD rrier frequency, the two SCell carrier frequencies when there is a single on-going LPP OTDOA

### 8.3 Measurements for E-UTRA carrier aggregation

number of carriers to monitor beyond 3.

#### 8.3.1 Introduction

Note 3:

This clause contains requirements on UE capabilities for support of E-UTRA carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UE which have been configured with at least one downlink SCell, but:

Support of Ecat of 20 for Measurement category Inter-frequency is applied for a UE supporting increased

- up to three downlink CCs and up to two uplink CCs for intra-band contiguous carrier aggregation, or
- up to three downlink CCs and one uplink CC for inter-band carrier aggregation, or

- up to two downlink CCs intra-band contiguous and one downlink intra-band non-contiguous and one uplink CC for carrier aggregation, or
- up to two downlink CCs and up to two uplink CCs for intra-band non-contiguous carrier aggregation, or
- up to two downlink CCs and up to two uplink CCs for inter-band carrier aggregation, or
- up to two downlink CCs intra-band contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs intra-band non-contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs and one uplink CC for intra-band non-contiguous carrier aggregation.

Non configured frequencies may be measured with measurement gaps or autonomous gaps according to the requirements in clause 8.1.2.3 (E-UTRAN inter frequency measurements and E-UTRAN inter frequency measurements with autonomous gaps). Requirements in this clause are applicable to E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

For UE, which does not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331, and is compliant to the requirements for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx specified in TS 36.101, the inter-band CA requirements in Section 8.3 shall apply also with different TDD UL/DL subframe configurations and/or different special subframe configurations used in CCs of different bands, under the following additional conditions:

- UE is not simultaneously scheduled in UL and DL on the different CCs, and
- at least DL subframe #0 or DL subframe #5 are available for measurements in the measured cell.

### 8.3.2 Measurements of the primary component carrier

Measurements of cells on the primary component carrier shall meet all applicable requirements (FDD or TDD) in clause 8.1.2.2 (E-UTRAN intra frequency measurements and E-UTRAN intra frequency measurements with autonomous gaps)

### 8.3.3 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

#### 8.3.3.1 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in clause 8.1.2.2(E-UTRAN intra frequency measurements and E-UTRAN intra frequency measurements with autonomous gaps). If common DRX is in use, then the requirements for that secondary component carrier are given by the applicable DRX requirements (FDD or TDD) in clause 8.1.2.2, otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in clause 9.1.11 (Carrier aggregation measurement accuracy)

#### 8.3.3.2 Measurements of a secondary component carrier with deactivated SCell

This clause defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

# 8.3.3.2.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within  $T_{identify\_scc}$ , according to the parameter measCycleSCell where  $T_{identify\_scc} = 20$  measCycleSCell

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Es/Iot according to Annex B.2.7 for a corresponding Band

The measurement period for deactivated scell measurements is  $T_{measure\_scc}$  according to the parameter measCycleSCell where  $T_{measure\_scc} = 5$  measCycleSCell. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_scc}$ .

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.11 (Carrier aggregation measurement accuracy)

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on one or two SCCs with deactivated SCell. This may cause interruptions on PCell or an activated SCell or both that are specified in Section 7.8.

#### 8.3.3.2.1.1 Measurement Reporting Requirements

#### 8.3.3.2.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

#### 8.3.3.2.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.3.2.1.1.3.

#### 8.3.3.2.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_scc}$  defined in Clause 8.3.3.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_scc}$  defined in clause 8.3.3.2.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_scc}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

## 8.3.3.2.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within  $T_{identify\_scc}$ , according to the parameter measCycleSCell where  $T_{identify\_scc} = max(20 \ measCycleSCell$ ,  $T_{identify\_scc1}$ ).  $T_{identify\_scc1}$  is given in table 8.3.3.2.2-1.

T<sub>identify\_scc1</sub> (s) (DRX DRX cycle cycles) length (s) 0.8 (Note1) ≤0.04 0.04<DRX-Note2 (40) cycle≤0.08 3.2 (25) 0.128 0.128<DRX-Note2(20) cvcle≤2.56 Number of DRX cycle depends Note1:

Table 8.3.3.2.2-1: Requirement for T<sub>identify\_scc1</sub>

Note1: Number of DRX cycle depends upon the DRX cycle in use

Note2: Time depends upon the DRX cycle in use

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.7 for a corresponding Band

The measurement period for deactivated scell measurements is  $T_{measure\_scc}$  according to the parameter measCycleSCell where  $T_{measure\_scc} = max(5 measCycleSCell, T_{measure\_scc})$ . The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_scc}$ .  $T_{measure\_scc1}$  is given in table 8.3.3.2.2-2

Table 8.3.3.2.2-2: Requirement for T<sub>measure scc1</sub>

DRX cycle	T <sub>measure_scc1</sub> (s)	
length (s)	(DRX cycles)	
≤0.04	0.2 (Note1)	
0.04 <drx-< th=""><th>Note2 (5)</th></drx-<>	Note2 (5)	
cycle≤2.56		
Note1: Number of DRX cycle		
depends upon the DRX cycle in use		
Note2: Time depends upon the DRX		
cycle in use		

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.11 (Carrier aggregation measurement accuracy).

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of cells on one or two SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or an activated SCell or both when the PCell and the SCell belong to the same frequency band. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

#### 8.3.3.2.2.1 Measurement Reporting Requirements

#### 8.3.3.2.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

#### 8.3.3.2.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.3.3.2.2.1.3.

#### 8.3.3.2.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_scc}$  defined in Clause 8.3.3.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_scc}$  defined in clause 8.3.3.2.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_scc}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

# 8.4 OTDOA RSTD Measurements for E-UTRAN carrier aggregation

#### 8.4.1 Introduction

This clause contains RSTD measurement requirements on UE capabilities for support of E-UTRA carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UE which have been configured with one or two downlink Scell(s). Non-configured frequencies may be measured with measurement gaps according to the requirements in clause 8.1.2.6, i.e., E-UTRAN inter-frequency RSTD measurement period applies. Requirements in this clause are applicable for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

For UE, which does not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and is compliant to the requirements for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx specified in TS 36.101 [5], RSTD requirements in Section 8.4 shall apply also with different TDD UL/DL subframe configurations and/or different special subframe configurations used in CCs of different bands, under the following additional conditions:

- all positioning subframes indicated in the OTDOA assistance data and specified in Section 9.1.10 are available for RSTD measurements in the measured and reference cells; and
- UE is not simultaneously scheduled in UL and DL on the different CCs.

### 8.4.2 Measurements on the primary component carrier

The RSTD measurements on cells belonging to the primary component carrier shall meet all applicable requirements (FDD or TDD) specified in clause 8.1.2.5, i.e., E-UTRAN intra-frequency RSTD measurement period applies.

The RSTD measurement accuracy for all the measurements on the primary component carrier shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

If the PCell is changed, regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to the primary component carrier, then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the primary component carrier. However in this case the total RSTD measurement period ( $T_{RSTD, E-UTRAN, PCell\_change}$ ) shall be according to the following expression:

$$T_{RSTD, E-UTRAN, PCell \ change} = T_{RSTD, E-UTRAN} + K \times T_{PRS} + T_{PCell \ change}$$
 ms,

where:

K is the number of times the PCell is changed during  $T_{RSTD, E-UTRAN, PCell \ change}$ ,

 $T_{\rm PRS}$  is defined in clause 8.1.2.5,

 $T_{\text{PCell\_change}}$  is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms.

 $T_{RSTD,\,E-UTRAN}$  corresponds to the E-UTRAN intra-frequency RSTD measurement period as specified in clause 8.1.2.5

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

# 8.4.3 Measurements on a secondary component carrier

The RSTD measurements when all cells are on a configured secondary component carrier shall meet all applicable requirements (FDD or TDD) specified in clause 8.1.2.5, i.e., E-UTRAN intra-frequency RSTD measurement period applies, regardless of whether the Scell on the corresponding frequency is activated or deactivated by the MAC-CE commands as specified in [17].

The RSTD measurement accuracy for all the measurements on the secondary component carrier shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making RSTD measurements on cells belonging to SCC with deactivated SCell. This may cause interruptions (packet drops) to a PCell when the PCell and the SCell belong to the adjacent or non-adjacent component carriers in the same frequency band or to different frequency bands. In this case, the UE shall follow the interruption requirements specified in Section 7.10.:

If the PCell is changed, regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to the secondary component carrier, then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the secondary component carrier. However in this case the total RSTD measurement period ( $T_{RSTD,\,E-UTRAN,\,PCell\_change}$ ) shall be according to the following expression:

$$T_{\text{RSTD, E-UTRAN, PCell change}} = T_{\text{RSTD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{PCell change}}$$
 ms,

where:

K is the number of times the PCell is changed during  $T_{RSTD, E-UTRAN, PCell \ change}$ ,

 $T_{\rm PRS}$  is defined in clause 8.1.2.5,

 $T_{
m PCell\_change}$  is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms.

 $T_{RSTD,\,E-UTRAN}$  corresponds to the E-UTRAN intra-frequency RSTD measurement period as specified in clause 8.1.2.5.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

# 8.4.4 Measurements on both primary component carrier and a secondary component carrier

The RSTD measurements of cells on both primary component carrier and a configured secondary component carrier shall meet all applicable requirements (FDD-FDD, TDD-TDD, TDD-FDD or FDD-TDD inter-Frequency OTDOA) specified in clause 8.1.2.6, i.e., E-UTRAN inter-frequency RSTD measurement period applies regardless of whether the SCell on the corresponding frequency is activated or deactivated by the MAC-CE commands as specified in [17], with the following exceptions

- the number of PRS positioning occasions is as specified in Table 8.4.4-1 shall apply, and
- TDD uplink-downlink subframes configurations as specified in Clause 8.1.2.5.2, Table 8.1.2.5.2-2 shall apply.

Table 8.4.4-1: Number of PRS positioning occasions within measurement period

Positioning subframe configuration period $T_{ m PRS}$	Number of PRS positioning occasions $M$
160 ms	32
>160 ms	16

The RSTD measurement accuracy for all the measurements on both primary component carrier and the secondary component carrier shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

A UE may reconfigure its receiver bandwidth taking into account the SCell activation/deactivation status, and when performing RSTD measurements on cells belonging to at least SCC with deactivated SCell. This may cause interruptions (packet drops) on a PCell when the PCell and the SCell belong to the adjacent or non-adjacent component carriers in the same frequency band or to different frequency bands. In this case, the UE shall follow the interruption requirements specified in Section 7.10:

If the PCell is changed regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to both the primary component carrier and the secondary component carrier then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the primary and secondary component carrier. However in this case the total RSTD measurement period ( $T_{\text{RSTD, E-UTRAN, PCell change}}$ ) shall be according to the following expression:

$$T_{RSTD, E-UTRAN, PCell \ change} = T_{RSTD, E-UTRAN} + K \times T_{PRS} + T_{PCell \ change}$$
 ms,

where:

K is the number of times the PCell is changed during  $T_{\text{RSTD, E-UTRAN, PCell\_change}}$ ,

 $T_{\rm PRS}$  is defined in clause 8.1.2.6,

 $T_{\text{PCell\_change}}$  is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms,

 $T_{RSTD,\,E-UTRAN}$  corresponds to the E-UTRAN inter-frequency RSTD measurement period as specified in clause 8.1.2.6 with the exception that the number of PRS positioning occasions is as specified in Table 8.4.4-1.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

# 8.4.5 Measurements on different secondary component carriers

The RSTD measurements of cells on a configured secondary component carrier and another configured secondary component carrier shall meet all applicable requirements (FDD-FDD, TDD-TDD, TDD-FDD or FDD-TDD inter-Frequency OTDOA) specified in clause 8.1.2.6, i.e., E-UTRAN inter-frequency RSTD measurement period applies regardless of whether the SCell on the corresponding frequency is activated or deactivated by the MAC-CE commands as specified in [17], with the following exceptions

- the number of PRS positioning occasions is as specified in Table 8.4.4-1 shall apply, and
- TDD uplink-downlink subframes configurations as specified in Clause 8.1.2.5.2, Table 8.1.2.5.2-2 shall apply.

Table 8.4.4-1: Number of PRS positioning occasions within measurement period

Positioning subframe configuration period $T_{ m PRS}$	Number of PRS positioning occasions $M$
160 ms	32
>160 ms	16

The RSTD measurement accuracy for all the measurements on the secondary component carriers shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

A UE may reconfigure its receiver bandwidth taking into account the SCell activation/deactivation status, and when performing RSTD measurements on cells belonging to at least SCC with deactivated SCell. This may cause interruptions (packet drops) on a PCell when the PCell and the SCell belong to the adjacent or non-adjacent component carriers in the same frequency band or to different frequency bands. In this case, the UE shall follow the interruption requirements specified in Section 7.10:

If the PCell is changed regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to the secondary component carriers then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the secondary component carriers. However in this case the total RSTD measurement period ( $T_{RSTD, E-UTRAN, PCell\_change}$ ) shall be according to the following expression:

$$\mathbf{T}_{\text{RSTD, E-UTRAN, PCell\_change}} = \mathbf{T}_{\text{RSTD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{PCell\_change}} \qquad \textit{ms} \; ,$$

where:

K is the number of times the PCell is changed during  $T_{\text{RSTD, E-UTRAN, PCell\_change}}$ ,

 $T_{\rm PRS}$  is defined in clause 8.1.2.6,

 $T_{\text{PCell\_change}}$  is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms,

 $T_{RSTD,\,E-UTRAN}$  corresponds to the E-UTRAN inter-frequency RSTD measurement period as specified in clause 8.1.2.6 with the exception that the number of PRS positioning occasions is as specified in Table 8.4.4-1.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

# 8.5 Measurements for UE category 0

#### 8.5.1 Introduction

The UE category 0 applicability of the requirements in subclause 8.5 is defined in Section 3.6.1.

This clause contains requirements on the UE regarding measurement reporting in RRC\_CONNECTED state. The requirements are specified for E-UTRA intra frequency measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracies are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

When the UE is provided with IDC solution, the UE shall also perform RRM measurements and meet the corresponding requirements in clause 8.

# 8.5.2 Requirements

# 8.5.2.1 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC\_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

#### 8.5.2.1.1 E-UTRAN FDD intra frequency measurements

# 8.5.2.1.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

$$T_{\text{identify intra\_UE cat 0}} = T_{\text{basic\_identify\_E-UTRA\_FDD\_UE cat 0}} \cdot \frac{T_{\text{Measurement\_Period\_UE cat 0, Intra}}}{T_{\text{Intra}}} \quad \textit{ms}$$

where

T<sub>basic identify E-UTRA FDD UE cat 0, intra</sub> is 1000 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

 $T_{Intra}$ : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_UE\ cat\ 0\ Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is 400 ms. When no measurement gaps are activated, the low complexity UE shall be capable of performing RSRPand RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 400 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least  $Y_{\text{measurement intra}\_UE \text{ cat 0}}$  cells , where  $Y_{\text{measurement intra}\_UE \text{ cat 0}}$  is defined in the following equation. If the UE has identified more than  $Y_{\text{measurement intra}\_UE \text{ cat 0}}$  cells, the UE shall perform measurements of at least 8 identified intra- frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement\_intra\_UE cat 0}} = Floor \left\{ X_{\text{basic\_measurement\_FDD\_UE cat 0}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period\_UE cat 0, Intra}} \right\}$$

cells where

 $X_{basic measurement FDD UE cat 0} = 8 (cells)$ 

 $T_{Measurement\_Period\_UE\ cat\ 0,\ Intra} = 400~ms.$  The measurement period for Intra frequency RSRP and RSRQ measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

#### 8.5.2.1.1.1.1 Measurement Reporting Requirements

#### 8.5.2.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

#### 8.5.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.1.1.1.3.

#### 8.5.2.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\ intra\_UE\ cat\ 0}$  defined in Clause 8.5.2.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_UE\ cat\ 0}$  defined in clause 8.5.2.1.1.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_UE\ cat\ 0}$ , Intra provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.5.2.1.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra\_UE\ cat\ 0}$  as shown in table 8.5.2.1.1.2-1

Table 8.5.2.1.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

DRX cycle length (s)	T <sub>identify_intra_UE cat 0</sub> (s) (DRX cycles)	
≤0.04	[1] (Note1)	
0.04 <drx-< td=""><td>Note2 (40)</td></drx-<>	Note2 (40)	
cycle≤0.08		
0.128	3.2 (25)	
0.128 <drx-< td=""><td>Note2(20)</td></drx-<>	Note2(20)	
cycle≤2.56		
Note1: Number of DRX cycle		
depends upon the DRX cycle in use		
Note2: Time depends upon the DRX		

cycle in use

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Es/Iot according to Annex B.2.1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra\_UE\ cat\ 0}$  as shown in table 8.5.2.1.1.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\ UE\ cat\ 0}$ .

Table 8.5.2.1.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)	T <sub>measure_intra_UE cat 0</sub> (s) (DRX cycles)	
≤0.08	0.4 (Note1)	
0.08 <drx-< th=""><th>Note2 (5)</th></drx-<>	Note2 (5)	
cycle≤2.56		
Note1: Number of DRX cycle		
depends upon the DRX cycle in use		
Note2: Time depends upon the DRX		
cycle in use		

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

# 8.5.2.1.1.2.1 Measurement Reporting Requirements

#### 8.5.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

#### 8.5.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.1.2.1.3.

#### 8.5.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra,\ UE\ cat\ 0}$  defined in Clause 8.5.2.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_UE\ cat\ 0}$  defined in clause 8.5.2.1.1.2 becomes undetectable for a period  $\le 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_UE\ cat\ 0}$  provided the timing to that cell has not changed more than  $\pm\ 50$  Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.5.2.1.2 E-UTRAN intra frequency measurements for HD-FDD

#### 8.5.2.1.2.1 E-UTRAN intra frequency measurements when no DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.5.2.1.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 or downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over T<sub>identify\_intra\_UE cat 0</sub>;
- at least one downlink subframe per radio frame of measured cell is available at the UE for RSRP and RSRQ measurements assuming measured cell is identified cell over T<sub>measure intra UE cat 0</sub>.

# 8.5.2.1.2.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra\_UE\ cat\ 0}$  as shown in table 8.5.2.1.2.2-1

Table 8.5.2.1.2.2-1: Requirement to identify a newly detectable HD-FDD intrafrequency cell

DRX cycle length (s)	T <sub>identify_intra_UE cat 0</sub> (s) (DRX cycles)
≤0.04	1 (Note1)
0.04 <drx-< td=""><td>Note2 (50)</td></drx-<>	Note2 (50)
cycle≤0.08	
0.128	3.2 (32)
0.128 <drx-< td=""><td>Note2(25)</td></drx-<>	Note2(25)
cycle≤2.56	

Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra\_UE\ cat\ 0}$  as shown in table 8.5.2.1.2.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-

intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\_UE\ cat\ 0}$ .

Table 8.5.2.1.2.2-2: Requirement to measure HD-FDD intrafrequency cells

DRX cycle length (s)	T <sub>measure_intra_UE cat 0</sub> (s) (DRX cycles)
≤0.04	0.4 (Note1)
0.04 <drx-< td=""><td>Note2 (7)</td></drx-<>	Note2 (7)
cycle≤0.16	
0.16 <drx-< td=""><td>Note2(5)</td></drx-<>	Note2(5)
cycle≤2.56	
Note1: Number of DRX cycle	

Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

#### 8.5.2.1.1.2.1 Measurement Reporting Requirements

#### 8.5.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

#### 8.5.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.1.2.1.3.

#### 8.5.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra\_UE\ cat\ 0}$  defined in Clause 8.5.2.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_UE\ cat\ 0}$  defined in clause 8.5.2.1.1.2 becomes undetectable for a period  $\le 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_UE\ cat\ 0}$  provided the timing to that cell has not changed more than  $\pm\ 50$  Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.5.2.1.3 E-UTRAN TDD intra frequency measurements

#### 8.5.2.1.3.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within

$$T_{\text{identify intra\_UE cat 0}} = T_{\text{basic identify }\textit{E-UTRA\_TDD\_UE cat 0, intra}} \cdot \frac{T_{\text{Measurement Period\_UE cat 0, Intra}}}{T_{\text{Intra}}} \quad \textit{ms}$$

where

T<sub>basic\_identify\_E-UTRA\_TDD\_UE cat 0, intra</sub> is 1000 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

 $T_{Intra}$ : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_UE\ cat\ 0\ Intra}$ . If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is 400 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 400 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least  $Y_{\text{measurement intra\_UE cat 0}}$  cells , where  $Y_{\text{measurement intra\_UE cat 0}}$  is defined in the following equation. If the UE has identified more than  $Y_{\text{measurement, intra\_UE cat 0}}$  cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathbf{Y}_{\text{measurement intra\_UE cat 0}} = Floor \left\{ X_{\text{basic measurement TDD\_UE cat 0}} \cdot \frac{\mathbf{T}_{\text{Intra}}}{\mathbf{T}_{\text{Measurement\_Period\_UE cat 0, Intra}} \right\}$$

cells where

 $X_{basic measurement TDD\_UE cat 0} = 8 (cells)$ 

 $T_{\text{Measurement\_Period intra\_UE cat 0}}$  = 400 ms. The measurement period for Intra frequency RSRP and RSRQ measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

#### 8.5.2.1.3.1.1 Measurement Reporting Requirements

# 8.5.2.1.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

#### 8.5.2.1.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.3.1.1.3.

#### 8.5.2.1.3.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\;intra\_UE\;cat\;0}$  defined in Clause 8.5.2.1.3.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_UE\ cat\ 0}$  defined in clause 8.5.2.1.3.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\ Intra\_UE\ cat\ 0}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.5.2.1.3.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within  $T_{identify\_intra\_UE\ cat\ 0}$  as shown in table 8.5.2.1.3.2-1

Table 8.5.2.1.3.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)	T <sub>identify_intra_UE cat 0</sub> (s) (DRX cycles)
≤0.04	1 (Note1)
0.04 <drx-< td=""><td>Note2 (40)</td></drx-<>	Note2 (40)
cycle≤0.08	
0.128	3.2 (25)
0.128 <drx-< td=""><td>Note2(20)</td></drx-<>	Note2(20)
cycle≤2.56	

Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{measure\_intra\_UE\ cat\ 0}$  as shown in table 8.5.2.1.3.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_intra\_UE\ cat\ 0}$ .

Table 8.5.2.1.3.2-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	T <sub>measure_intra_UE cat 0</sub> (s) (DRX cycles)	
≤0.08	0.4 (Note1)	
0.08 <drx-< td=""><td>Note2 (5)</td></drx-<>	Note2 (5)	
cycle≤2.56		
Note1: Number of DRX cycle		
depends upon the		
DRX cycle in use.		
Note2: Time depends upon the DRX cycle in use.		

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

#### 8.5.2.1.3.2.1 Measurement Reporting Requirements

#### 8.5.2.1.3.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

#### 8.5.2.1.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.3.2.1.3.

#### 8.5.2.1.3.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T  $_{identify\_intra\_UE\ cat\ 0}$  defined in Clause 8.5.2.1.3.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_UE\ cat\ 0}$  defined in clause 8.5.2.1.3.2 becomes undetectable for a period  $\le 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_intra\_UE\ cat\ 0}$  provided the timing to that cell has not changed more than  $\pm\ 50$  Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.5.2.1.4 E-UTRAN FDD intra frequency measurements with autonomous gaps for UE category 0

The requirements defined in this subclause 8.5.2.1.4 apply provided the following condition is met:

Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.

#### 8.5.2.1.4.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

Where

 $T_{basic\_identify\_CGI\_LC-UE, intra} = 190$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [TBD].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI\_LC-UE,intra}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{identify\_CGI\_LC-UE, intra}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least 92 ACK/NACKs on PCell provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

#### 8.5.2.1.4.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.5.2.1.5 E-UTRAN intra frequency measurements with autonomous gaps for HD-FDD UE category 0

The requirements in this section are applicable for the UE which supports half duplex FDD operation on one or more supported frequency bands [2].

The requirements defined in this subclause 8.5.2.1.5 apply provided the following condition is met:

Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.

#### 8.5.2.1.5.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

All the CGI requirements with the exception of requirement on the number of ACK/NACK transmission on PCell defined in clause 8.5.2.1.4.1 also apply for this section.

For the UE supporting half duplex FDD operation there is no requirement in terms of number of ACK/NACK transmission on PCell.

#### 8.5.2.1.5.2 ECGI Reporting Delay

The ECGI reporting delay defined in clause 8.5.2.1.4.2 also apply for this section.

# 8.5.2.1.6 E-UTRAN TDD intra frequency measurements with autonomous gaps for UE category 0

The requirements defined in this subclause 8.5.2.1.6 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.

#### 8.5.2.1.6.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify CGI LC-UE, intra}} = T_{\text{basic identify CGI LC-UE, intra}}$$
 ms

Where

 $T_{basic\_identify\_CGI\_LC-UE, intra} = 190$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable when the following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [TBD].

The requirement for identifying a new CGI of an E-UTRA cell within  $T_{basic\_identify\_CGI\_LC-UE, intra}$  is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time,  $T_{\text{identify\_CGI\_LC-UE, intra}}$  ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.5.2.1.6.1-1 on PCell provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.5.2.1.6.1-1: Requirement on minimum number of ACK/NACKs to transmit during T<sub>basic\_identify\_CGI\_LC-UE, intra</sub>.

UL/DL configuration	Minimum number of transmitted ACK/NACKs
0	30
1	54
2	68
3	56
4	61
5	66
6	46

#### 8.5.2.1.6.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

# 8.6 Discovery signal measurements

# 8.6.1 Introduction

This clause contains requirements on the UE for measurement reporting in RRC\_CONNECTED state when discovery signal [16] is configured. The requirements are specified for E-UTRA CRS based discovery signal measurements and CSI-RS based discovery signal measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracy requirements are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

The requirements in Section 9 are applicable for a UE performing measurements according to Section 8.6.

# 8.6.2 Requirements for CRS based discovery signal measurements

# 8.6.2.1 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC\_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

# 8.6.2.1.1 E-UTRAN FDD intra frequency measurements

#### 8.6.2.1.1.1 E-UTRAN FDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra\_SCE}$ ,

 $T_{identify\ intra\ SCE} = 12*T_{DMTC\ periodicity} + T_{Measurement\ Period\ intra\ FDD\ CRS}$ 

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{DMTC\_periodicity} \ is \ the \ discovery \ signal \ measurement \ timing \ configuration \ periodicity \ of \ higher \ layer.$ 

 $T_{Measurement\_Period\_intra\_FDD\_CRS} \ is \ the \ intra-frequency \ period \ for \ measurements \ as \ shown \ in \ table \ 8.6.2.1.1.1-1$ 

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\ intra\_FDD\_CRS}$  when no DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{Measurement\_Period}$  \_intra\_FDD\_CRS as shown in table 8.6.2.1.1.1-1, when no DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\_Period\_intra\_FDD\_CRS}$ 

Table 8.6.2.1.1.1-1: Requirement to measure FDD intra frequency cell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period intra_FDD_CRS</sub> [ms]
≥6	≥1	5 * T <sub>DMTC_periodicity</sub>
≥25	≥1	3 * T <sub>DMTC_periodicity</sub>

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

#### 8.6.2.1.1.1.1 Measurement Reporting Requirements

#### 8.6.2.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

#### 8.6.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.1.1.1.3.

#### 8.6.2.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_SCE}$  defined in Clause 8.6.2.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_SCE}$  defined in clause 8.6.2.1.1.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_FDD\_CRS}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.2.1.1.2 E-UTRAN FDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within  $T_{identify\_intra\_SCE\_DRX}$ .

 $T_{identify\_intra\_SCE\_DRX\ =\ 16*Max\ \{\ T_{DMTC\_periodicity},\ DRX\ cycle\ length\} +\ T_{Measurement\_Period\ \_intra\_FDD\_CRS\_DRX}$ 

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

 $T_{Measurement\_Period\_intra\_FDD\_CRS\_DRX} \ is \ the \ intra-frequency \ period \ for \ measurements \ as \ shown \ in \ table \ 8.6.2.1.1.2-1$ 

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\ intra\_FDD\_\ CRS\_DRX}$  when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{Measurement\_Period}$  intra\_FDD\_CRS\_DRX as shown in table 8.6.2.1.1.2-1, when DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\_Period\_intra\_FDD\_CRS\_DRX}$ .

Table 8.6.2.1.1.2-1: Requirement to measure FDD intra frequency cell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period intra_FDD_CRS_DRX</sub> [ms]
≥6	≥1	5 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length }
≥25	≥1	3 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length }

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

# 8.6.2.1.1.2.1 Measurement Reporting Requirements

# 8.6.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

#### 8.6.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.1.2.1.3.

# 8.6.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_SCE\_DRX}$  defined in Clause 8.6.2.1.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_SCE\_DRX}$  defined in clause 8.6.2.1.1.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_FDD\_CRS\_DRX}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.2.1.2 E-UTRAN TDD intra frequency measurements

#### 8.6.2.1.2.1 E-UTRAN TDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within  $T_{identify\_intra\_SCE}$ ,

 $T_{identify\_intra\_SCE} = 12*T_{DMTC\_periodicity} + T_{Measurement\_Period\_intra\_TDD\_CRS}$ 

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

T<sub>DMTC</sub> periodicity is the discovery signal measurement timing configuration periodicity of higher layer.

 $T_{Measurement\_Period\_intra\_TDD\_CRS}$  is the intra-frequency period for measurements

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_intra\_TDD\_CRS}$  when no DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{\text{Measurement\_Period}}$  \_intra\_TDD\_CRS as shown in table 8.6.2.1.2.1-1, when no DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Period\_intra\_TDD\_CRS}$ 

Table 8.6.2.1.2.1-1: Requirement to measure TDD intra frequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period intra_TDD_CRS</sub> [ms]
≥6	≥2	5 * T <sub>DMTC_periodicity</sub>
≥ 25	≥2	3 * T <sub>DMTC_periodicity</sub>

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

#### 8.6.2.1.2.1.1 Measurement Reporting Requirements

#### 8.6.2.1.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

#### 8.6.2.1.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.2.1.1.3.

#### 8.6.2.1.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_SCE}$  defined in Clause 8.6.2.1.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_SCE}$  defined in clause 8.6.2.1.2.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_TDD\_CRS}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.2.1.2.2 E-UTRAN TDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within  $T_{identify\_intra\_SCE\_DRX}$ .

 $T_{identify\ intra\ SCE\ DRX\ =} 16* max \{ T_{DMTC\ periodicity}, DRX\ cycle\ length \} + T_{Measurement\ Period\ intra\ TDD\ CRS\ DRX} \}$ 

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\ intra\_TDD\_\ CRS\_DRX}$  when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{Measurement\_Period}$  \_intra\_TDD\_CRS\_DRX as shown in table 8.6.2.1.2.2-1, when DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\_Period\_intra\_TDD\_CRS\_DRX}$ 

Table 8.6.2.1.2.2-1: Requirement to measure TDD intra frequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period</sub> intra_TDD_CRS_DRX [ms]
≥6	≥2	5 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length
≥25	≥2	3 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length
		}

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

#### 8.6.2.1.2.2.1 Measurement Reporting Requirements

#### 8.6.2.1.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

#### 8.6.2.1.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8,6.2.1.2.2.1.3.

#### 8.6.2.1.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_SCE\_DRX}$  defined in Clause 8.6.2.1.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_intra\_SCE\_DRX}$  defined in clause 8.6.2.1.2.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_TDD\_CRS\_DRX}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.6.2.2 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency cells and perform RSRP and RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided. The discovery signal occasion and the measurement gap should be aligned, provided that also the following additional conditions are fulfilled:

Entire discovery signal occasion should be contained in the measurement gap.

The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

#### 8.6.2.2.1 E-UTRAN FDD – FDD inter-frequency measurements

#### 8.6.2.2.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency within  $T_{Identify\_Inter\_SCE}$  according to the following expression:

 $T_{Identify\_Inter\_SCE} = \underline{13} * Max \{T_{DMTC\_periodicity}, MGRP\} * N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS}$ 

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1.14.2 and RSRQ related side conditions given in Sections 9.1.14.4 are fulfilled,
- SCH\_RP|<sub>dBm</sub> SCH Ês/Iot according to Annex B.2.11 for a corresponding Band,

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

 $T_{Measurement\_Period\_intra\_FDD\_CRS}$  is the inter-frequency period for measurements as shown in table 8.6.2.2.1.2-1.  $N_{freq}$  is defined in clause 8.1.2.1.1.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.2 and 9.1.14.4, respectively, with measurement period given by table 8.6.2.3.1.1-1.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.1-1 when no DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.2.2.1.1-1: Requirement to measure FDD inter frequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period</sub> inter_FDD_CRS [ms]
≥6	≥1	5 * <i>Max</i> { T <sub>DMTC_periodicity</sub> , MGRP}* <i>N</i> <sub>freq</sub>
≥25	≥1	3 * <i>Max</i> { T <sub>DMTC_periodicity</sub> , MGRP}* <i>N</i> <sub>freq</sub>

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

#### 8.6.2.2.1.1.1 Measurement Reporting Requirements

#### 8.6.2.2.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4,respectively.

#### 8.6.2.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.2.1.1.1.3.

# 8.6.2.2.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay

excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{Identify\_Inter\_SCE}$  defined in Clause 8.6.2.2.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{Identify\_Inter\_SCE}$  defined in clause 8.6.2.2.1.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_FDD\_CRS}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.2.2.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency cell within  $T_{identify\_inter\_SCE\_DRX}$ .

 $T_{identify\_inter\_SCE\_DRX} = 17*Max \; \{ \; T_{DMTC\_periodicity}, \; DRX \; cycle \; length, \; MGRP \} \; *N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX} \; description \; T_{identify\_inter\_SCE\_DRX} = 17*Max \; \{ \; T_{DMTC\_periodicity}, \; DRX \; cycle \; length, \; MGRP \} \; *N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX} \; description \; T_{identify\_inter\_SCE\_DRX} = 17*Max \; \{ \; T_{DMTC\_periodicity}, \; DRX \; cycle \; length, \; MGRP \} \; *N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX} \; description \; T_{identify\_inter\_SCE\_DRX} = 17*Max \; \{ \; T_{DMTC\_periodicity}, \; DRX \; cycle \; length, \; MGRP \} \; *N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX} \; description \; T_{identify\_inter\_SCE\_DRX} = 17*Max \; \{ \; T_{DMTC\_periodicity}, \; DRX \; cycle \; length, \; MGRP \} \; *N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX} \; description \; T_{identify\_inter\_SCE\_DRX} = 17*Max \; T_{identify\_inter\_SCE\_DRX}$ 

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

T<sub>DMTC periodicity</sub> is the discovery signal measurement timing configuration periodicity of higher layer.

 $T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$  is the inter-frequency period for measurements as shown in Table 8.6.2.2.1.2-1.  $N_{freq}$  is defined in clause 8.1.2.1.1.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$  when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.2.2.1.2-1: Requirement to measure FDD interfrequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period inter_FDD_CRS_DRX [ms]
≥6	≥1	5 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length,MGRP}*N <sub>freq</sub>
≥25	≥1	3 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length,MGRP}*N <sub>freq</sub>

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

# 8.6.2.2.1.2.1 Measurement Reporting Requirements

#### 8.6.2.2.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4 respectively.

#### 8.6.2.2.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.2.1.2.1.3.

#### 8.6.2.2.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times \text{TTI}_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_inter\_SCE\ DRX}$  defined in Clause 8.6.2.2.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_inter\_SCE\ DRX}$  defined in clause 8.6.2.2.1.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.6.2.2.2 E-UTRAN TDD – TDD inter frequency measurements

# 8.6.2.2.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new TDD inter-frequency within  $T_{Identify\_Inter\_SCE}$  according to the following expression:

 $T_{identify\_inter\_SCE} = 13 * Max \{ T_{DMTC\_periodicity}, MGRP \} * N_{freq} + T_{Measurement\_Period\_inter\_TDD\_CRS}$ 

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1.14.2 and RSRQ related side conditions given in Sections 9.1.14.4 are fulfilled,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

T<sub>DMTC</sub> periodicity is the discovery signal measurement timing configuration periodicity of higher layer.

 $T_{\text{Measurement\_Period\_inter\_TDD\_CRS}}$  is the inter-frequency period for measurements as shown in Table 8.6.2.2.2.1-1.  $N_{\text{freq}}$  is defined in clause 8.1.2.1.1.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.2, and 9.1.14.4, respectively, with measurement period  $T_{\text{Measurement\_Period inter\_TDD\_CRS}$  given by table 8.6.2.2.2.1-1:

Table 8.6.2.2.2.1-1: Requirement to measure TDD interfrequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period inter_TDD_CRS</sub> [ms]
≥6	≥2	5 * <i>Max</i> { T <sub>DMTC_periodicity</sub> , MGRP}* <i>N</i> <sub>freq</sub>
≥25	≥2	3 * <i>Max</i> { T <sub>DMTC_periodicity</sub> , MGRP}* <i>N</i> <sub>freq</sub>

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per FDD inter-frequency for up to 3TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

#### 8.6.2.2.1.1 Measurement Reporting Requirements

#### 8.6.2.2.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

#### 8.6.2.2.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.2.2.1.1.3.

#### 8.6.2.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{Identify\_Inter}$  defined in clause 8.6.2.2.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{Identify\_Inter\_SCE}$  defined in clause 8.6.2.2.2.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\ inter\_TDD\_CRS}$  defined in clause 8.6.2.2.2.1 provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.2.2.2.2 E-UTRAN TDD – TDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency cell within  $T_{identify\_inter\_SCE\_DRX}$ 

 $T_{identify\_inter\_SCE\_DRX} = 17 * \textit{Max} \; \{ \; T_{DMTC\_periodicity}, \; DRX \; cycle \; length, \; MGRP \} \; *N_{freq} \; + T_{Measurement\_Period\_inter\_TDD\_CRS\_DRX} \; | \; T_{identify\_inter\_SCE\_DRX} \; |$ 

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.14.2 and RSRQ related side conditions given in Sections 9.1.14.4 are fulfilled,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

T<sub>DMTC</sub> periodicity is the discovery signal measurement timing configuration periodicity of higher layer.

 $T_{Measurement\_Period\_inter\_TDD\_CRS\_DRX}$  is the inter-frequency period for measurements as shown in Table 8.6.2.2.2-1.  $N_{freq}$  is defined in clause 8.1.2.1.1.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\ intra\_TDD\_CRS\_DRX}$  when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.2.2.2.1: Requirement to measure TDD interfrequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period inter_TDD_CRS_DRX [ms]
≥6	≥2	5 * Max{ T <sub>DMTC_periodicity</sub> , DRX cycle length,MGRP}*N <sub>freq</sub>
≥25	≥2	3 * <i>Max</i> { T <sub>DMTC_periodicity</sub> , DRX cycle length,MGRP}* <i>N<sub>freq</sub></i>

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

#### 8.6.2.2.2.1 Measurement Reporting Requirements

#### 8.6.2.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

#### 8.6.2.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.2.1.1.3.

#### 8.6.2.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times \text{TTI}_{\text{DCCH}}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{Identify\_Inter}$  defined in clause 8.1.2.3.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_inter\_SCE\_DRX}$  defined in clause 8.6.2.2.2.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_TDD\_CRS\_DRX}$  defined in clause 8.6.2.2.2.2 provided the timing to that cell has not changed more than  $\pm$  50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.2.2.3 E-UTRAN TDD – FDD inter frequency measurements

#### 8.6.2.2.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.1.1 also apply for this section.

#### 8.6.2.2.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.1.2 also apply for this section.

#### 8.6.2.2.4 E-UTRAN FDD – TDD inter frequency measurements

#### 8.6.2.2.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.2.1 also apply for this section.

#### 8.6.2.2.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.2.2 also apply for this section.

# 8.6.3 Requirements for CSI-RS based discovery signal measurements

# 8.6.3.1 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency TPs and perform CSI-RSRP measurements of intra-frequency TPs with an explicit intra-frequency TP list containing physical layer cell identities. During the RRC\_CONNECTED state the UE shall continuously measure identified intra frequency TPs and additionally search for and identify new intra frequency TPs.

#### 8.6.3.1.1 E-UTRAN FDD intra frequency measurements

# 8.6.3.1.1.1 E-UTRAN FDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency TP within  $T_{identify\_intra\_TP\_SCE}$ ,

 $T_{identify\_intra\_TP\_SCE} = T_{identify\_intra\_SCE} + T_{Measurement\_Period\_intra\_FDD\_CSI-RS}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{identify\_intra\_SCE}$  is the intra-frequency period for cell identification in section 8.6.2.1.1.1.  $T_{Measurement\_Period\_intra\_FDD\_CSI-RS}$  is the intra-frequency period for TP measurement as shown in table 8.6.3.1.1.1-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_intra\_FDD\_CSI-RS}$  when no DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{Measurement\_Period\_intra\_FDD\_CSI\_RS}$  as shown in table 8.6.3.1.1.1-1, when no DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\_Period\_intra\_FDD\_CSI\_RS}$ 

Table 8.6.3.1.1.1-1: Requirement to measure FDD intra frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period_intra_FDD_CSI-RS</sub> [ms]
≥ 6	≥1	5* T <sub>DMTC_periodicity</sub>
≥ 25	≥1	3* T <sub>DMTC_periodicity</sub>

T<sub>DMTC periodicity</sub> is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

#### 8.6.3.1.1.1.1 Measurement Reporting Requirements

#### 8.6.3.1.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.1.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.1.1.1.3.

#### 8.6.3.1.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_TP\_SCE}$  defined in Clause 8.6.3.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_intra\_TP\_SCE}$  defined in clause 8.6.3.1.1.1 becomes undetectable for a period  $\leq 5$  seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_FDD\_CSI\_RS}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.1.1.2 E-UTRAN FDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency TP within  $T_{identify\_intra\_TP\_SCE\_DRX}$ .

 $T_{identify\ intra\ TP\ SCE\ DRX} = T_{identify\ intra\ SCE\ DRX} + T_{Measurement\ Period\ intra\ FDD\ CSI-RS\ DRX}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{identify\_intra\_SCE\_DRX}$  is the intra-frequency period for cell identification in section 8.6.2.1.1.2.  $T_{Measurement\_Period\_intra\_FDD\_CSI-RS\_DRX}$  is the intra-frequency period for TP measurement as shown in table 8.6.3.1.1.2-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_intra\_FDD\_CSI-RS\_DRX}$  when DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{\text{Measurement\_Period}}$  intra\_FDD\_CSI-RS\_DRX as shown in table 8.6.3.1.1.2-1, when DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Period\_intra\_FDD\_CSI-RS\_DRX}$ .

Table 8.6.3.1.1.2-1: Requirement to measure FDD intra frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period intra_FDD_ CSI-RS_DRX [ms]
≥ 6	≥1	5*Max{T <sub>DMTC_periodicity</sub> , DRX cycle length}
≥ 25	≥1	3*Max{T <sub>DMTC_periodicity</sub> , DRX cycle length}

T<sub>DMTC periodicity</sub> is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

# 8.6.3.1.1.2.1 Measurement Reporting Requirements

#### 8.6.3.1.1.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.1.1.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.1.2.1.3.

#### 8.6.3.1.1.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay

uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_TP\_SCE\_DRX}$  defined in Clause 8.6.3.1.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_intra\_TP\_SCE\_DRX}$  defined in clause 8.6.3.1.1.2 becomes undetectable for a period  $\leq 5$  seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_FDD\_CSI\_RS\_DRX}$  provided the timing to that TP has not changed more than  $\pm 50$  Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.1.2 E-UTRAN TDD intra frequency measurements

#### 8.6.3.1.2.1 E-UTRAN TDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency TP within  $T_{identify\_intra\_TP\_SCE}$ ,

 $T_{identify\_intra\_TP\_SCE} = T_{identify\_intra\_SCE} + T_{Measurement\_Period\_intra\_TDD\_CSI-RS}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{identify\_intra\_SCE}$  is the intra-frequency period for cell identification in section 8.6.2.1.2.1.  $T_{Measurement\_Period\_intra\_TDD\_CSI-RS}$  is the intra-frequency period for TP measurement as shown in table 8.6.3.1.2.1-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_intra\_TDD\_CSI-RS}$  when no DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{\text{Measurement\_Period}}$  intra\_TDD\_CSI-RS as shown in table 8.6.3.1.2.1-1, when no DRX is in use. The UE shall be capable of performing measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Period\_intra\_TDD\_CSI-RS}$ 

Table 8.6.3.1.2.1-1: Requirement to measure TDD intra frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period _intra_TDD_CSI-RS [ms]
≥ 6	≥2	5* T <sub>DMTC_periodicity</sub>
≥ 25	≥2	3* T <sub>DMTC</sub> periodicity

T<sub>DMTC</sub> periodicity is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

#### 8.6.3.1.2.1.1 Measurement Reporting Requirements

# 8.6.3.1.2.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.1.2.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8,6,3,1,2,1,1,3.

#### 8.6.3.1.2.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_TP\_SCE}$  defined in Clause 8.6.3.1.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_intra\_TP\_SCE}$  defined in clause 8.6.3.1.2.1 becomes undetectable for a period  $\leq 5$  seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_TDD\_CSI-RS}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.1.2.2 E-UTRAN TDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency TP within  $T_{identify\_intra\_TP\_SCE\_DRX}$ .

 $T_{identify\_intra\_TP\_SCE\_DRX} = T_{identify\_intra\_SCE\_DRX} + T_{Measurement\_Period\_intra\_TDD\_CSI-RS\_DRX}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{identify\_intra\_SCE\_DRX}$  is the intra-frequency period for cell identification as shown in section 8.6.2.1.2.2.  $T_{Measurement\_Period\_intra\_TDD\_CSI-RS\_DRX}$  is the intra-frequency period for TP measurement as shown in table 8.6.3.1.2.2-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of  $T_{Measurement\_Period\_intra\_TDD\_CSI-RS\_DRX}$  when DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is  $T_{Measurement\_Period}$  \_intra\_TDD\_CSI-RS\_DRX as shown in table 8.6.3.1.2.2-1, when DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{Measurement\_Period\_intra\_TDD\_CSI-RS\_DRX}$ 

Table 8.6.3.1.2.2-1: Requirement to measure TDD intrafrequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period</sub> intra_TDD_ CSI-RS_DRX [ms]
≥ 6	≥2	5*Max{T <sub>DMTC periodicity</sub> , DRX cycle length}
≥ 25	≥2	3*Max{T <sub>DMTC_periodicity</sub> , DRX cycle length}

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

#### 8.6.3.1.2.2.1 Measurement Reporting Requirements

#### 8.6.3.1.2.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.1.2.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.2.2.1.3.

# 8.6.3.1.2.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times \text{TTI}_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_intra\_TP\_SCE\_DRX}$  defined in Clause 8.6.3.1.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_intra\_TP\_SCE\_DRX}$  defined in clause 8.6.3.1.2.2 becomes undetectable for a period  $\leq$  5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_intra\_TDD\_CSI\_RS\_DRX}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.2 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency TPs and perform CSI-RSRP measurements of inter-frequency TP with an explicit inter-frequency TP list containing physical layer cell identities. The discovery signal occasion and the measurement gap should be aligned, provided that also the following additional conditions are fulfilled:

Entire discovery signal occasion should be contained in the measurement gap.

The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

#### 8.6.3.2.1 E-UTRAN FDD – FDD inter frequency measurements

#### 8.6.3.2.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency TP within T<sub>identify\_inter\_TP\_SCE</sub> according to the following expression:

 $T_{identify\_inter\_TP\_SCE} = T_{identify\_Inter\_SCE} + T_{Measurement\_Period\_inter\_FDD\_CSI-RS}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

 $T_{identify\_inter\_SCE}$  is the inter-frequency period for cell identification as shown in section 8.6.2.2.1.1.  $N_{freq}$  is defined in clause 8.1.2.1.1.  $T_{Measurement\_Period\_inter\_FDD\_CSI-RS}$  is the inter-frequency period for TP measurement as shown in table 8.6.3.2.1.1-1.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.1.1-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TPs per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.1.1-1 when no DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.1.1-1: Requirement to measure FDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_Period</sub> inter_FDD_ CSI-RS [ms]
≥ 6	≥1	$5*Max\{T_{DMTC\_periodicity}, MGRP\}*N_{freq}$
≥ 25	≥1	3*Max{T <sub>DMTC periodicity</sub> , MGRP }*N <sub>freq</sub>

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

# 8.6.3.2.1.1.1 Measurement Reporting Requirements

#### 8.6.3.2.1.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.2.1.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.1.1.1.3.

#### 8.6.3.2.1.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times \text{TTI}_{\text{DCCH}}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_inter\_TP\_SCE}$  defined in Clause 8.6.3.2.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_inter\_TP\_SCE}$  defined in clause 8.6.3.2.1.1 becomes undetectable for a period  $\leq 5$  seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_FDD\_CSI\_RS}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.2.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency TP within  $T_{identify\_inter\_TP\_SCE\_DRX}$  according to the following expression:

 $T_{identify\_inter\_TP\_SCE\_DRX} = T_{identify\_inter\_SCE\_DRX} + T_{Measurement\_Period\_inter\_FDD\_CSI-RS\_DRX}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

 $T_{identify\_inter\_SCE\_DRX}$  is the inter-frequency period for cell identification as shown in section 8.6.2.2.1.2.  $N_{freq}$  is defined in clause 8.1.2.1.1.  $T_{Measurement\_Period\_inter\_FDD\_CSI-RS\_DRX}$  is the inter-frequency period for TP measurement as shown in table 8.6.3.2.1.2-1.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.1.2-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TPs per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.1.2-1: Requirement to measure FDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period inter_FDD_ CSI-RS_DRX [ms]
≥ 6	≥1	5* <i>Max</i> {T <sub>DMTC_periodicity</sub> , DRX cycle length, MGRP}* <i>N</i> <sub>freq</sub>
≥ 25	≥1	$3*Max{T_{DMTC\_periodicity}, DRX cycle}$ length, MGRP}* $N_{freq}$

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

#### 8.6.3.2.1.2.1 Measurement Reporting Requirements

#### 8.6.3.2.1.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3 respectively.

#### 8.6.3.2.1.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8,6,3,2,1,2,1,3.

#### 8.6.3.2.1.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI<sub>DCCH</sub>. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_inter\_TP\_SCE\_DRX}$  defined in clause 8.6.3.2.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_inter\_TP\_SCE\_DRX}$  defined in clause 8.6.3.2.1.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_FDD\_CSI\_RS\_DRX}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.2.2 E-UTRAN TDD – TDD inter frequency measurements

# 8.6.3.2.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new TDD inter-frequency TP within  $T_{identify\_inter\_TP\_SCE}$  according to the following expression:

 $T_{identify\_inter\_TP\_SCE} = T_{identify\_inter\_SCE} + T_{Measurement\_Period\_inter\_TDD\_CSI-RS}$ 

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

 $T_{identify\_inter\_SCE}$  is the inter-frequency period for cell identification as shown in section 8.6.2.2.2.1.  $N_{freq}$  is defined in clause 8.1.2.1.1.  $T_{Measurement\_Period\_inter\_TDD\_CSI-RS}$  is the inter-frequency period for TP measurement as shown in table 8.6.3.2.2.1-1.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.2.1-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TP per TDD inter-frequency for up to 3TDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.2.1-1 when no DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.2.1-1: Requirement to measure TDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period inter_TDD_ CSI-RS [ms]
≥ 6	≥2	5*Max{T <sub>DMTC periodicity</sub> , MGRP}*N <sub>freq</sub>
≥ 25	≥2	3*Max{T <sub>DMTC_periodicity</sub> , MGRP }*N <sub>freq</sub>

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

#### 8.6.3.2.2.1.1 Measurement Reporting Requirements

#### 8.6.3.2.2.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.2.2.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.2.1.1.3.

#### 8.6.3.2.2.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_inter\_TP\_SCE}$  defined in clause 8.6.3.2.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_inter\_TP\_SCE}$  defined in clause 8.6.3.2.2.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_TDD\_CSI-RS}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

# 8.6.3.2.2.2 E-UTRAN CSI-RS based TDD – TDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency TP within  $T_{identify\_inter\_TP\_SCE\_DRX}$  according to the following expression:

 $T_{identify\_inter\_TP\_SCE\_DRX} = T_{identify\_inter\_SCE\_DRX} + T_{Measurement\_Period\_inter\_TDD\_CSI-RS\_DRX}$ 

A TP shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

 $T_{identify\_inter\_SCE\_DRX}$  is the inter-frequency period for cell identification as shown in section 8.6.2.2.2.2.  $N_{freq}$  is defined in clause 8.1.2.1.1.  $T_{Measurement\_Period\_inter\_TDD\_CSI-RS\_DRX}$  is the inter-frequency period for TP measurement as shown in table 8.6.3.2.2.2-1.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.1.2-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TPs per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.2.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.2.2-1: Requirement to measure TDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>Measurement_</sub> Period inter_TDD_ CSI-RS_DRX [ms]
≥ 6	≥2	$5*Max{T_{DMTC\_periodicity}, DRX cycle}$ length, MGRP $}*N_{freq}$
≥ 25	≥2	3* <i>Max</i> {T <sub>DMTC_periodicity</sub> , DRX cycle length, MGRP}* <i>N</i> <sub>freq</sub>

 $T_{DMTC\_periodicity}$  is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

#### 8.6.3.2.2.2.1 Measurement Reporting Requirements

# 8.6.3.2.2.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

#### 8.6.3.2.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.2.2.1.3.

#### 8.6.3.2.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_inter\_TP\_SCE\_DRX}$  defined in Clause 8.6.3.2.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_inter\_TP\_SCE\_DRX}$  in clause 8.6.3.2.2.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than  $T_{Measurement\_Period\_inter\_TDD\_CSI\_RS\_DRX}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

#### 8.6.3.2.3 E-UTRAN TDD – FDD inter frequency measurements

#### 8.6.3.2.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.1.1 also apply for this section.

#### 8.6.3.2.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.1.2 also apply for this section.

#### 8.6.3.2.4 E-UTRAN FDD – TDD inter frequency measurements

#### 8.6.3.2.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.2.1 also apply for this section.

#### 8.6.3.2.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.2.2 also apply for this section.

# 8.7 Discovery signal measurements for E-UTRA carrier aggregation

# 8.7.1 Introduction

This clause contains requirements on UE capabilities for support of E-UTRA carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UE which have been configured with at least one downlink SCell, but:

- up to three downlink CCs and up to two uplink CCs for intra-band contiguous carrier aggregation, or
- up to three downlink CCs and one uplink CC for inter-band carrier aggregation, or
- up to two downlink CCs intra-band contiguous and one downlink intra-band non-contiguous and one uplink CC for carrier aggregation, or
- up to two downlink CCs intra-band contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs intra-band non-contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs and one uplink CC for intra-band non-contiguous carrier aggregation.

Non configured frequencies may be measured with measurement gaps according to the requirements in clause 8.6.2.2 and clause 8.6.3.2 (E-UTRAN CRS based inter frequency measurements and E-UTRAN CSI-RS based inter frequency measurements). Requirements in this clause are applicable to E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

## 8.7.2 Requirements for CRS based discovery signal measurements for E-UTRA carrier aggregation

### 8.7.2.1 Measurements of the primary component carrier

CRS based measurements of cells on the primary component carrier shall meet all applicable requirements (FDD or TDD) in clause 8.6.2.1.

### 8.7.2.2 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

### 8.7.2.3 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in clause 8.6.2.1. If common DRX is in use, then the requirements for that secondary component carrier are given by the applicable DRX requirements (FDD or TDD) in clause 8.6.2.1, otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in clause 9.1.15.

### 8.7.2.4 Measurements of a secondary component carrier with deactivated SCell

This clause defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

# 8.7.2.4.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within  $T_{identify\_scc\_SCE}$ , according to the parameter measCycleSCell where  $T_{identify\_scc\_CRS} = 13 *measCycleSCell + T_{measure\_scc\_CRS}$ 

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

The measurement period for deactivated scell measurements is  $T_{measure\_scc\_CRS}$  according to the parameter measCycleSCell shown in Tables 8.7.2.4.1-1 and 8.7.2.4.1-2.

Table 8.7.2.4.1-1: Requirement to measure intra frequency cell on FDD SCC with deactivated SCell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_CRS</sub> [ms]
≥6	≥1	5* measCycleSCell
≥25	≥1	3 * measCycleSCell

Table 8.7.2.4.1-2: Requirement to measure intra frequency cell on TDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_CRS</sub> [ms]	
≥6	≥2	5* measCycleSCell	
≥25	≥2	3 * measCycleSCell	

The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\_scc\_CRS}$ .

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on one or two SCCs with deactivated SCell. This may cause interruptions on PCell or an activated SCell or both that are specified in Section 7.8.

#### 8.7.2.4.1.1 Measurement Reporting Requirements

#### 8.7.2.4.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

#### 8.7.2.4.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic CRS based measurement reporting shall meet the requirements specified in clause 8.7.2.4.1.1.3.

### 8.7.2.4.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_scc\_CRS}$  defined in Clause 8.7.2.4.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_scc\_SCE}$  defined in clause 8.7.2.4.1 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_scc\_CRS}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

# 8.7.2.4.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within  $T_{identify\_scc}$ , according to the parameter measCycleSCell where  $T_{identify\_scc\_SCE\_DRX} = 17*Max(measCycleSCell$ , DRX cycle length)+ $T_{measure\_scc\_CRS\_DRX}$ .

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

The measurement period for deactivated scell measurements is  $T_{measure\_scc\_CRS\_DRX}$  according to the parameter *measCycleSCell* shown in Tables 8.7.2.4.2-1 and 8.7.2.4.2-1.

Table 8.7.2.4.2-1: Requirement to measure intrafrequency cell on FDD SCC with deactivated SCell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_CRS_DRX</sub> [ms]
≥6	≥1	5* Max{ measCycleSCell, DRX cycle length }
≥ 25	≥1	3 * Max{ measCycleSCell, DRX cycle length }

Table 8.7.2.4.2-2: Requirement to measure intrafrequency cell on TDD SCC with deactivated SCell

Measurement bandwidth[RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_CRS_DRX</sub> [ms]
≥6	≥2	5* Max{ measCycleSCell, DRX cycle length }
≥25	≥2	3 * Max{ measCycleSCell, DRX cycle length }

The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{measure\_scc\_CRS\_DRX}}$ .

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of cells on one or two SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or an activated SCell or both when the PCell and the SCell belong to the same frequency band. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

#### 8.7.2.4.2.1 Measurement Reporting Requirements

### 8.7.2.4.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

### 8.7.2.4.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.7.2.4.2.1.3.

#### 8.7.2.4.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered CRS based measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a

delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_scc\_CRS}$  defined in Clause 8.7.2.4.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period  $T_{identify\_scc\_SCE\_DRX}$  defined in clause 8.7.2.4.2 becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_scc\_CRS\_DRX}$  provided the timing to that cell has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

# 8.7.3 Requirements for CSI-RS based discovery signal measurements for E-UTRA carrier aggregation

### 8.7.3.1 Measurements of the primary component carrier

Measurements of cells on the primary component carrier shall meet all applicable requirements (FDD or TDD) in clause 8.6.3.1.

### 8.7.3.2 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

### 8.7.3.3 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in clause 8.6.3.1. If common DRX is in use, then the requirements for that secondary component carrier are given by the applicable DRX requirements (FDD or TDD) in clause 8.6.3.1, otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in clause 9.1.15.

### 8.7.3.4 Measurements of a secondary component carrier with deactivated SCell

This clause defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

# 8.7.3.4.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD or TDD TP on a secondary component carrier within  $T_{identify\_scc\_TP\_SCE}$ , according to the parameter measCycleSCell, where  $T_{identify\_scc\_TP\_SCE} = T_{identify\_scc\_SCE} + T_{measure\_scc\_CSI-RS}$ ,

A cell shall be considered detectable when

- CSI-RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{identify\_scc\_SCE}$  is the intra-frequency period for cell identification in section 8.7.2.4.1.  $T_{measure\_scc\_CSI-RS}$  is the intra-frequency period for TP measurement in table 8.7.3.4.1-1.

The measurement period for deactivated scell measurements is  $T_{measure\_scc\_CSI-RS}$  according to the parameter *measCycleSCell* as shown in tables 8.7.3.4.1-1 and 8.7.3.4.1-1.

Table 8.7.3.4.1-1: Requirement to measure intra frequency TP on FDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_CSI-RS</sub> [ms]
≥ 6	≥1	5* measCycleSCell
≥ 25	≥1	3* measCycleSCell

Table 8.7.3.4.1-2: Requirement to measure intra frequency TP on TDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_CSI-RS</sub> [ms]
≥ 6	≥2	5* measCycleSCell
≥ 25	≥2	3* measCycleSCell

The UE shall be capable of performing RSRP measurements for 3 identified TPs on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{measure\ scc\ CSI-RS}$ .

The measurement accuracy for all measured TPs shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on one or two SCCs with deactivated SCell. This may cause interruptions on PCell or an activated SCell or both that are specified in Section 7.8.

#### 8.7.3.4.1.1 Measurement Reporting Requirements

#### 8.7.3.4.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

#### 8.7.3.4.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.7.3.4.1.1.3.

#### 8.7.3.4.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_scc\_TP\_SCE}$  defined in Clause 8.7.3.4.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_scc\_TP\_SCE}$  defined in clause 8.7.3.4.1 becomes undetectable for a period  $\leq 5$  seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_scc\_CSI-RS}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

# 8.7.3.4.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD or TDD TP on a secondary component carrier within  $T_{identify\_scc\_TP\_SCE\_DRX}$ , according to the parameter measCycleSCell, where  $T_{identify\_scc\_TP\_SCE\_DRX} = T_{identify\_scc\_CSCE\_DRX} + T_{measure\_scc\_CSI-RS\_DRX}$ ,

A cell shall be considered detectable when

- CSI-RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- SCH\_RP|<sub>dBm</sub> and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

 $T_{identify\_scc\_SCE\_DRX}$  is the intra-frequency period for cell identification in section 8.7.2.4.2.  $T_{measure\_scc\_CSI-RS\_DRX}$  is the intra-frequency period for TP measurement in table 8.7.3.4.2-1.

The measurement period for deactivated scell measurements is  $T_{measure\_scc\_CSI-RS\_DRX}$  according to the parameter *measCycleSCell* as shown in tables 8.7.3.4.2-1 and 8.7.3.4.2-2.

Table 8.7.3.4.2-1: Requirement to measure intrafrequency TP on FDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_TP_SCE_DRX</sub> [ms]
≥ 6	≥1	5* max {measCycleSCell, DRX cycle length }
≥ 25	≥1	3* max {measCycleSCell, DRX cycle length }

Table 8.7.3.4.2-1: Requirement to measure intrafrequency TP on TDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (ds-OccasionDuration) [ms]	T <sub>measure_scc_TP_SCE_DRX</sub> [ms]
≥ 6	≥2	5* max {measCycleSCell, DRX cycle length }
≥ 25	≥2	3* max {measCycleSCell, DRX cycle length }

The UE shall be capable of performing CSI-RSRP measurements for 3 identified TPs on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{measure scc CSI-RS DRX}}$ .

The measurement accuracy for all measured TPs shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of TPs on one or two SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or an activated SCell or both when the PCell and the SCell belong to the same frequency band. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

### 8.7.3.4.2.1 Measurement Reporting Requirements

#### 8.7.3.4.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

#### 8.7.3.4.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.7.3.4.2.1.3.

#### 8.7.3.4.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is:  $2 \times TTI_{DCCH}$ . This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{identify\_scc\_TP\_SCE\_DRX}$  defined in Clause 8.7.3.4.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period  $T_{identify\_scc\_TP\_SCE\_DRX}$  defined in clause 8.7.3.4.2 becomes undetectable for a period  $\leq 5$  seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than  $T_{measure\_scc\_CSI-RS\_DRX}$  provided the timing to that TP has not changed more than  $\pm$  50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

## 8.8 Measurements for E-UTRA dual connectivity

### 8.8.1 Introduction

This clause contains requirements for UE supporting E-UTRA dual connectivity. Requirements in this clause are applicable to UEs which have been configured with one PSCell for inter-band dual connectivity. Requirements in this clause are applicable to E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

## 8.8.2 Intra-frequency measurements requirements on PCell

PCell intra-frequency measurements shall meet all applicable requirements in clause 8.1.2.2. If MCG DRX is in use, then the PCell intra-frequency requirements for when DRX is in use in clause 8.1.2.2 shall apply and shall depend on the MCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.1.

## 8.8.3 Intra-frequency measurements requirements on PSCell

PSCell starts with activated state upon configuration and cannot be deactivated. PSCell intra-frequency measurements shall meet all applicable requirements in clause 8.1.2.2. If SCG DRX is in use, then the PSCell intra-frequency requirements for when DRX is in use in clause 8.1.2.2 shall apply and shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.1.

## 8.8.4 Inter-frequency and inter-RAT measurement requirements

Inter-frequency measurements shall meet all applicable requirements in clause 8.1.2.3. If MCG DRX is in use, then the inter-frequency requirements for when DRX is in use in clause 8.1.2.3 shall apply and shall depend on the MCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.1.

Inter-RAT measurements shall meet all applicable requirements in clause 8.1.2.4. If MCG DRX is in use, then the inter-RAT requirements for when DRX is in use in clause 8.1.2.4 shall apply and shall depend on the MCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.2, 9.3, 9.4 and 9.5.

### 8.9 MBSFN Measurements

### 8.9.1 Introduction

The requirements specified in Section 8.9 apply for MBSFN measurements (MBSFN RSRP, MBSFN RSRQ, and MCH BLER defined in [4]), which are performed in RRC\_CONNECTED and logged for MDT by UEs which are MBMS-capable and also indicate their MBSFN measurement logging capability [2].

UE shall measure MBSFN RSRP, MBSFN RSRQ and MCH BLER only in subframes and on carriers where UE is decoding PMCH. The requirements are specified for any carrier where PMCH is received by UE. The requirements specified in this section apply for any carrier frequency with configured MBSFN subframes with PMCH, which may be the same as or different from any serving unicast carrier.

The UE receiving PMCH on any non-serving carrier and performing MBSFN measurements shall not cause interruptions on any serving carrier in unicast subframes and in the subframes with non-MBSFN multicast transmissions such as system information.

### 8.9.2 MBSFN RSRP Measurements

The UE physical layer shall be capable of performing the MBSFN RSRP measurement [4] within the MBSFN RSRP measurement period and report the measurement, while meeting the MBSFN RSRP measurement accuracy requirements specified in section 9.8.2.

The MBSFN RSRP measurement period is defined as the maximum between 640 ms and the period during which the UE decodes [5, Section 10] 5 subframes containing PMCH transmissions.

The MBSFN RSRP measurement period is the same for UE in DRX and non-DRX.

### 8.9.3 MBSFN RSRQ Measurements

The UE physical layer shall be capable of performing the MBSFN RSRQ measurement [4] within the MBSFN RSRP measurement period and report the measurement, while meeting the MBSFN RSRQ measurement accuracy requirements specified in section 9.8.3.

The MBSFN RSRQ measurement period is defined as the maximum between 640 ms and the period during which the UE decodes [5, Section 10] 5 subframes containing PMCH transmissions.

The MBSFN RSRQ measurement period is the same for UE in DRX and non-DRX.

#### 8.9.4 MCH BLER Measurements

The UE physical layer shall be capable of performing and reporting the MCH BLER measurement [4] to higher layers within the MCH BLER measurement period. The MCH BLER measurement reporting is according to section 9.8.4.

The MCH BLER measurement period is equal to the MBSFN logging interval configured by higher layers [2].

## 8.10 Proximity-based Services

### 8.10.1 Introduction

This section contains the requirements for the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery in RRC\_CONNECTED state. The ProSe requirements shall apply provided that the sidelink used by the UE for ProSe direct communication and/or ProSe direct discovery is on the carrier of the PCell.

### 8.10.2 Requirements

When a UE in RRC\_CONNECTED state is performing transmissions and/or reception for ProSe Direct Discovery and/or ProSe Direct Communication, the UE shall meet all the requirements specified in Section 8.

Note: The UE may need to interrupt ProSe operation in order to meet the measurement requirements of Section 8

### 8.10.2.1 Initiation/Cease of SLSS transmissions with ProSe Direct Discovery

The requirements in this subclause are applicable to a UE capable of ProSe Direct Discovery and SLSS transmission and reception.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType19*. The UE shall be capable of measuring the RSRP of the cell used to transmit Prose Direct Discovery announcements and evaluate to initiate/cease SLSS transmissions within T<sub>evaluate,SLSS</sub> where,

- $T_{\text{evaluate.SLSS}} = 0.4$  seconds when UE is not configured with DRX, or,
- $T_{evaluate,SLSS}$  = as specified in Table 8.10.2.1-1 when UE is configured with DRX.

Table 8.10.2.1-1: T<sub>evaluate.SLSS</sub> with ProSe Direct Discovery

DRX cycle length [s]		T <sub>evaluate,SLSS</sub> [s] (number of DRX cycles)	
≤0.04		0.4 (Note 1)	
0.04 <drx-cycle< td=""><td>Note 2 (6)</td></drx-cycle<>		Note 2 (6)	
Note1:	Note1: Number of DRX cycles depends upon the DRX cycle in use		
Note2:	Time depends upon the DRX cycles in use		

If higher layer filtering is configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the cell used to transmit ProSe Direct Discovery announcements:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 for a corresponding Band are fulfilled,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

### 8.10.2.2 Initiation/Cease of SLSS transmissions with ProSe Direct Communication

The requirements in this subclause are applicable to a UE capable of ProSe Direct Communication.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; networkControlledSyncTx is not configured; and syncTxThreshIC is included in SystemInformationBlockType18. The UE shall be capable of measuring the RSRP of the cell used to transmit Prose Direct Communication to evaluate to initiate/cease SLSS transmissions within  $T_{evaluate,SLSS}$ 

where,

- $T_{evaluate,SLSS} = 0.4$  seconds when UE is not configured with DRX.
- $T_{evaluate,SLSS}$  = as specified in Table 8.10.2.2-1 when UE is configured with DRX.

Table 8.10.2.2-1: Tevaluate, SLSS with ProSe Direct Communication

DRX cycle length [s]		T <sub>evaluate,SLSS</sub> [s] (number of DRX cycles)	
≤0.04		0.4 (Note 1)	
0.04 <drx-cycle< td=""><td>Note 2 (6)</td></drx-cycle<>		Note 2 (6)	
		RX cycles depends upon the use	
Note2:	Time depends upon the DRX cycles in use		

If higher layer filtering is configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the cell used to transmit ProSe Direct Communication:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 for a corresponding Band are fulfilled,
- SCH\_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

# 9 Measurements performance requirements for UE

One of the key services provided by the physical layer is the measurements used to trigger or perform a multitude of functions. Both the UE and the E-UTRAN are required to perform measurements. The physical layer measurement model and a complete list of measurements are specified in [25] and [22] respectively. The physical layer measurements are described and defined in [4]. In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

Since the UE reference sensitivity requirements are different depending on supported band, this is noted in each case with definition of the range Io for each frequency band. Definitions of each frequency bands can be found in [5].

Except for requirements in sections 9.1.2A, 9.1.3A, 9.1.5A and 9.1.6A, the accuracy requirements in this clause are applicable for AWGN radio propagation conditions and assume independent interference (noise) at each receiver antenna port.

## 9.1 E-UTRAN measurements

### 9.1.1 Introduction

The requirements in this clause are applicable for a UE:

- in state RRC\_CONNECTED
- performing measurements with appropriate measurement gaps as defined in Clause 8.1.2.1.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in [25].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the higher layer filtering disabled.

In the requirements of Section 9 for the UE capable of CA and the UEs configured with one or two downlink SCell(s), the applicable exceptions for side conditions are specified in Annex B, Sections B.4.2 and B.4.3, respectively.

## 9.1.2 Intra-frequency RSRP Accuracy Requirements

### 9.1.2.1 Absolute RSRP Accuracy

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.2.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.2.1-1: RSRP Intra frequency absolute accuracy

Accı	uracy		Conditions			
Normal Extreme		_	Io Note 1 range			
condition	condition	Ês/lot	E-UTRA operating band groups <sup>Note 3</sup>	Minin	Minimum Io	
dB	dB	dB		dBm/15kHz Note 2 dBm/BW <sub>Chann</sub>		dBm/BW <sub>Channel</sub>
			FDD_A, TDD_A	-121	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
±4.5	<u>±</u> 9	≥-6 dB	FDD_E, TDD_E	-119	N/A	N/A -70
	19	≥-0 ub	FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±8 ±11 ≥-6 dB		FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

### 9.1.2.2 Relative Accuracy of RSRP

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency.

The accuracy requirements in Table 9.1.2.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2<sub>dBm</sub> according to Annex B.3.8 for a corresponding Band.

NOTE 2: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

Table 9.1.2.2-1: RSRP Intra frequency relative accuracy

Accı	ıracy		Condition				
Normal	Extreme	Ês/lot Note	lo <sup>Not</sup>	e 1 range	range		
condition	condition	2	E-UTRA operating band groups Note 5	Minimum Io	Maximum lo		
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>		
		FDD_A, TDD_A		FDD_A, TDD_A	-121	-50	
			FDD_C, TDD_C	-120	-50		
			FDD_D	FDD_A, TDD_A     -121     -50       FDD_C, TDD_C     -120     -50       FDD_D     -119.5     -50       FDD_E, TDD_E     -119     -50			
±2	±3	≥-3 dB	FDD_E, TDD_E				
±2	±3	≥-3 UD	FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±3	±3	≥-6 dB	Note 3	Note 3	Note 3		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.2.3 Absolute RSRP Accuracy under Time Domain Measurement Resource Restriction

The requirements for absolute accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements on this cell is configured by higher layers (TS 36.331 [2]).

The accuracy requirements in Table 9.1.2.3-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

RSRP<sub>dBm</sub> according to Annex B.3.9 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

Table 9.1.2.3-1: RSRP Intra frequency absolute accuracy under time domain measurement resource restriction

Accı	ıracy		C	onditions			
Normal	Extreme	_	lo Note 2 range				
condition	condition	Ês/lot	E-UTRA operating band groups <sup>Note 4</sup>	Minim	num lo	Maximum Io	
dB	dB	dB		dBm/ 15kHz Note 1, 3	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
			FDD_A, TDD_A	-121	N/A	-70	
			FDD_C, TDD_C	-120	N/A	-70	
	±9	≥-4 dB	FDD_D	-119.5	N/A	-70	
±4.5			FDD_E, TDD_E	-119	N/A	-70	
±4.3		≥-4 ub	FDD_F	-118.5	N/A	-70	
			FDD_G	-118	N/A	-70	
			FDD_H	-117.5	N/A	-70	
			FDD_N	-114.5	N/A	-70	
±8	±11	≥-4 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50	

NOTE 1: This minimum lo condition is expressed as the average lo per RE over all REs in that symbol.

For time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes, requirements in Section 9.1.2.1 apply.

# 9.1.2.4 Relative Accuracy of RSRP under Time Domain Measurement Resource Restriction

The requirements for relative accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements for this cell is configured by higher layers (TS 36.331 [2]).

The accuracy requirements in Table 9.1.2.4-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

RSRP1,2|<sub>dBm</sub> according to Annex B.3.10 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The lo range defined by the minimum and the maximum lo levels applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.

NOTE 3: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

Table 9.1.2.4-1: RSRP Intra frequency relative accuracy under time domain measurement resource restriction

Accı	ıracy		Condition	าร	
Normal Extreme		Ês/lot Note	lo Note 3 range		
condition	condition	ES/IOT	E-UTRA operating band groups Note 6	Minimum Io	Maximum Io
dB	dB	dB		dBm/ 15kHz Note 1, 5	dBm/BW <sub>Channel</sub>
	10		FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
±2		> 0 4D	FDD_E, TDD_E	-119	-50
±2	±3	≥-2 dB	FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3	±3	≥-4 dB	Note 4	Note 4	Note 4

- NOTE 1: This minimum lo condition is expressed as the average lo per RE over all REs in that symbol.
- NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.
- NOTE 3: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The Io range defined by the minimum and the maximum Io levels applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 4: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

For time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes, requirements in Section 9.1.2.2 apply.

# 9.1.2.5 Absolute RSRP Accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

The requirements for absolute accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements on this cell is configured by higher layers (TS 36.331 [2]) and the CRS assistance information is provided. The requirements apply for UEs supporting CRS interference handling.

The accuracy requirements in Table 9.1.2.5-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Secion 7.3 for reference sensitivity are fulfilled,

RSRP<sub>dBm</sub> according to Annex B.3.11 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern,

The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

Table 9.1.2.5-1: RSRP Intra frequency absolute accuracy under Time Domain Measurement Resource
Restriction with CRS assistance information

Accı	ıracy		Conditions					
Normal	Extreme	_	lo <sup>Note 2</sup> range					
condition	condition	Ês/lot	E-UTRA operating band groups Note 4	Minim	um lo	Maximum Io		
dB	dB	dB	-	dBm/15kHz Note	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>		
			FDD_A, TDD_A	-121	N/A	-70		
			FDD_C, TDD_C	-120	N/A	-70		
	±9		FDD_D	-119.5	N/A	-70		
±4.5		±9 ≥-9.46	FDD_E, TDD_E	-119	N/A	-70		
±4.3			FDD_F	-118.5	N/A	-70		
			FDD_G	-118	N/A	-70		
			FDD_H	-117.5	N/A	-70		
			FDD_N	-114.5	N/A	-70		
±8 ±11		≥-9.46	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50		

- NOTE 1: This lo condition is expressed as the average lo per RE over all REs in an OFDM symbol.
- NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.2.6 Relative Accuracy of RSRP under Time Domain Measurement Resource Restriction with CRS assistance information

The requirements for relative accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements for this cell is configured by higher layers (TS 36.331 [2]) and the CRS assistance information is provided. The requirements apply for UEs supporting CRS interference handling.

The accuracy requirements in Table 9.1.2.6-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled,

RSRP1,2 $|_{dBm}$  according to Annex B.3.12 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern,

The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met also when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

Table 9.1.2.6-1: RSRP Intra frequency relative accuracy under Time Domain Measurement Resource
Restriction with CRS assistance information

Accı	ıracy		Conditio	ns	
Normal	Extreme	Êc/lot Note	lo <sup>n</sup>	range	
condition	condition	Ês/lot Note	E-UTRA operating band groups <sup>Note 7</sup>	Minimum Io	Maximum lo
dB	dB	dB		dBm/15kHz Note 1, 5	dBm/BW <sub>Channel</sub>
			FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
+2	±3	≥-6.96	FDD_E, TDD_E	-119	-50
±Ζ	±3	≥-6.96	FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3	±3	≥-9.46	Note 4	Note 4	Note 4

- NOTE 1: This lo condition is expressed as the average lo per RE over all REs in an OFDM symbol.
- NOTE 2: The parameter £s/lot is the minimum £s/lot of the pair of cells to which the requirement applies.
- NOTE 3: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 4: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 6: The gap between the Es/lot level in table 9.1.2.6-1 and 9.1.2.4-1 is due to the interference from either PCell or at least one neighbour cell indicated within the CRS assistance information.
- NOTE 7: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.2A Intra-frequency RSRP Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

### 9.1.2A.1 Absolute RSRP Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.2A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.2A1-1: RSRP Intra frequency absolute accuracy

Accı	Accuracy		C	onditions			
Normal	Extreme	omo	lo <sup>Note 1</sup> range				
condition	condition	Ês/lot	E-UTRA operating band groups Note 3	Minin	num lo	Maximum Io	
dB	dB	dB		dBm/15kHz Note 2	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
			FDD_A, TDD_A	-121	N/A	-70	
	±10.5		FDD_C, TDD_C	-120	N/A	-70	
			FDD_D	-119.5	N/A	-70	
±6		≥-6 dB	FDD_E, TDD_E	-119	N/A	-70	
Ξ0		10.5 ≥-6 dB	FDD_F	-118.5	N/A	-70	
			FDD_G	-118	N/A	-70	
			FDD_H	-117.5	N/A	-70	
			FDD_N	-114.5	N/A	-70	
±9.5	±12.5	≥-6 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.2A.2 Relative Accuracy of RSRP in high Doppler conditions

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency.

The accuracy requirements in Table 9.1.2A.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2<sub>dBm</sub> according to Annex B.3.8 for a corresponding Band.

Table 9.1.2A.2-1: RSRP Intra frequency relative accuracy

Accı	Accuracy		Conditions				
Normal	Extreme	Êc/lot Note	Note Io Note 1 range				
condition	condition	Ês/lot Note	E-UTRA operating band groups Note 5	Minimum Io	Maximum lo		
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>		
			FDD_A, TDD_A	-121	-50		
	.40		FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±3.3		≥-3 dB	FDD_E, TDD_E	-119	-50		
±3.3	±4.3	≥-3 UD	FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±4.3	±4.3	≥-6 dB	Note 3	Note 3	Note 3		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.3 Inter-frequency RSRP Accuracy Requirements

### 9.1.3.1 Absolute RSRP Accuracy

The requirements for absolute accuracy of RSRP in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.3.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.3.1-1: RSRP Inter frequency absolute accuracy

Accı	ıracy		Conditions					
Normal	Extreme		lo Note 1 range					
condition	condition	Ês/lot	E-UTRA operating band groups Note 3	Minim	um lo	Maximum lo		
dB	dB	dB		dBm/15kHz Note	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>		
			FDD_A, TDD_A	-121	N/A	-70		
	±9		FDD_C, TDD_C	-120	N/A	-70		
		≥-6 dB	FDD_D	-119.5	N/A	-70		
±4.5			FDD_E, TDD_E	-119	N/A	-70		
±4.5			FDD_F	-118.5	N/A	-70		
			FDD_G	-118	N/A	-70		
			FDD_H	-117.5	N/A	-70		
			FDD_N	-114.5	N/A	-70		
±8	±11	≥-6 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.3.2 Relative Accuracy of RSRP

The relative accuracy of RSRP in inter frequency case is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.3.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2|dBm according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1 \right|_{dBm} - RSRP2 \Big|_{dBm} \right| \le 27 \, dB$$

| Channel 1\_Io -Channel 2\_Io | ≤ 20 dB

Table 9.1.3.2-1: RSRP Inter frequency relative accuracy

Accı	Accuracy		Conditions				
Normal	Extreme	Ês/lot Note	lo <sup>No</sup>	range			
condition	condition	2	E-UTRA operating band groups <sup>Note 4</sup>	Minimum Io	Maximum lo		
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>		
			FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±4.5	±6	≥-6 dB	FDD_E, TDD_E	-119	-50		
±4.5	±0	≥-6 UD	FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.3A Inter-frequency RSRP Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

### 9.1.3A.1 Absolute RSRP Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRP in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.3A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.3A.1-1: RSRP Inter frequency absolute accuracy

Accuracy		Conditions					
Normal	Extreme	_	lo Note 1 range				
condition			E-UTRA operating band groups Note 3	Minimum Io		Maximum lo	
dB	dB	dB		dBm/15kHz Note	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
			FDD_A, TDD_A	-121	N/A	-70	
	±10.5		FDD_C, TDD_C	-120	N/A	-70	
		≥-6 dB	FDD_D	-119.5	N/A	-70	
±6			FDD_E, TDD_E	-119	N/A	-70	
±6			FDD_F	-118.5	N/A	-70	
			FDD_G	-118	N/A	-70	
			FDD_H	-117.5	N/A	-70	
			FDD_N	-114.5	N/A	-70	
±9.5	±12.5	≥-6 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.3A.2 Relative Accuracy of RSRP in high Doppler conditions

The relative accuracy of RSRP in inter frequency case is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.3A.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2|dBm according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1 \right|_{dBm} - RSRP2 \Big|_{dBm} \right| \le 27 dB$$

| Channel 1\_Io -Channel 2\_Io |  $\leq$  20 dB

Table 9.1.3A.2-1: RSRP Inter frequency relative accuracy

Accuracy		Conditions				
Normal Extreme condition		Ês/lot Note	Io Note 1 range			
		2	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io	
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>	
			FDD_A, TDD_A	-121	-50	
			FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
±5.8	±7.3	≥-6 dB	FDD_E, TDD_E	-119	-50	
±5.6	±7.3	≥-6 UD	FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

## 9.1.4 RSRP Measurement Report Mapping

The reporting range of RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.1.4-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.4-1: RSRP measurement report mapping

Reported value	Measured quantity value	Unit
RSRP_00	RSRP < -140	dBm
RSRP_01	-140 ≤ RSRP < -139	dBm
RSRP_02	-139 ≤ RSRP < -138	dBm
	***	
RSRP_95	-46 ≤ RSRP < -45	dBm
RSRP_96	-45 ≤ RSRP < -44	dBm
RSRP_97	-44 ≤ RSRP	dBm

### 9.1.5 Intra-frequency RSRQ Accuracy Requirements

### 9.1.5.1 Absolute RSRQ Accuracy

The requirements for absolute accuracy of RSRQ in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.5.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.5.1-1: RSRQ Intra frequency absolute accuracy

Accı	Accuracy		Conditions				
Normal	Extreme		lo <sup>No</sup>	range			
condition	condition	Ês/lot	E-UTRA operating band groups Note 4	Minimum Io	Maximum lo		
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>		
			FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
		≥-3 dB	FDD_D	-119.5	-50		
±2.5	±4		FDD_E, TDD_E	-119	-50		
±2.5	± <del>4</del>		FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±3.5	±4	≥-6 dB	Note 2	Note 2	Note 2		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

# 9.1.5.2 Absolute RSRQ Accuracy under Time Domain Measurement Resource Restriction

The requirements for absolute accuracy of RSRQ in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRQ measurements of this cell is configured by higher layers (TS 36.331 [2]).

The accuracy requirements in Table 9.1.5.2-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

RSRP|<sub>dBm</sub> according to Annex B.3.9 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRQ measurement,

The RSRQ measurement is not performed in any subframe other than those indicated by the time domain measurement resource restriction pattern configured for the measured cell,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

NOTE 2: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 3: The condition level is increased by  $\Delta > 0$ , when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

Table 9.1.5.2-1: RSRQ Intra frequency absolute accuracy under time domain measurement resource restriction

Accı	Accuracy		Conditions			
Normal	Extreme		lo <sup>Note 2</sup> range			
condition	condition	Ês/lot	E-UTRA operating band groups Note 5	Minimum Io	Maximum lo	
dB	dB	dB		$\begin{array}{c} dBm/\\ \textbf{15kHz} \\ ^{\text{Note 1, 4}} \end{array}$	dBm/BW <sub>Channel</sub>	
	+4		FDD_A, TDD_A	-121	-50	
			FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
+2.5		≥-2 dB	FDD_E, TDD_E	-119	-50	
±2.5	± <del>4</del>	≥-2 ub	FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±3.5	<u>±</u> 4	≥-4 dB	Note 3	Note 3	Note 3	

- NOTE 1: This minimum lo condition is expressed as the average lo per RE over all REs in that symbol.
- NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRQ measurements of this cell. The Io range defined by the minimum and the maximum Io levels applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 4: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

For time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes, requirements in Section 9.1.5.1 apply.

# 9.1.5.3 Absolute RSRQ Accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

The requirements for absolute accuracy of RSRQ in this section shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRQ measurements of this cell is configured by higher layers (TS 36.331 [2]) and the CRS assistance information is provided. The requirements apply for UEs supporting CRS interference handling.

The accuracy requirements in Table 9.1.5.3-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled,

RSRP<sub>dBm</sub> according to Annex B.3.11 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRQ measurement,

The RSRQ measurement is not performed in any subframe other than those indicated by the time domain measurement resource restriction pattern configured for the measured cell,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern,

The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

Table 9.1.5.3-1: RSRQ Intra frequency absolute accuracy under Time Domain Measurement Resource
Restriction with CRS assistance information

Accuracy		Conditions				
Mormal	Evtromo		lo Note 2 range			
Normal Extreme condition		Ês/lot Note 5	E-UTRA operating band groups <sup>Note 6</sup>	Minimum Io	Maximum Io	
dB	dB	dB		dBm/15kHz Note 1, 4	dBm/BW <sub>Channel</sub>	
	±4		FDD_A, TDD_A	-121	-50	
		≥-6.96	FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
±2.5			FDD_E, TDD_E	-119	-50	
±2.5		≥-0.90	FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±3.5	±4	≥-9.46	Note 3	Note 3	Note 3	

- NOTE 1: This lo condition is expressed as the average lo per RE over all REs in that symbol.
- NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRQ measurements of this cell. The specified lo range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 4: The condition level is increased by  $\Delta > 0$ , when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 5: The gap between the Es/lot level in table 9.1.5.3-1 and 9.1.5.2-1 is due to the interference from either PCell or at least one neighbour cell indicated within the CRS assistance information.
- NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.5.4 Absolute WB-RSRQ Accuracy

The requirements in this section shall apply when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. The WB-RSRQ accuracy figures in Table 9.1.5.4-1 are relative to the value that would be obtained by using the *AllowedMeasBandwidth* in TS 36.331 [2].

The accuracy requirements in Table 9.1.5.4-1 are valid under the following conditions:

The value of the parameter, AllowedMeasBandwidth in TS 36.331 [2], is 50 resource blocks or larger

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [5] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band.

Table 9.1.5.4-1: WB-RSRQ Intra frequency absolute accuracy

Accuracy			Conditions				
Normal	Extreme	Ês/lot	lo1-lo2	lo range <sup>Note 1</sup>			
condition condition	Note 3	Note 2	E-UTRA operating band groups Note 6	Minimum Io Note 5	Maximum Io		
dB	dB	dB	dB		dBm/15kHz	dBm/BW <sub>Channel</sub>	
			0 ≤lo1- lo2	FDD_A, TDD_A	-121	-50	
		> 0 -ID		FDD_C, TDD_C	-120	-50	
				FDD_D	-119.5	-50	
±2.5				FDD_E, TDD_E	-119	-50	
±2.5	<u>±</u> 4	≥-3 dB		FDD_F	-118.5	-50	
				FDD_G	-118	-50	
				FDD_H	-117.5	-50	
				FDD_N	-114.5	-50	
±3.5	±4	≥-6 dB	]	Note 4	Note 4	Note 4	

- NOTE 1: Io is the average across all the resource blocks within the AllowedMeasBandwidth in TS 36.331 [2].
- NOTE 2: Io1 is the Io level in the resource blocks other than central 6 resource blocks within the AllowedMeasBandwidth in TS 36.331 [2] and Io2 is the Io level in central 6 resource blocks. The Io1 and Io2 have the same range as defined for Io.
- NOTE 3: lot is the received power spectrum density of total interference and noise for all the resource blocks, other than central 6 resource blocks.
- NOTE 4: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.5A Intra-frequency RSRQ Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

### 9.1.5A.1 Absolute RSRQ Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRQ in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.5A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.5A.1-1: RSRQ Intra frequency absolute accuracy

Accı	Accuracy		Conditions			
Normal	Extreme		lo <sup>Note 1</sup> range			
condition condition	Ês/lot	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>	
	±5.5		FDD_A, TDD_A	-121	-50	
		≥-3 dB	FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
±4			FDD_E, TDD_E	-119	-50	
± <del>4</del>			FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±5	±5.5	≥-6 dB	Note 2	Note 2	Note 2	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

## 9.1.6 Inter-frequency RSRQ Accuracy Requirements

### 9.1.6.1 Absolute RSRQ Accuracy

The requirements for absolute accuracy of RSRQ in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.6.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.6.1-1: RSRQ Inter frequency absolute accuracy

Accuracy		Conditions				
Nermal	Extreme		lo Note 1 range			
condition		Ês/lot	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io	
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>	
	±4	±4 ≥-3 dB	FDD_A, TDD_A	-121	-50	
			FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
+2.5			FDD_E, TDD_E	-119	-50	
±2.5			FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±3.5	±4	≥-6 dB	Note 2	Note 2	Note 2	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 3: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

NOTE 2: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.1.6.2 Relative Accuracy of RSRQ

The relative accuracy of RSRQ in inter frequency case is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.6.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2|dBm according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1 \right|_{dBm} - RSRP2 \Big|_{dBm} \right| \le 27 dB$$

| Channel 1\_Io -Channel 2\_Io | ≤ 20 dB

Table 9.1.6.2-1: RSRQ Inter frequency relative accuracy

Accı	Accuracy		Conditions			
Normal	Extreme	Ês/lot Note	lo Note 1 range			
condition condition	2	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>	
	<u>±</u> 4		FDD_A, TDD_A	-121	-50	
		4 ≥-3 dB	FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
±3			FDD_E, TDD_E	-119	-50	
±3			FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±4	±4	≥-6 dB	Note 3	Note 3	Note 3	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies. NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.1.6.3 Absolute WB-RSRQ Accuracy

The requirements in this section shall apply when the measurement configuration message received by the UE contains widebandRSRQ-Meas parameter in TS 36.331 [2]. The WB-RSRQ accuracy figures in Table 9.1.6.3-1 are relative to the value that would be obtained by using the AllowedMeasBandwidth in TS 36.331 [2].

The accuracy requirements in Table 9.1.6.3-1 are valid under the following conditions:

The value of the parameter, AllowedMeasBandwidth in TS 36.331 [2], is 50 resource blocks or larger

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [5] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band.

±3.5

±4

-117.5

-114.5

Note 4

-50

-50 Note 4

Conditions Accuracy lo range Note 1 lo1-lo2 Note 2 Ês/lot Note 3 Normal **Extreme** E-UTRA operating band groups Note 6 Minimum lo condition condition Maximum lo dB dB dB dB dBm/15kHz dBm/BW<sub>Channel</sub> FDD\_A, TDD\_A -121 -50 FDD\_C, TDD\_C -120 -50 FDD D -119.5 -50 FDD\_E, TDD\_E -119 -50 ±2.5 ±4 ≥-3 dB 0 ≤lo1- $FDD_F$ -118.5 -50 lo2 FDD\_G -118 -50

FDD\_H

FDD N

Note 4

Table 9.1.6.3-1: WB-RSRQ Inter frequency absolute accuracy

- NOTE 1: Io is the average across all the resource blocks within the AllowedMeasBandwidth in TS 36.331 [2].
- NOTE 2: Io1 is the Io level in the resource blocks other than central 6 resource blocks within the AllowedMeasBandwidth in TS 36.331 [2] and Io2 is the Io level in central 6 resource blocks. The Io1 and Io2 have the same range as defined for Io.
- NOTE 3: lot is the received power spectrum density of total interference and noise for all the resource blocks, other than central 6 resource blocks.
- NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 5: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

≥-6 dB

#### 9.1.6.4 Relative WB-RSRQ Accuracy

The requirements in this section shall apply when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. The WB-RSRQ accuracy figures in Table 9.1.6.4-1 are relative to the value that would be obtained by using the *AllowedMeasBandwidth* in TS 36.331 [2].

The accuracy requirements in Table 9.1.6.4-1 are valid under the following conditions:

The value of the parameter, *AllowedMeasBandwidth* in TS 36.331 [2], is 50 resource blocks or larger for the measured cells from different frequencies

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [5] Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2|dRm according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1 \right|_{dBm} - RSRP2 \Big|_{dBm} \right| \le 27dB$$

| Channel 1\_Io -Channel 2\_Io | ≤ 20 dB

Table 9.1.6.4-1: WB-RSRQ Inter frequency relative accuracy

Accı	Accuracy		Conditions				
Normal	Extreme	Ês/lot	lo1-lo2	lo range Note 1			
condition condition	Note 3	Note 2	E-UTRA operating band groups Note 6	Minimum Io	Maximum lo		
dB	dB	dB	dB		dBm/15kHz	dBm/BW <sub>Channel</sub>	
			0 ≤lo1- lo2	FDD_A, TDD_A	-121	-50	
				FDD_C, TDD_C	-120	-50	
				FDD_D	-119.5	-50	
±3	1.4	≥-3 dB		FDD_E, TDD_E	-119	-50	
±3	±4	≥-3 UD		FDD_F	-118.5	-50	
				FDD_G	-118	-50	
				FDD_H	-117.5	-50	
				FDD_N	-114.5	-50	
±4	±4	≥-6 dB		Note 4	Note 4	Note 4	

- NOTE 1: Io is the average across all the resource blocks within the AllowedMeasBandwidth in TS 36.331 [2].
- NOTE 2: Io1 is the Io level in the resource blocks other than central 6 resource blocks within the AllowedMeasBandwidth in TS 36.331 [2] and Io2 is the Io level in central 6 resource blocks. The Io1 and Io2 have the same range as defined for Io.
- NOTE 3: lot is the received power spectrum density of total interference and noise for all the resource blocks, other than central 6 resource blocks. The parameter £s/lot is the minimum £s/lot of the pair of cells to which the requirement applies
- NOTE 4: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.6A Inter-frequency RSRQ Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

### 9.1.6A.1 Absolute RSRQ Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRQ in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.6A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.6A.1-1: RSRQ Inter frequency absolute accuracy

Accı	Accuracy		Conditions			
Normal	Extreme		lo <sup>Note 1</sup> range			
condition condition	Ês/lot	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>	
	±5.5		FDD_A, TDD_A	-121	-50	
		≥-3 dB	FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
±4			FDD_E, TDD_E	-119	-50	
± <del>4</del>			FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±5	±5.5	≥-6 dB	Note 2	Note 2	Note 2	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.6A.2 Relative Accuracy of RSRQ in high Doppler conditions

The relative accuracy of RSRQ in inter frequency case is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.6A.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2|<sub>dBm</sub> according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1 \right|_{dBm} - RSRP2 \Big|_{dBm} \right| \le 27 dB$$

| Channel 1\_Io -Channel 2\_Io | ≤ 20 dB

Table 9.1.6A.2-1: RSRQ Inter frequency relative accuracy

Accı	Accuracy		Conditions				
Normal	Extreme	Ês/lot Note	lo Note 1 range				
	condition		E-UTRA operating band groups Note 5	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>		
	±5.0	≥-3 dB	FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±3.5			FDD_E, TDD_E	-119	-50		
±3.5	±5.0		FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±4.5	±5.0	≥-6 dB	Note 3	Note 3	Note 3		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: The condition level is increased by  $\Delta > 0$ , when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

## 9.1.7 RSRQ Measurement Report Mapping

The reporting range of RSRQ is defined from -34 dB to 2.5 dB with 0.5 dB resolution.

The mapping of measured quantity is defined in table 9.1.7-1. The range in the signalling may be larger than the guaranteed accuracy range.

Reported value Measured quantity value Unit RSRQ\_-30 RSRQ < -34 dB RSRQ\_-29 -34 ≤ RSRQ < -33.5 dB RSRQ\_-02 -20.5 ≤ RSRQ < -20 dB RSRQ\_-01 -20 ≤ RSRQ < -19.5 dB RSRQ\_00 dB RSRQ < -19.5 RSRQ\_01 dB -19.5 ≤ RSRQ < -19 RSRQ\_02 -19 ≤ RSRQ < -18.5 dΒ RSRQ 32 -4 ≤ RSRQ < -3.5 dB RSRQ 33 -3.5 ≤ RSRQ < -3 dB RSRQ 34 -3 ≤ RSRQ dB -3 ≤ RSRQ < -2.5 RSRQ 35 dB RSRQ 36 -2.5 ≤ RSRQ < -2 dB RSRQ 45 2 ≤ RSRQ < 2.5 dB RSRQ 46  $2.5 \le RSRQ$ dB

Table 9.1.7-1: RSRQ measurement report mapping

Note: The ranges from RSRQ\_-30 to RSRQ\_-01 and from RSRQ\_35 to RSRQ\_46 apply for the UE who can support extended RSRQ range in [31].9.1.8 Power Headroom

The requirements in this clause shall apply for power headroom Type 1 and for power headroom Type 2, which are specified in clause 5.1.1.2 in [3].

For a UE not configured with a secondary cell, the power headroom provides the serving eNB with information about the differences between the UE configured maximum output power ( $P_{CMAX,}$ ) defined in TS 36.101 [5] and the estimated power for UL-SCH transmission of the serving cell [3]. In this case the UE shall meet requirements for power headroom Type 1.

For a UE configured with a secondary cell, the power headroom provides the serving eNB with information about the differences between the UE configured maximum output power ( $P_{CMAX,c}$ ) defined in TS 36.101[5] and the estimated power for UL-SCH transmission per activated serving cell c, or the estimated power for simultaneous PUSCH and PUCCH transmission on PCell [3]. In this case the UE shall meet requirements for both power headroom Type 1 and Type 2.

#### 9.1.8.1 Period

The reported power headroom shall be estimated over 1 subframe.

When *extendedPHR* is not configured [17], the Type 1 power headroom shall be estimated for the primary serving cell as defined in clause 5.1.1.2 in TS 36.213 [3].

When *extendedPHR* is configured [17], the Type 1 and Type 2 power headroom shall be estimated for each activated serving cell with configured uplink as defined in clause 5.1.1.2 in TS 36.213 [3].

### 9.1.8.2 Reporting Delay

The power headroom reporting delay is defined as the time between the beginning of the power headroom reference period and the time when the UE starts transmitting the power headroom over the radio interface. The reporting delay of the power headroom shall be 0 ms, which is applicable for all configured triggering mechanisms for power headroom reporting.

### 9.1.8.3 Void

### 9.1.8.4 Report Mapping

The power headroom reporting range is from -23 ...+40 dB. Table 9.1.8.4-1 defines the report mapping.

Table 9.1.8.4-1: Power headroom report mapping

Reported value	Measured quantity value (dB)
POWER_HEADROOM_0	-23 ≤ PH < -22
POWER_HEADROOM_1	-22 ≤ PH < -21
POWER_HEADROOM_2	-21 ≤ PH < -20
POWER_HEADROOM_3	-20 ≤ PH < -19
POWER_HEADROOM_4	-19 ≤ PH < -18
POWER_HEADROOM_5	-18 ≤ PH < -17
POWER_HEADROOM_57	34 ≤ PH < 35
POWER_HEADROOM_58	35 ≤ PH < 36
POWER_HEADROOM_59	36 ≤ PH < 37
POWER_HEADROOM_60	37 ≤ PH < 38
POWER_HEADROOM_61	38 ≤ PH < 39
POWER_HEADROOM_62	39 ≤ PH < 40
POWER_HEADROOM_63	PH ≥ 40

### 9.1.9 UE Rx – Tx time difference

### 9.1.9.1 Measurement Requirement

The UE RX-TX time difference is measured from the PCell.

The accuracy requirements in Table 9.1.9.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

No changes to the uplink transmission timing are applied during the measurement period.

 $RSRP|_{dBm} \ according \ to \ Annex \ B.3.5 \ for \ a \ corresponding \ Band$ 

Note 3

Note 3

Note 3

Note 3

Conditions lo Note 1 range Downlink Accuracy transmission Ês/lot E-UTRA operating band groups Note 6 bandwidth of Minimum Io Maximum lo **PCell** Ts Note 2 dBm/15kHz Note 5 dB MHz dBm/BW<sub>Channel</sub> FDD\_A, TDD\_A -121 -50 FDD\_C, TDD\_C -120 -50 FDD\_D -119.5 -50 FDD\_E, TDD\_E -119 -50 ≥1.4 MHz ±20 ≥-3 dB FDD F -118.5 -50 FDD\_G Note 4 -118 -50 FDD H -117.5 -50 FDD N -114.5 -50 ±14 ≥-3 dB ≥ 3 MHz Note 3 Note 3 Note 3

Table 9.1.9.1-1: UE Rx - Tx time difference measurement accuracy

Note 3

Note 3

≥ 5 MHz

≥10 MHz

≥-3 dB

≥-3 dB

±10

±7

### 9.1.9.2 Measurement Report mapping

The reporting range of UE Rx - Tx time difference is defined from 0 to  $20472T_s$  with  $2T_s$  resolution for UE Rx - Tx time difference less than  $4096T_s$  and 8Ts for UE Rx - Tx time difference equal to or greater than  $4096T_s$ .

The mapping of measured quantity is defined in Table 9.1.9.2-1.

Table 9.1.9.2-1: UE Rx - Tx time difference measurement report mapping

Reported value	Measured quantity value	Unit
RX-TX_TIME_DIFFERENCE_0000	$T_{UE\ Rx-Tx} < 2$	Ts
RX-TX_TIME_DIFFERENCE_0001	$2 \le T_{UE Rx-Tx} < 4$	T <sub>s</sub>
RX-TX_TIME_DIFFERENCE_0002	$4 \le T_{UE Rx-Tx} < 6$	Ts
		•••
RX-TX_TIME_DIFFERENCE_2046	$4092 \le T_{UE Rx-Tx} < 4094$	Ts
RX-TX_TIME_DIFFERENCE_2047	$4094 \le T_{UE Rx-Tx} < 4096$	Ts
RX-TX_TIME_DIFFERENCE_2048	$4096 \le T_{UE Rx-Tx} < 4104$	Ts
RX-TX_TIME_DIFFERENCE_2049	$4104 \le T_{UE Rx-Tx} < 4112$	Ts
		•••
RX-TX_TIME_DIFFERENCE_4093	$20456 \le T_{UE Rx-Tx} < 20464$	Ts
RX-TX_TIME_DIFFERENCE_4094	$20464 \le T_{UE Rx-Tx} < 20472$	Ts
RX-TX_TIME_DIFFERENCE_4095	$20472 \leq T_{UE\;Rx\text{-}Tx}$	Ts

# 9.1.9.3 Measurement Requirement under Time Domain Measurement Resource Restriction

The requirements in this section apply for UE configured with a time-domain measurement resource restriction pattern for PCell measurements. The UE Rx-Tx time difference is measured from the Pcell.

The accuracy requirements in Table 9.1.9.3-1 are valid under the following conditions:

- Cell specific reference signals are transmitted either from one, two or four antenna ports,
- Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

NOTE 1: When in dBm/15kHz, the minimum lo condition is expressed as the average lo per RE over all REs in that symbol. Io may be different in different symbols within a subframe.

NOTE 2: Ts is the basic timing unit defined in TS 36.211.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≥1.4 MHz.

NOTE 4: Except Band 29 and Band 32.

NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

- No changes to the uplink transmission timing are applied during the measurement period,

RSRP<sub>dBm</sub> according to Annex B.3.5 for a corresponding Band,

- The time domain measurement resource restriction pattern configured for the PCell indicates at least one subframe per radio frame for performing the PCell measurements [2],
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

Table 9.1.9.3-1: UE Rx-Tx time difference measurement accuracy under time domain measurement resource restriction

	Conditions						
		Downlink	lo Note 1, 5 range				
	Ês/lot Note 6	transmission bandwidth of PCell	E-UTRA operating band groups <sup>Note 8</sup>	Minimum Io	Maximum lo		
Ts Note 2	dB	MHz		dBm/15kHz Note /	dBm/BW <sub>Channel</sub>		
		s dB ≤ 3 MHz	FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±20	≥-3 dB		FDD_E, TDD_E	-119	-50		
±20	≥-3 ub		FDD_F	-118.5	-50		
			FDD_G Note 4	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±10	≥-3 dB	≥ 5 MHz	Note 3	Note 3	Note 3		

- NOTE 1: When in dBm/15kHz, the minimum lo condition is expressed as the average lo per RE over all REs in that symbol. Io may be different in different symbols within a subframe.
- NOTE 2: Ts is the basic timing unit defined in TS 36.211.
- NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≤ 3 MHz.
- NOTE 4: Except Band 29 and Band 32.
- NOTE 5: Io is defined for the subframes indicated by the time-domain measurement resource restriction pattern for serving cell measurements. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 6: CRS Es/lot is in subframes indicated for PCell measurements by the time-domain measurement resource restriction pattern.
- NOTE 7: The condition level is increased by  $\Delta > 0$ , when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

# 9.1.9.4 Measurement Requirement when Time Domain Measurement Resource Restriction Pattern is Configured with CRS Assistance Information

The UE Rx-Tx time difference measurement is performed for the PCell.

For UE configured with a time-domain measurement resource restriction pattern for PCell measurements, the accuracy requirements in Table 9.1.9.4-1 apply provided that the following conditions are met for the PCell:

- PCell cell specific reference signals are transmitted from one, two or four antenna ports,
- Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled,
- No changes to the uplink transmission timing are applied during the measurement period,
- RSRP<sub>dBm</sub> according to Annex B.3.13 for a corresponding Band,
- The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, and
- The UE is provided via PCell with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

When the CRS assistance information is provided, the transmission bandwidth [30] in all intra-frequency cells in the CRS assistance information [2] is the same or larger than the transmission bandwidth of the PCell for which measurement is performed.

Table 9.1.9.4-1: UE Rx-Tx time difference measurement accuracy

	Conditions						
	CRS Ês/lot Note 6	Downlink transmission bandwidth of PCell	lo range Note 5				
			E-UTRA operating band groups <sup>Note 8</sup>	Minimum Io <sup>Note 1, 7</sup>	Maximum Io		
Ts Note 2	dB	MHz		dBm/15kHz Note /	dBm/BW <sub>Channel</sub>		
±20	≥-7.76	≤ 3 MHz	FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
			FDD_E, TDD_E	-119	-50		
			FDD_F	-118.5	-50		
			FDD_G Note 4	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±10	≥-7.76	≥ 5 MHz	Note 3	Note 3	Note 3		

- NOTE 1: This lo condition is expressed as the average lo per RE over all REs in an OFDM symbol.
- NOTE 2: Ts is the basic timing unit defined in TS 36.211.
- NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≤ 3 MHz.
- NOTE 4: Except Band 29 and Band 32.
- NOTE 5: Io is defined in subframes indicated for PCell measurements by the time domain measurement resource restriction pattern. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
- NOTE 6: CRS Ês/lot is in subframes indicated for PCell measurements by the time-domain measurement resource restriction pattern.
- NOTE 7: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

## 9.1.10 Reference Signal Time Difference (RSTD)

NOTE: This measurement is used for UE positioning purposes.

### 9.1.10.1 Intra-Frequency Accuracy Requirement

The accuracy requirements in Table 9.1.10.1-1 shall apply without DRX as well as for all the DRX cycles specified in TS 36.331 [2].

The accuracy requirements in Table 9.1.10.1-1 are valid under the following conditions:

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

PRP 1,2<sub>dBm</sub> according to Annex B.3.6 for a corresponding Band

There are no measurement gaps overlapping with the PRS subframes of the measured serving cell.

The parameter expected RSTDU ncertainty signalled over LPP by E-SMLC as defined in TS 36.355 [24] is less than  $5 \mu s$ .

Table 9.1.10.1-1: RSTD measurement accuracy

	Conditions							
		Minimum		lo <sup>No</sup>	Io Note / range			
Accuracy	PRS Ês/lot	PRS bandwidth, which is minimum of serving cell channel bandwidth and the PRS bandwidths of the reference cell and the measured neighbour cell i Note 5	Minimum number of available measurement subframes among the reference cell and the measured neighbour cell i	E-UTRA operating band groups <sup>Note 8</sup>	Minimum Io <sup>Note 1</sup>	Maximum Io		
Ts Note 2	dB	RB			dBm/15kHz Note 6	dBm/BW <sub>Channe</sub>		
		≥ 6	6	FDD_A, TDD_A	-121	-50		
				FDD_C, TDD_C	-120	-50		
	(PRS Ês/lot) <sub>ref</sub> ≥-6dB			FDD_D	-119.5	-50		
±15	and			FDD_E, TDD_E	-119	-50		
±13	(PRS Ês/lot) <sub>i</sub> ≥-13dB			FDD_F	-118.5	-50		
	, , , , , , , , , , , , , , , , , , , ,			FDD_G	-118	-50		
				FDD_H	-117.5	-50		
	(DDO Ê - /I-+)			FDD_N	-114.5	-50		
±10	(PRS Ês/lot) <sub>ref</sub> ≥- 6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 15	6	Note 4	Note 4	Note 4		
±6	(PRS Ês/lot) <sub>ref</sub> ≥- 6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 25	≥ 2	Note 4	Note 4	Note 4		
±5	(PRS Ês/lot) <sub>ref</sub> ≥- 6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 50	≥1	Note 4	Note 4	Note 4		
±4	(PRS Ês/lot) <sub>ref</sub> ≥- 6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 75	≥1	Note 4	Note 4	Note 4		

- NOTE 1: This minimum lo condition is expressed as the average lo per RE over all REs in an OFDM symbol.
- NOTE 2: Ts is the basic timing unit defined in TS 36.211 [16].
- NOTE 3: PRS bandwidth is as indicated in prs-Bandwidth in the OTDOA assistance data defined in [24].
- NOTE 4: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth ≥ 6 RB.
- NOTE 5: The serving cell, the reference cell, and the measured neighbour cell i are on the same carrier frequency.
- NOTE 6: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 7: The lo is defined in PRS positioning subframes. The same lo range applies to PRS and non-PRS symbols. lo levels are different in PRS and non-PRS symbols within the same subframe.
- NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

### 9.1.10.2 Inter-Frequency Accuracy Requirement

The accuracy requirements in Table 9.1.10.2-1 shall apply without DRX as well as for all the DRX cycles specified in TS 36.331 [2].

The accuracy requirements in Table 9.1.10.2-1 are valid under the following conditions:

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

PRP 1,2|<sub>dBm</sub> according to Annex B.3.7 for a corresponding Band

There are no measurement gaps overlapping with the PRS subframes in cells belonging to the serving carrier frequency.

The parameter expectedRSTDUncertainty signalled over LPP by E-SMLC as defined in TS 36.355 [24] is less than 5 us.

Table 9.1.10.2-1: RSTD measurement accuracy

	Conditions								
Ī		Minimum		lo Note 6 range					
Accuracy	PRS Ês/lot	PRS bandwidth which is minimum of serving cell channel bandwidth <sup>Note</sup> <sup>7</sup> and the PRS bandwidths of the reference cell and the measured neighbour cell i	Minimum number of available measurement subframes among the reference cell and the measured neighbour cell i	E-UTRA operating band groups <sup>Note 8</sup>	Minimum Io <sup>Note 1</sup>	Maximum Io			
Ts Note 2	dB	RB			dBm/15kHz Note 5	dBm/BW <sub>Chan</sub>			
	(DDO Ê (L.))	≥ 6	4	FDD_A, TDD_A	-121	-50			
				FDD_C, TDD_C	-120	-50			
				FDD_D	-119.5	-50			
104	(PRS Ês/lot) <sub>ref</sub> ≥-6dB			FDD_E, TDD_E	-119	-50			
±21	and (PRS Ês/lot) <sub>i</sub> ≥-13dB			FDD_F	-118.5	-50			
	(PRS ES/101); 2-130D			FDD_G	-118	-50			
				FDD_H	-117.5	-50			
				FDD_N	-114.5	-50			
±16	(PRS Ês/lot) <sub>ref</sub> ≥-6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 15	4	Note 4	Note 4	Note 4			
±10	(PRS Ês/lot) <sub>ref</sub> ≥-6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 25	≥ 2	Note 4	Note 4	Note 4			
±9	(PRS Ês/lot) <sub>ref</sub> ≥-6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 50	≥ 1	Note 4	Note 4	Note 4			
±8	(PRS Ês/lot) <sub>ref</sub> ≥-6dB and (PRS Ês/lot) <sub>i</sub> ≥-13dB	≥ 75	≥ 1	Note 4	Note 4	Note 4			

- NOTE 1: This minimum lo condition is expressed as the average lo per RE over all REs in an OFDM symbol.
- NOTE 2: Ts is the basic timing unit defined in TS 36.211 [16].
- NOTE 3: PRS bandwidth is as indicated in prs-Bandwidth in the OTDOA assistance data defined in [24].
- NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth ≥ 6 RB.
- NOTE 5: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 6: The lo is defined in PRS positioning subframes. The same lo range applies to PRS and non-PRS symbols. Io levels are different in PRS and non-PRS symbols within the same subframe.
- NOTE 7: If a CA capable UE is configured with one or two SCell(s), the serving cell channel bandwidth is the minimum of the serving cell channel bandwidths in the component carriers involved in the RSTD measurement. If any of the serving cells is not involved in this RSTD measurement for CA, the channel bandwidth of that serving cell is not included in the determination of the minimum PRS bandwidth.
- NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.10.3 RSTD Measurement Report Mapping

The reporting range of RSTD is defined from -15391 $T_s$  to 15391 $T_s$  with 1 $T_s$  resolution for absolute value of RSTD less or equal to 4096 $T_s$  and 5 $T_s$  for absolute value of RSTD greater than 4096 $T_s$ .

The mapping of measured quantity is defined in Table 9.1.10.3-1.

Table 9.1.10.3-1: RSTD report mapping

Reported Value	Measured Quantity Value	Unit
RSTD_0000	-15391 > RSTD	$T_s$
RSTD_0001	-15391 ≤ RSTD < -15386	$T_{\rm s}$
		***
RSTD_2258	-4106 ≤ RSTD < -4101	$T_{\rm s}$
RSTD_2259	-4101 ≤ RSTD < -4096	$T_s$
RSTD_2260	-4096 ≤ RSTD < -4095	$T_{\rm s}$
RSTD_2261	-4095 ≤ RSTD < -4094	$T_{\rm s}$
		•••
RSTD_6353	-3 ≤ RSTD < -2	$T_s$
RSTD_6354	-2 ≤ RSTD < -1	$T_s$
RSTD_6355	-1 ≤ RSTD ≤ 0	$T_s$
RSTD_6356	0 < RSTD ≤ 1	$T_s$
RSTD_6357	1 < RSTD ≤ 2	$T_s$
RSTD_6358	2 < RSTD ≤ 3	$T_s$
RSTD_10450	4094 < RSTD ≤ 4095	Ts
RSTD_10451	4095 < RSTD ≤ 4096	Ts
RSTD_10452	4096 < RSTD ≤ 4101	$T_s$
RSTD_10453	4101 < RSTD ≤ 4106	$T_s$
RSTD_12709	15381 < RSTD ≤ 15386	$T_s$
RSTD_12710	15386 < RSTD ≤ 15391	Ts
RSTD_12711	15391 < RSTD	$T_s$

# 9.1.11 Carrier aggregation measurement accuracy

This clause contains requirements on UE capabilities for support of E-UTRA FDD, TDD and TDD-FDD carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UEs which have been configured with one or two downlink SCell(s). Note: This clause covers measurement accuracy requirements for frequencies corresponding to those used for the PCell and SCell(s); measurements of any other frequency are considered to be inter-frequency measurements covered by the accuracy requirements in clause 9.1.3 and 9.1.6

The requirements in this clause apply for bandwidths defined in the bandwidth combination set for the CA configurations supported by the UE [5].

# 9.1.11.1 Primary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on the primary component carrier shall meet the intrafrequency absolute accuracy requirements in sections 9.1.2.1 and 9.1.5.1. Comparisons between RSRP of cells on the primary component carrier shall also meet the intra-frequency relative accuracy requirements in sections 9.1.2.2.

### 9.1.11.2 Secondary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on any of the secondary component carrier(s) shall meet the intrafrequency absolute accuracy requirements in sections 9.1.2.1 and 9.1.5.1. Comparisons between RSRP of cells on the same secondary component carrier shall meet the intra-frequency relative accuracy requirements in sections 9.1.2.2

# 9.1.11.3 Primary and secondary component carrier relative accuracy requirement

When measurements of cells on the primary component carrier are compared with measurements of cells on any of the secondary component carrier(s), the applicable relative accuracy requirements are the RSRP and RSRQ inter-frequency accuracy requirements in sections 9.1.3.2 and 9.1.6.2.

#### 9.1.11.4 Secondary component carrier relative accuracy requirement

When measurements of cells on any of the secondary component carrier(s) are compared with measurements of cells on the other secondary component carrier, the applicable relative accuracy requirements are the RSRP and RSRQ interfrequency accuracy requirements in sections 9.1.3.2 and 9.1.6.2.

# 9.1.12 Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation

This clause contains requirements for E-UTRA FDD, TDD and TDD-FDD carrier aggregation. This clause contains RSTD measurement accuracy requirements for a UE configured with one or two downlink SCell(s). The UE may operate in one of the E-UTRA carrier aggregations listed in clause 8.3.1. The requirements in this clause shall apply regardless whether the configured downlink secondary cell is activated or deactivated by the MAC-CE command [17]. The requirements apply for bandwidths defined in the bandwidth combination set for the CA configurations supported by the UE [5].

The RSTD measurements, which are obtained when both the reference cell and neighbouring cell belong to the primary component carrier, shall meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

The RSTD measurements, which are obtained when both the reference cell and neighbouring cell belong to the same secondary component carrier, shall meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

The RSTD measurements, which are obtained when the reference cell and neighbouring cell do not belong to the same carrier, shall meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.

# 9.1.13 Measurement accuracy for UE category 0

#### 9.1.13.1 Intra-frequency Absolute RSRP Accuracy for UE category 0

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell for UE category 0.

The accuracy requirements in Table 9.1.13.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.13.1-1: RSRP Intra frequency absolute accuracy for UE category 0

Accuracy			Conditions				
Normal	Extreme		lo Note 1 range				
condition condition		Ês/lot	E-UTRA operating band groups Note 3	Minin	num lo	Maximum lo	
dB	dB	dB		dBm/15kHz Note 2	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
		140	FDD_A, TDD_A	-121	N/A	-70	
			FDD_C, TDD_C	-120	N/A	-70	
			FDD_D	-119.5	N/A	-70	
±7	140		FDD_E, TDD_E	-119	N/A	-70	
±γ	±10	≥-6 dB	FDD_F	-118.5	N/A	-70	
			FDD_G	-118	N/A	-70	
			FDD_H	-117.5	N/A	-70	
			FDD_N	-114.5	N/A	-70	
±9	±12	≥-6 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

## 9.1.13.2 Intra-frequency Relative Accuracy of RSRP for UE category 0

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency for category 0 UE.

The accuracy requirements in Table 9.1.13.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2<sub>dBm</sub> according to Annex B.3.8 for a corresponding Band.

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.13.2-1: RSRP Intra frequency relative accuracy for UE category 0

Accı	ıracy	Conditions				
Normal	Extreme	Ês/lot Note	lo Note 1 range			
condition		2	E-UTRA operating band groups <sup>Note 5</sup>	Minimum Io	Maximum lo	
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>	
	14		FDD_A, TDD_A	-121	-50	
			FDD_C, TDD_C	-120	-50	
			FDD_D	-119.5	-50	
±3		≥-3 dB	FDD_E, TDD_E	-119	-50	
±3	±4	≥-3 UD	FDD_F	-118.5	-50	
			FDD_G	-118	-50	
			FDD_H	-117.5	-50	
			FDD_N	-114.5	-50	
±4	±4	≥-6 dB	Note 3	Note 3	Note 3	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter £s/lot is the minimum £s/lot of the pair of cells to which the requirement applies.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

# 9.1.13.3 Intra-frequency Absolute RSRQ Accuracy for UE category 0

The requirements for absolute accuracy of RSRQ in this clause apply to a cell on the same frequency as that of the serving cell for category 0 UE.

The accuracy requirements in Table 9.1.13.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRQ measurement assuming measured cell is identified cell.

Table 9.1.13.3-1: RSRQ Intra frequency absolute accuracy for UE category 0

Accı	ıracy		Conditions				
Normal	Extreme		lo Note 1 range				
condition	condition	Ês/lot	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>		
	±5		FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±3.5		≥-3 dB	FDD_E, TDD_E	-119	-50		
±3.5	ΞS	≥-3 UD	FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±4.5	±5	≥-6 dB	Note 2	Note 2	Note 2		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

# 9.1.14 Accuracy requirements for Discovery Signal Measurements

#### 9.1.14.1 Introduction

Discovery signal measurements are performed when higher layers indicate measurements based on discovery signals according to DMTC configuration [2]. The discovery measurement accuracy requirements are defined for the following physical layer measurements performed in discovery signal occasions [16],

RSRP measured in subframes of the configured discovery signal occasions as specified in [4],

CSI-RSRP measurements specified in [4],

RSRQ measured in subframes of the configured discovery signal occasions as specified in [4].

#### 9.1.14.2 RSRP measurements in discovery signal occasions

Intra-frequency absolute RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.2.1.

Intra-frequency relative RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.2.2.

Inter-frequency absolute RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.3.1.

NOTE 2: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

Inter-frequency relative RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.3.2.

Measurement report mapping for RSRP measurements in discovery signal occasions are the same as specified in Section 9.1.4.

# 9.1.14.3 CSI-RSRP measurements in discovery signal occasions

#### 9.1.14.3.1 Intra-frequency CSI-RSRP measurements

#### 9.1.14.3.1.1 Absolute CSI-RSRP measurement requirements

In this clause, absolute CSI-RSRP measurement accuracy requirements in discovery signal occasions apply to a cell or TP on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.14.3.1.1-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.14 for a corresponding Band.

Table 9.1.14.3.1.1-1: Intra-frequency absolute CSI-RSRP measurement accuracy

Accuracy			Conditions				
Normal	Extreme	CSI	lo <sup>Note 1</sup> range				
condition			E-UTRA operating band groups <sup>Note 3</sup>	Minin	num lo	Maximum Io	
dB	dB	dB		dBm/15kHz Note 2	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
			FDD_A, TDD_A	-121	N/A	-70	
		≥ 0 dB	FDD_C, TDD_C	-120	N/A	-70	
			FDD_D	-119.5	N/A	-70	
±4.5	±9		FDD_E, TDD_E	-119	N/A	-70	
±4.5	±9		FDD_F	-118.5	N/A	-70	
			FDD_G	-118	N/A	-70	
			FDD_H	-117.5	N/A	-70	
			FDD_N	-114.5	N/A	-70	
±8	±11	≥ 0 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.1.14.3.1.2 Relative CSI-RSRP measurement requirements

In this section, the relative CSI-RSRP measurement is defined as the CSI-RSRP measured from one cell or TP compared to the CSI-RSRP measured on the same frequency from another cell or from another TP. If two TPs are compared, they may belong to the same or different cells.

The accuracy requirements in Table 9.1.14.3.1.2-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.15 for a corresponding Band.

Table 9.1.14.3.1.2-1: Intra-frequency relative CSI-RSRP measurement accuracy

Accı	ıracy	Conditions					
Normal	Extreme	CSI	lo Note 1 range				
condition		Ês/lot Note 2	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>		
				FDD_A, TDD_A	-121	-50	
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±2	±3	> 0 dD	FDD_E, TDD_E	-119	-50		
工工	±3	≥ 0 dB	FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		
±3	±3	≥ 0 dB	Note 3	Note 3	Note 3		

- NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
- NOTE 2: The parameter CSI Ês/lot is the minimum CSI Ês/lot of the pair of cells or TPs to which the requirement applies.
- NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
- NOTE 4: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.1.14.3.2 Inter-frequency CSI-RSRP measurements

#### 9.1.14.3.2.1 Absolute CSI-RSRP measurement requirements

In this clause, absolute CSI-RSRP measurement accuracy requirements for discovery signal measurements apply to a cell or TP on a different carrier frequency from that of the serving cell.

The accuracy requirements in Table 9.1.14.3.2.1-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.16 for a corresponding Band.

Table 9.1.14.3.2.1-1: Inter-frequency absolute CSI-RSRP measurement accuracy

Accuracy				Conditions		
Normal	Extreme	CSI	lo Note 1 range			
condition condition		Ês/lot	E-UTRA operating band groups Note 3	Minimum Io		Maximum lo
dB	dB	dB		dBm/15kHz Note	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>
			FDD_A, TDD_A	-121	N/A	-70
		≥ 0 dB	FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
±4.5	±9		FDD_E, TDD_E	-119	N/A	-70
±4.5	±9		FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥ 0 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.1.14.3.2.2 Relative CSI-RSRP measurement requirements

In this section, the relative CSI-RSRP measurement is defined as the CSI-RSRP measured from one cell or TP compared to the CSI-RSRP measured on a different frequency from another cell or from another TP.

The accuracy requirements in Table 9.1.14.3.2.2-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.17 for a corresponding Band.

$$\left| CSI \_RSRP1 \right|_{dBm} - CSI \_RSRP2 \Big|_{dBm} \right| \le 27 dB$$

| Channel 1\_Io -Channel 2\_Io | ≤ 20 dB

Table 9.1.14.3.2.2-1: Inter-frequency relative CSI-RSRP measurement accuracy

Accuracy		Conditions					
Normal Esteams		CSI	lo Note 1 range				
condition	Normal Extreme condition		E-UTRA operating band groups Note 4	Minimum Io	Maximum Io		
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>		
			FDD_A, TDD_A	-121	-50		
			FDD_C, TDD_C	-120	-50		
			FDD_D	-119.5	-50		
±4.5	16	> 0 dD	FDD_E, TDD_E	-119	-50		
±4.5	±6	≥ 0 dB	FDD_F	-118.5	-50		
			FDD_G	-118	-50		
			FDD_H	-117.5	-50		
			FDD_N	-114.5	-50		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter CSI Ês/lot is the minimum CSI Ês/lot of the pair of cells or TPs to which the requirement applies.

NOTE 3: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.1.14.3.3 CSI-RSRP measurement report mapping

The reporting range of CSI-RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.1.14.3.3-1. The range in the signalling may be larger than the guaranteed accuracy range.

Reported value	Measured quantity value	Unit
CSI_RSRP_00	CSI_RSRP < -140	dBm
CSI_RSRP _01	-140 ≤ CSI_RSRP < -139	dBm
CSI_RSRP _02	-139 ≤ CSI_RSRP < -138	dBm
		***
CSI_RSRP _95	-46 ≤ CSI_RSRP < -45	dBm
CSI_RSRP _96	-45 ≤ CSI_RSRP < -44	dBm
CSI RSRP 97	-44 ≤ CSI RSRP	dBm

Table 9.1.14.3.3-1: CSI-RSRP measurement report mapping

#### 9.1.14.4 RSRQ measurements in discovery signal occasions

Intra-frequency absolute RSRQ measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.5.1.

Inter-frequency absolute RSRQ measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.6.1.

Inter-frequency relative RSRQ measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.6.2.

Measurement report mapping for RSRQ measurements in discovery signal occasions are the same as specified in Section 9.1.7.

# 9.1.15 Discovery signal measurements accuracy for E-UTRAN carrier aggregation

This clause contains requirements on UE capabilities for support of E-UTRA FDD, TDD and TDD-FDD carrier aggregation when discovery signal [16] is configured. Requirements in this clause are applicable to all carrier aggregation capable UEs which have been configured with one or two downlink SCell(s). Note: This clause covers measurement accuracy requirements for frequencies corresponding to those used for the PCell and SCell(s). Measurements of any other frequency are considered to be inter-frequency measurements covered by the accuracy requirements in clause 9.1.14.

The requirements in this clause apply for bandwidths defined in the bandwidth combination set for the CA configurations supported by the UE [5].

# 9.1.15.1 Requirements for CRS based discovery signal measurements accuracy for E-UTRAN carrier aggregation

#### 9.1.15.1.1 Primary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on the primary component carrier shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.2 and 9.1.14.4. Comparisons between RSRP of cells on the primary component carrier shall also meet the intra-frequency relative accuracy requirements in sections 9.1.14.2.

#### 9.1.15.1.2 Secondary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on any of the secondary component carrier(s) shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.2 and 9.1.14.4. Comparisons between RSRP of cells on the same secondary component carrier shall meet the intra-frequency relative accuracy requirements in sections 9.1.14.2.

## 9.1.15.1.3 Primary and secondary component carrier relative accuracy requirement

When measurements of cells on the primary component carrier are compared with measurements of cells on any of the secondary component carrier(s), the applicable relative accuracy requirements are the RSRP and RSRQ inter-frequency accuracy requirements in sections 9.1.14.2 and 9.1.14.4.

#### 9.1.15.1.4 Secondary component carrier relative accuracy requirement

When measurements of cells on any of the secondary component carrier(s) are compared with measurements of cells on the other secondary component carrier, the applicable relative accuracy requirements are the RSRP and RSRQ interfrequency accuracy requirements in sections 9.1.14.2 and 9.1.14.4.

# 9.1.15.2 Requirements for CSI-RS based discovery signal measurements accuracy for E-UTRAN carrier aggregation

## 9.1.15.2.1 Primary component carrier accuracy requirement

RSRP measurements of cells on the primary component carrier shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.3.1.1. Comparisons between RSRP of cells on the primary component carrier shall also meet the intra-frequency relative accuracy requirements in sections 9.1.14.3.1.2.

#### 9.1.15.2.2 Secondary component carrier accuracy requirement

RSRP measurements of cells on any of the secondary component carrier(s) shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.3.1.1. Comparisons between RSRP of cells on the same secondary component carrier shall meet the intra-frequency relative accuracy requirements in sections 9.1.14.3.1.2.

#### 9.1.15.2.3 Primary and secondary component carrier relative accuracy requirement

When measurements of cells on the primary component carrier are compared with measurements of cells on any of the secondary component carrier(s), the applicable relative accuracy requirements are the RSRP inter-frequency accuracy requirements in sections 9.1.14.3.2.2.

## 9.1.15.2.4 Secondary component carrier relative accuracy requirement

When measurements of cells on any of the secondary component carrier(s) are compared with measurements of cells on the other secondary component carrier, the applicable relative accuracy requirements are the RSRP inter-frequency accuracy requirements in sections 9.1.14.3.2.2.

# 9.1.16 Accuracy requirements for RSRQ measurement on all OFDM symbols

This clause contains requirements for RSRQ measurement when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2].

Intra-frequency absolute RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.5.1.

Inter-frequency absolute RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.1.

Inter-frequency relative RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.2.

NOTE: The minimum Io condition in Table 9.1.5.1-1, Table 9.1.6.1-1 and Table 9.1.6.2-1 is expressed as the average Io per RE over all REs in that symbol.

NOTE: The Io range defined by the minimum and the maximum Io levels in Table 9.1.5.1-1, Table 9.1.6.1-1 and Table 9.1.6.2-1 applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.

NOTE: Iot in Table 9.1.5.1-1, Table 9.1.6.1-1 and Table 9.1.6.2-1 is the received power spectrum density of total interference and noise averaged over CRS REs.

Intra-frequency absolute WB-RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.5.4.

Inter-frequency absolute WB-RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.3.

Inter-frequency relative WB-RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.4.

NOTE: The minimum Io condition in Table 9.1.5.4-1, Table 9.1.6.3-1 and Table 9.1.6.4-1 is expressed as the average Io per RE over all REs in that symbol across all the resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2].

NOTE: The Io1, Io2 and Io range defined by the minimum and the maximum Io levels in Table 9.1.5.4-1, Table 9.1.6.3-1 and Table 9.1.6.4-1 applies to CRS and non-CRS symbols. Io1, Io2 and Io may be different in different symbols within a subframe.

NOTE: Iot in Table 9.1.5.4-1, Table 9.1.6.3-1 and Table 9.1.6.4-1 is the received power spectrum density of total interference and noise averaged over CRS REs.

# 9.2 UTRAN FDD Measurements

The requirements in this clause are applicable for a UE:

- in state RRC\_CONNECTED
- performing measurements according to clause 8.1.2.4 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

#### 9.2.1 UTRAN FDD CPICH RSCP

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD and for SON.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC\_CONNECTED state is specified in clauses 8.1.2.4.1 and 8.1.2.4.2.

In RRC\_CONNECTED state the accuracy requirements shall meet the absolute accuracy requirements in table 9.2.1-1, under the following conditions:

- CPICH Ec/Io condition for a detectable cell is as specified in clauses 8.1.2.4.1, 8.1.2.4.2, 8.1.2.4.7, 8.1.2.4.8;
- SCH\_Ec/Io condition for a detectable cell is as specified in clauses 8.1.2.4.1, 8.1.2.4.2, 8.1.2.4.7, 8.1.2.4.8.

Acc	uracy	Conditions			
Normal	Extreme	lo r	ange		
condition	condition	UTRA operating bands	Minimum Io	Maximum lo	
dB	dB		dBm/3.84 MHz	dBm/3.84 MHz	
	±9	Band I, IV, VI, X XI, XIX and XXI	-94	-70	
		Band IX	-93	-70	
±6		Band II, V and VII	-92	-70	
±0		Band III, VIII, XII, XIII, XIV , XX and XXII	-91	-70	
		Band XXV, XXVI Note 1	-90.5	-70	
±8	±11	Note 2	-70	-50	

Table 9.2.1-1: UTRAN FDD CPICH\_RSCP absolute accuracy

NOTE 1: For Band XXVI, the condition has the minimum lo of -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

NOTE 2: The same bands apply for this requirement as for the corresponding highest accuracy requirement.

If the UE, in RRC\_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the relevant UTRAN FDD measurement procedure and measurement gap pattern stated in clause 8.1.2.4 shall apply.

The reporting range and mapping specified for FDD CPICH RSCP in TS 25.133 [18] shall apply.

#### 9.2.2 Void

### 9.2.3 UTRAN FDD CPICH Ec/No

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD and for SON.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC CONNECTED state is specified in clauses 8.1.2.4.1 and 8.1.2.4.2.

In RRC\_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for FDD CPICH Ec/No in TS 25.133 [18].

If the UE, in RRC\_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the UTRAN FDD measurement procedure and measurement gap pattern stated in clause 8.1.2.4.1 shall apply.

The reporting range and mapping specified for FDD CPICH Ec/No in TS 25.133 [18] shall apply.

## 9.3 UTRAN TDD Measurements

The requirements in this clause are applicable for a UE:

- in state RRC CONNECTED
- performing measurements according to clause 8.1.2.4 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

# 9.3.1 UTRAN TDD P-CCPCH RSCP

NOTE: This measurement is for handover between E-UTRAN and UTRAN TDD and for SON.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC\_CONNECTED state is specified in clauses 8.1.2.4.3 and 8.1.2.4.4.

In RRC\_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for TDD P-CCPCH in TS 25.123 [19].

If the UE, in RRC\_CONNECTED state, needs measurement gaps to perform UTRAN TDD measurements, the relevant UTRAN TDD measurement procedure and measurement gap pattern stated in clause 8.1.2.4 shall apply.

The reporting range and mapping specified for TDD P-CCPCH RSCP in TS 25.123 [19] shall apply.

#### 9.3.2 Void

#### 9.3.3 Void

## 9.4 GSM Measurements

The requirements in this clause are applicable for a UE:

- in state RRC CONNECTED
- performing measurements according to clause 8.1.2.4.5 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

#### 9.4.1 GSM carrier RSSI

NOTE: This measurement is for handover between E-UTRAN and GSM.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC\_CONNECTED state is specified in clause 8.1.2.4.5.

In RRC\_CONNECTED state the measurement accuracy requirements for RXLEV in TS 45.008 [8] shall apply.

If the UE, in RRC\_CONNECED state, needs measurement gaps to perform GSM measurements, the GSM measurement procedure and measurement gap pattern stated in clause 8.1.2.4.5 shall apply.

The reporting range and mapping specified for RXLEV in TS 45.008 [8] shall apply.

## 9.5 CDMA2000 1x RTT Measurements

The requirements in this clause are applicable for a UE:

- in RRC\_CONNECTED state.
- synchronised to the cell that is measured.

# 9.5.1 CDMA2000 1x RTT Pilot Strength

NOTE: This measurement is for handover between E-UTRAN and cdma2000 1 x RTT.

The requirements in this clause are valid for terminals supporting this capability.

CDMA2000 1xRTT Pilot Strength defined in sub-clause 5.1.10 of [4] shall meet the performance requirement defined in sub-clause 3.2.4 of [14] on the cdma2000 1xRTT neighbour cells indicated by the serving eNode B.

# $P_{CMAX,c}$

For a UE configured with a secondary cell, the UE is required to report the UE configured maximum output power  $(P_{CMAX,c})$  together with the power headroom. This clause defines the requirements for the  $P_{CMAX,c}$  reporting.

# 9.6.1 Report Mapping

The  $P_{CMAX,c}$  reporting range is defined from -29dBm to 33 dBm with 1 dB resolution. Table 9.6.1-1 defines the reporting mapping.

Reported value	Measured quantity value	Unit
PCMAX_C_00	P <sub>CMAX,c</sub> < -29	dBm
PCMAX_C_01	-29 ≤ P <sub>CMAX,c</sub> < -28	dBm
PCMAX_C_02	$-28 \le P_{CMAX,c} < -27$	dBm
	•••	
PCMAX_C_61	$31 \le P_{CMAX,c} < 32$	dBm
PCMAX_C_62	32 ≤ P <sub>CMAX,c</sub> < 33	dBm
PCMAX C 63	33 < P <sub>CMAY c</sub>	dBm

Table 9.6.1-1 Mapping of P<sub>CMAX,c</sub>

#### 9.6.2 Estimation Period

When *extendedPHR* is configured and UE is required to include  $P_{CMAX,c}$  in Extended PHR MAC control element as defined in subclause 5.4.6 in [17], the UE shall calculate the  $P_{CMAX,c}$  per activated serving cell c for UL-SCH transmission according to subclause 6.2.5A of TS 36.101 [5] over 1 subframe.

# 9.6.3 Reporting Delay

The  $P_{CMAX,c}$  reporting delay is defined as the time between the beginning of the  $P_{CMAX,c}$  reference period and the time when the UE starts transmitting  $P_{CMAX,c}$  over the radio interface. The reporting delay of the  $P_{CMAX,c}$  shall be 0 ms, which is applicable for all configured triggering mechanisms for  $P_{CMAX,c}$  reporting.

# 9.7 IEEE802.11 Measurements

The requirements in this clause are applicable for a UE:

- in RRC\_CONNECTED state.
- synchronised to the IEEE 802.11 access point that is measured.

# 9.7.1 IEEE802.11 Beacon RSSI

NOTE: This measurement is for access network selection and traffic steering between E-UTRAN and IEEE802.11.

The requirements in this clause are valid for terminals supporting this capability.

IEEE802.11 Beacon RSSI defined in sub-clause 5.1.16 of [4] shall meet the performance requirement defined in [32].

# 9.8 MBSFN Measurements

## 9.8.1 Introduction

MBSFN measurements include MBSFN RSRP, MBSFN RSRQ, and MCH BLER, which are defined in [4]. The measurements are used for MDT.

#### 9.8.2 MBSFN RSRP

## 9.8.2.1 Absolute MBSFN RSRP measurement accuracy requirements

The requirements for absolute accuracy of MBSFN RSRP in this clause apply to any carrier, which may be the same as or different from any serving unicast carrier, where PMCH is received while meeting performance requirements in Section 10 of [5].

The accuracy requirements in Table 9.8.2.1-1 are valid under the following conditions:

MBSFN RS are transmitted from antenna port 4 in the MBSFN subframes where PMCH is received.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

MBSFN RSRP|dBm/15kHz is the same as RSRP|dBm/15kHz specified in Annex B.3.1 for each corresponding Band.

Table 9.8.2.1-1: Absolute MBSFN RSRP measurement accuracy

Accı	Accuracy		Conditions				
Normal	Extreme	Ês/lot	lo Note 1 range				
condition			E-UTRA operating band groups Note 3	Minimum Io		Maximum lo	
dB	dB	dB		dBm/15kHz Note 2	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
			FDD_A, TDD_A	-121	N/A	-70	
			FDD_C, TDD_C	-120	N/A	-70	
		≥-6 dB	FDD_D	-119.5	N/A	-70	
±4.5	±9		FDD_E, TDD_E	-119	N/A	-70	
±4.5	±9		FDD_F	-118.5	N/A	-70	
			FDD_G	-118	N/A	-70	
			FDD_H	-117.5	N/A	-70	
			FDD_N	-114.5	N/A	-70	
±8	±11	≥-6 dB	FDD_A, TDD_A, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

#### 9.8.2.2 MBSFN RSRP measurement report mapping

The reporting range of MBSFN RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.8.2.2-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.8.2.2-1: MBSFN RSRP measurement report mapping

Reported value	Measured quantity value	Unit
MBSFN_RSRP_00	MBSFN_RSRP < -140	dBm
MBSFN_RSRP_01	-140 ≤ MBSFN_RSRP < -139	dBm
MBSFN_RSRP_02	-139 ≤ MBSFN_RSRP < -138	dBm
	•••	•••
MBSFN_RSRP_95	-46 ≤ MBSFN_RSRP < -45	dBm
MBSFN_RSRP_96	-45 ≤ MBSFN_RSRP < -44	dBm
MBSFN_RSRP_97	-44 ≤ MBSFN_RSRP	dBm

### 9.8.3 MBSFN RSRQ

### 9.8.3.1 Absolute MBSFN RSRQ measurement accuracy requirements

The requirements for absolute accuracy of MBSFN RSRQ in this clause apply to any carrier, which may be the same as or different from a serving unicast carrier, where PMCH is received while meeting performance requirements in Section 10 of [5].

The accuracy requirements in Table 9.8.3.1-1 are valid under the following conditions:

MBSFN RS are transmitted from antenna port 4 in the MBSFN subframes where PMCH is received.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

MBSFN RSRP|dBm/15kHz is the same as RSRP|dBm/15kHz specified in Annex B.3.1 for each corresponding Band.

Table 9.8.3.1-1: Absolute MBSFN RSRQ measurement accuracy

Accı	ıracy	Conditions			
Normal	Extreme		lo <sup>N</sup>		
condition	condition Ês/lot		E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	dBm/BW <sub>Channel</sub>
	<u>+</u> 4		FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
±2.5		≥-3 dB	FDD_E, TDD_E	-119	-50
±2.5		±4	FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3.5	±4	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 3: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

# 9.8.3.2 MBSFN RSRQ measurement report mapping

The reporting range of MBSFN RSRQ is defined from -23 dB to -7.5 dB with 0.5 dB resolution.

The mapping of measured quantity is defined in Table 9.8.3.2-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.8.3.2-1: MBSFN RSRQ measurement report mapping

Reported value	Measured quantity value	Unit
MBSFN_RSRQ_00	MBSFN_RSRQ < -23	dB
MBSFN_RSRQ_01	-23 ≤ MBSFN_RSRQ < -22.5	dB
MBSFN_RSRQ_02	-22.5 ≤ MBSFN_RSRQ < -22	dB
		•••
MBSFN_RSRQ_30	-8.5 ≤ MBSFN_RSRQ < -8	dB
MBSFN_RSRQ_31	-8 ≤ MBSFN_RSRQ	dB

# 9.8.4 MCH BLER

MCH BLER shall be measured as defined in [4].

## 9.8.4.1 Measurement report mapping for MCH BLER

The UE shall report MCH BLER together with the corresponding total number of MCH blocks, which were received by the UE during the MCH BLER measurement period and used for calculating the reported MCH BLER.

The reporting range of MCH BLER is defined from 0.1% to 50% with uniform quantization in log domain.

The mapping of measured quantity is defined in Table 9.8.4.1-1. The range in the signalling may be larger than the range specified in the table below.

Table 9.8.4.1-1: MCH BLER measurement report mapping

Reported value	Measured quantity value	Unit
MCH BLER_00	MCH BLER < 0.1	%
MCH BLER_01	0.1≤ MCH BLER < 0.123	%
MCH BLER_02	0.123≤ MCH BLER < 0.151	%
MCH BLER_03	0.151≤ MCH BLER <0.186	%
MCH BLER_04	0.186≤ MCH BLER <0.229	%
MCH BLER_05	0.229≤ MCH BLER <0.282	%
MCH BLER_06	0. 282≤ MCH BLER <0.347	%
MCH BLER_07	0. 347≤ MCH BLER <0.426	%
MCH BLER_08	0. 426≤ MCH BLER <0.525	%
MCH BLER_09	0. 525≤ MCH BLER <0.645	%
MCH BLER_10	0. 645≤ MCH BLER <0.794	%
MCH BLER_11	0. 794≤ MCH BLER <0.976	%
MCH BLER_12	0. 976≤ MCH BLER <1.201	%
MCH BLER_13	1. 201≤ MCH BLER <1.478	%
MCH BLER_14	1. 478≤ MCH BLER <1.818	%
MCH BLER_15	1. 818≤ MCH BLER <2.236	%
MCH BLER_16	2. 236≤ MCH BLER <2.751	%
MCH BLER_17	2. 751≤ MCH BLER <3.384	%
MCH BLER_18	3. 384≤ MCH BLER <4.163	%
MCH BLER_19	4.163≤ MCH BLER <5.121	%
MCH BLER_20	5.121≤ MCH BLER <6.300	%
MCH BLER_21	6.300≤ MCH BLER <7.750	%
MCH BLER_22	7.750≤ MCH BLER <9.533	%
MCH BLER_23	9.533≤ MCH BLER <11.728	%
MCH BLER_24	11.728≤ MCH BLER <14.427	%
MCH BLER_25	14.427≤ MCH BLER <17.478	%
MCH BLER_26	17.478≤ MCH BLER <21.833	%
MCH BLER_27	21.833≤ MCH BLER <26.858	%
MCH BLER_28	26.858≤ MCH BLER <33.040	%
MCH BLER_29	33.040≤ MCH BLER <40.645	%
MCH BLER_30	40.645≤ MCH BLER < 50	%
MCH BLER_31	50 ≤ MCH BLER	%

## 9.8.4.2 Measurement report mapping for MCH Block Number

The reporting range of the total number of received MCH blocks during the measurement period is defined from 0 to 65152. The total number of received MCH blocks is quantized to two values n and m with the mappings defined in Table 9.8.4.2-1 and Table 9.8.4.2-2, respectively.

The range in the signalling may be larger than the range specified in the table below.

 $N_R$  in Table 9.8.4.2-1 and Table 9.8.4.2-2 represents the total number of received MCH blocks.  $f(N_R)$  is a function of  $N_R$  with the definition that  $f\left(N_R\right) = \frac{N_R - \left(2^n - 1\right) \times 2^8}{2^n}$ , from where the quantized total number of MCH blocks is found as  $\left(2^n - 1\right) \times 2^8 + m \times 2^n$ .

Table 9.8.4.2-1: Number of received MCH blocks mapping to n

Reported value, n	Number of received MCH blocks
MCH_NR_N_00	$0 \le N_R < 256$
MCH_NR_N_01	256≤ N <sub>R</sub> < 768
MCH_NR_N_02	768≤ N <sub>R</sub> < 1792
MCH_NR_N_03	1792≤ N <sub>R</sub> < 3840
MCH_NR_N_04	3840≤ N <sub>R</sub> < 7936
MCH_NR_N_05	7936≤ N <sub>R</sub> <16128
MCH_NR_N_06	16128≤ N <sub>R</sub> < 32512
MCH_NR_N_07	32512≤ N <sub>R</sub>

Table 9.8.4.2-2: Number of received MCH blocks mapping to m

Reported value, m	f(N <sub>R</sub> )
MCH_NR_M_00	$0 \le f(N_R) < 1$
MCH_NR_M_01	$1 \le f(N_R) < 2$
MCH_NR_M_02	2≤ f(N <sub>R</sub> ) < 3
MCH_NR_M_253	$253 \le f(N_R) < 254$
MCH_NR_M_254	254≤ f(N <sub>R</sub> ) < 255
MCH_NR_M_255	255≤ f(N <sub>R</sub> )

# 9.9 Measurements Performance Requirements for ProSe

## 9.9.1 Introduction

The requirements in this clause are applicable for a UE capable of ProSe Direct Communication.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in [25].

The accuracy requirements in this clause are:

- applicable for AWGN radio propagation conditions,
- assume independent interference (noise) at each receiver antenna port.
- valid for the reported measurement result after layer 1 filtering,
- are verified from the measurement report at point D in the measurement model having the higher layer filtering disabled.

# 9.9.2 Intra-Frequency S-RSRP Measurement Accuracy Requirements

# 9.9.2.1 Absolute S-RSRP Accuracy

The requirements for absolute accuracy of S-RSRP in this clause apply to a ProSe synchronization source on the same frequency as that of the own ProSe UE performing the measurement.

The accuracy requirements in Table 9.9.2.1-1 are valid under the following conditions:

- Demodulation reference signals are transmitted from one port.
- Conditions defined in 36.101 Clause 7.3D for reference sensitivity are fulfilled.
- S-RSRP|dBm according to Annex B.5.1 for a corresponding Band are fulfilled.

Table 9.9.2.1-1: Intra-frequency S-RSRP absolute accuracy for UE capable of ProSe Direct Communication

Accı	ıracy		Conditions				
Normal	Extreme	Ês/lot		lo Note 1 range			
condition	condition	Note 4	E-UTRA ProSe operating band groups Note 3	Minim	Minimum Io M		
dB	dB	dB		dBm/15kHz Note 2	dBm/BW <sub>Channel</sub>	dBm/BW <sub>Channel</sub>	
			FDD_D	-119.5	N/A	-70	
			FDD_E	-119	N/A	-70	
±4.5	±9	≥-6 dB	FDD_F	-118.5	N/A	-70	
				FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70	
±8	±11	≥-6 dB	FDD_D, FDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50	

- NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
- NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
- NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.
- NOTE 4: Ês/lot for a SyncRef UE is the minimum of the Ês/lot of PSSS/PSBCH and the Ês/lot of SSSS

## 9.9.2.2 Relative Accuracy of S-RSRP

The relative accuracy of S-RSRP is defined as the S-RSRP measured from one ProSe synchronization source compared to the S-RSRP measured from another ProSe synchronization source on the same frequency.

The accuracy requirements in Table 9.9.2.2-1 are valid under the following conditions:

- Demodulation reference signals are transmitted from one port.
- Conditions defined in 36.101 Clause 7.3D for reference sensitivity are fulfilled.
- S-RSRP1,2<sub>dBm</sub> according to Annex B.5.2 for a corresponding Band.

Table 9.9.2.2-1: S-RSRP Intra frequency relative accuracy for UE capable of ProSe direct communication

Accı	ıracy		Conditions			
Normal	Extreme	Ês/lot Note	Io Note 1 range			
condition	condition	2, 6	groups		Maximum Io	
dB	dB	dB		dBm/15kHz Note 4	dBm/BW <sub>Channel</sub>	
+2	±2	≥-3 dB	FDD_D	-119.5	-50	
±2	±3	∠-3 UD	FDD_E	-119	-50	

			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±3	±3	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of SyncRef UEs to which the requirement applies.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: The condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA

operating bands.

NOTE 6: Ês/lot for a SyncRef UE is the minimum of the Ês/lot of PSSS/PSBCH and the Ês/lot of SSSS

# 10 Measurements Performance Requirements for E-UTRAN

# 10.1 Received Interference Power

The measurement period shall be 100 ms.

# 10.1.1 Absolute accuracy requirement

Table 10.1.1-1: Received Interference Power absolute accuracy

Parameter	Unit	Accuracy Conditions	
		[dB]	lob [dBm/180 kHz]
lob	dBm/180 kHz	± 4	-11796

# 10.1.2 Relative accuracy requirement

The relative accuracy is defined as the Received Interference Power measured at one frequency compared to the Received Interference Power measured from the same frequency at a different time.

Table 10.1.2-1: Received Interference Power relative accuracy

Parameter	Unit	Accuracy	Conditions
		[dB]	lob [dBm/180 kHz]
lob	dBm/180 kHz	± 0.5	-11796
			AND for changes ≤ ±9.0 dB

# 10.1.3 Received Interference Power measurement report mapping

The reporting range for Received Interference Power (RIP) is from -126 ... -75 dBm.

In table 10.2.3-1 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 10.1.3-1: Received Interference Power measurement reporting range

Reported value	Measured quantity value	Unit
RTWP_LEV _000	RIP < -126.0	dBm
RTWP_LEV _001	-126.0 ≤ RIP < -125.9	dBm
RTWP_LEV _002	-125.9 ≤ RIP < -125.8	dBm
RTWP_LEV _509	-75.2 ≤ RIP < -75.1	dBm
RTWP_LEV _510	-75.1 ≤ RIP < -75.0	dBm
RTWP_LEV _511	-75.0 ≤ RIP	dBm

# 10.2 Angle of Arrival (AOA)

# 10.2.1 Range/mapping

The reporting range for AOA measurement is from 0 to 360 degree, with resolution of 0.5 degree.

The mapping of the measured quantity is defined in table 10.2.1-1.

Table 10.2.1-1: AOA measurement report mapping

Reported value	Measured quantity value	Unit
AOA_ANGLE _000	0 ≤ AOA_ANGLE < 0.5	degree
AOA_ANGLE _001	0.5 ≤ AOA_ANGLE < 1	degree
AOA_ANGLE _002	1 ≤ AOA_ANGLE < 1.5	degree
•••	•••	
AOA_ANGLE _717	358.5 ≤ AOA_ANGLE < 359	degree
AOA_ANGLE _718	359 ≤ AOA_ANGLE < 359.5	degree
AOA_ANGLE _719	359.5 ≤ AOA_ANGLE < 360	degree

# 10.3 Timing Advance (T<sub>ADV</sub>)

# 10.3.1 Report mapping

The reporting range of  $T_{ADV}$  is defined from 0 to  $49232T_s$  with  $2T_s$  resolution for timing advance less or equal to  $4096T_s$  and  $8T_s$  for timing advance greater than  $4096T_s$ .

The mapping of measured quantity is defined in Table 10.3.1-1.

Table 10.3.1-1: T<sub>ADV</sub> measurement report mapping

Reported value	Measured quantity value	Unit
TIME_ADVANCE_00	T <sub>ADV</sub> < 2	T <sub>s</sub>
TIME_ADVANCE_01	2 ≤ T <sub>ADV</sub> < 4	Ts
TIME_ADVANCE_02	4 ≤ T <sub>ADV</sub> < 6	Ts
TIME_ADVANCE_2046	$4092 \le T_{ADV} < 4094$	Ts
TIME_ADVANCE_2047	4094 ≤ T <sub>ADV</sub> < 4096	Ts
TIME_ADVANCE_2048	$4096 \le T_{ADV} < 4104$	Ts
TIME_ADVANCE_2049	$4104 \le T_{ADV} < 4112$	T <sub>s</sub>
•••		
TIME_ADVANCE_7688	49216 ≤ T <sub>ADV</sub> < 49224	T <sub>s</sub>
TIME_ADVANCE_7689	49224 ≤ T <sub>ADV</sub> < 49232	T <sub>s</sub>
TIME_ADVANCE_7690	49232 ≤ T <sub>ADV</sub>	Ts

# 11 ProSe Requirements in Any Cell Selection state

## 11.1 Introduction

This section contains the requirements for the UE capable of ProSe Direct Communication in any cell selection state . The ProSe requirements shall apply provided that the sidelink used by the UE for ProSe Direct Communication is on the carrier that is preconfigured in the ProSe UE for out-of-coverage operation.

Note: Any cell selection state refers to a UE that is out of network coverage.

# 11.2 UE Transmit Timing for ProSe in Any Cell Selection State

#### 11.2.1 Introduction

This clause contains requirements on the UE capable of ProSe Direct Communication regarding transmit timing in any cell selection state.

# 11.2.2 ProSe UE transmission timing

The requirements in this subclause are applicable when the reference timing used for deriving ProSe transmission is from another ProSe UE transmitting sidelink synchronization signals.

The sidelink transmissions takes place  $(N_{\rm TA,SL} + N_{\rm TA\,offset}) \cdot T_{\rm s}$  before the reception of the first detected path (in time) of the corresponding timing reference frame from the UE, with  $N_{\rm TA\,offset} = 0$  and  $N_{\rm TA,SL} = 0$  [16]. The transmission timing error for sidelink transmissions shall be less than or equal to  $\pm T_{\rm e}$  where the timing error limit value  $T_{\rm e}$  is specified in Table 11.2.2-1.

Table 11.2.2-1: Te Timing Error Limit

Side	link Bandwidth (MHz)	T <sub>e</sub>
	≥1.4	24*T <sub>S</sub>
Note:	T <sub>S</sub> is the basic timing un	it defined in TS 36.211

## 11.3 Initiation/Cease of SLSS Transmissions

## 11.3.1 Introduction

The requirements in this subclause apply when the conditions for SLSS transmissions specified in [2] are met and if *syncTxThreshOoC* is included in the preconfigured ProSe parameters.

# 11.3.2 Requirements

The UE shall be capable of measuring the S-RSRP of the selected SyncRef UE used to derive transmission timing for Prose Direct Communication and evaluate it to initiate/cease SLSS transmissions within  $T_{\text{evaluate},SLSS} = 0.8$  seconds.

If higher layer filtering for S-RSRP measurements is pre-configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the selected SyncRef UE [2] used to derive transmission timing for ProSe Direct Communication:

- S-RSRP related side conditions given in Section 11.5 for a corresponding Band are fulfilled,
- ProSe SCH\_RP and SCH Ês/Iot according to Annex B.5.1 for a corresponding Band are fulfilled.

# 11.4 Measurements for ProSe in Any Cell Selection State

## 11.4.1 Introduction

This clause contains requirements for E-UTRA cell identification for the UE capable of ProSe Direct Communication in any cell selection state.

The UE can be preconfigured with ProSe resources for ProSe operation in any cell selection state.

The requirements in this section are applicable for the ProSe in any cell selection state. The ProSe UE in any cell selection state shall:

- continuously search for any detectable E-UTRA cell on the donwlink carrier frequency associated with the preconfigured ProSe carrier frequency for ProSe operation in any cell selection state, and
- search cells also on other carriers and perform cell selection according to the procedure specified in section 4.1.

# 11.4.2 Requirements

The UE capable of ProSe Direct Communication immediately upon entering in any cell selection state shall search for any detectable cell on the carrier preconfigured with ProSe resources.

In any cell selection state the UE shall be able to identify a newly detectable E-UTRA cell on the downlink carrier frequency associated with the preconfigured with ProSe carrier frequency:

- within T<sub>basic\_identify\_OoC\_ProSe Tx\_ON</sub> if the UE is performing ProSe transmissions on the sidelink, or
- within  $T_{basic\_identify\_OoC\_ProSe\ Tx\_OFF}$  if the UE is not performing ProSe transmissions on the sidelink.

where,

 $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON} = 6.4$  seconds, and

 $T_{basic\_identify\_OoC\_ProSe\ Tx\_OFF} = 32\ seconds.$ 

An E-UTRA cell is considered detectable provided it meets the intra-frequency cell identification conditions specified in section 8.1.2.2.

# 11.5 Selection / Reselection of ProSe Synchronization Reference

#### 11.5.1 Introduction

This clause contains requirements for the measurements performed by the UE capable of ProSe Direct Communication in any cell selection state.

# 11.5.2 Selection/Reselection to intra-frequency SyncRef UE

#### 11.5.2.1 Introduction

This clause contains requirements for the measurement for the ProSe synchronization on the UE capable of ProSe Direct Communication in any cell selection state.

#### 11.5.2.2 Requirements

The UE shall be able to identify newly detectable SyncRef UE within  $T_{\text{detect},SyncRef UE}$  seconds if SyncRef UE meets the selection / reselection criterion defined in TS 36.331 [2].

ProSe synchronization source, SyncRef UE, is defined as a ProSe synchronization source which is capable to transmit ProSe synchronization signals.

A SyncRef UE is considered to be detectable when

- S-RSRP related side conditions given in Section 9.9.2 are fulfilled for a corresponding Band,
- ProSe SCH\_RP and SCH Ês/Iot are fulfilled according to Annex B.5.3 for a corresponding Band.

 $T_{\text{detect,SyncRef UE}}$  is defined as 20 seconds at SCH Es/Iot  $\geq$  -4 dB, provided that the ProSe UE is allowed to drop a maximum of 2% of its ProSe Direct Communication transmissions at the physical layer for the purpose of SyncRef UE selection / reselection.

The UE capable of ProSe Direct Communication shall be capable of performing S-RSRP measurements for 6 identified ProSe synchronization sources with the measurement period of 400 ms. It is assumed that the ProSe synchronization sources do not drop or delay more than one SLSS transmission within the measurement period. Otherwise, the measurement period may be extended.

# 11.6 Void

# Annex A (normative): Test Cases

# A.1 Purpose of annex

This Annex specifies test specific parameters for some of the functional requirements in sections 4 to 9. The tests provide additional information to how the requirements should be interpreted for the purpose of conformance testing. The tests in this Annex are described such that one functional requirement may be tested in one or several test and one test may verify several requirements. Some requirements may lack a test.

The conformance tests are specified in TS 36.521-3 [23]. Statistical interpretation of the requirements is described in Annex A.2.

# A.2 Requirement classification for statistical testing

Requirements in this specification are either expressed as absolute requirements with a single value stating the requirement, or expressed as a success rate. There are no provisions for the statistical variations that will occur when the parameter is tested.

Annex A outlines the tests in more detail and lists the test parameters needed. The test will result in an outcome of a test variable value for the device under test (DUT) inside or outside the test limit. Overall, the probability of a "good" DUT being inside the test limit(s) and the probability of a "bad" DUT being outside the test limit(s) should be as high as possible. For this reason, when selecting the test variable and the test limit(s), the statistical nature of the test is accounted for.

The statistical nature depends on the type of requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a DUT passing the test actually meets the requirements and determines how many times a test has to be repeated and what the pass and fail criteria are. Those aspects are not covered by TS 36.133. The details of the tests on how many times to run it and how to establish confidence in the tests are described in TS 36.521-3 [23]. This Annex establishes the variable to be used in the test and whether it can be viewed as statistical in nature or not.

# A.2.1 Types of requirements in TS 36.133

# A.2.1.1 Time and delay requirements on UE higher layer actions

A very large part of the RRM requirements are delay requirements:

- In E-UTRAN RRC\_IDLE state mobility (clause A.4) there is cell re-selection delay.
- In E-UTRAN RRC\_CONNECTED state mobility (clauses A.5 and A.8) there is handover delay, cell search delay and measurement reporting delay.
- In RRC Connection Control (clause A.6) there is RRC re-establishment delay.

All have in common that the UE is required to perform an action observable in higher layers (e.g. camp on the correct cell) within a certain time after a specific event (e.g. when a new strong pilot or reference signal appears). The delay time is statistical in nature for several reasons, among others that several of the measurements are performed by the UE in a fading radio environment.

The variations make a strict limit unsuitable for a test. Instead there is a condition set for a correct action by the UE, e.g. that the UE shall camp on the correct cell within X seconds. Then the rate of correct events is observed during repeated tests and a limit is set on the rate of correct events, usually 90% correct events are required. How the limit is applied in the test depends on the confidence required, further detailed are in TS 36.521-3 [23].

# A.2.1.2 Measurements of power levels, relative powers and time

A very large number of requirements are on measurements that the UE performs:

- In E-UTRAN RRC\_CONNECTED state mobility (clause A.5) there are measurement reports.
- In Measurement Performance Requirements (clause A.9) there are requirements for all type of measurements.

The accuracy requirements on measurements are expressed in this specification as a fixed limit (e.g. +/-X dB), but the measurement error will have a distribution that is not easily confined in fixed limits. Assuming a Gaussian distribution of the error, the limits will have to be set at +/-3.29 $\sigma$  if the probability of failing a "good DUT" in a single test is to be kept at 0.1%. It is more reasonable to set the limit tighter and test the DUT by counting the rate of measurements that are within the limits, in a way similar to the requirements on delay.

# A.2.1.3 Implementation requirements

A few requirements are strict actions the UE should take or capabilities the UE should have, without any allowance for deviations. These requirements are absolute and should be tested as such. Examples are:

- "Event triggered report rate" in E-UTRAN RRC\_CONNECTED state mobility (clauses A.5 and A.8)
- "Correct behaviour at time-out" in RRC connection control (clause A.6)

# A.2.1.4 Physical layer timing requirements

There are requirements on Timing and Signaling Characteristics (clauses A.7). There are both absolute and relative limits on timing accuracy depending upon the type of requirement. Examples are:

- Initial Transmit Timing (clause A.7.1) has an absolute limit on timing accuracy.
- Timing Advance (clause A.7.2) has a relative limit on timing accuracy.

# A.3 RRM test configurations

# A.3.1 Reference Measurement Channels

#### A.3.1.1 PDSCH

#### A.3.1.1.1 FDD

Table A.3.1.1.1-1: PDSCH Reference Measurement Channels for FDD

Parameter	Unit		Value							
Reference channel		R.2		R.5	R.7	R.0	R.1	R.3	R.4	R.6
		FDD		FDD	FDD	FDD	FDD	FDD	FDD	FDD
Channel bandwidth	MHz	1.4	3	5	5	10	10	10	20	20
Number of transmitter antennas		1		1	1	1	2	1	1	1
Allocated resource blocks (Note 4)		2		11	11	24	24	24	24	24
Allocated subframes per Radio Frame		10		10	10	10	10	10	10	10
Modulation		QPS		QPS	QPS	QPS	QPS	QPS	QPS	QPS
		K		K	K	K	K	K	K	K
Target Coding Rate		1/3		1/3	1/3	1/3	1/3	1/3	1/3	1/3
Information Bit Payload										
For Sub-Frames 4, 9	Bits	120		968	968	2088	2088	2088	2088	2088
For Sub-Frame 5	Bits	104		776	776	2088	1736	2088	2088	2088
For Sub-Frame 0	Bits	32		616	616	1736	1736	1736	1736	1736
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0		0	968	0	0	2088	0	2088
Number of Code Blocks per Sub-Frame										
(Note 5)										
For Sub-Frames 4, 9		1		1	1	1	1	1	1	1
For Sub-Frame 5		1		1	1	1	1	1	1	1
For Sub-Frame 0		1		1	1	1	1	1	1	1
For Sub-Frame 1, 2, 3, 6, 7, 8		0		0	1	0	0	1	0	1
Binary Channel Bits Per Sub-Frame										
For Sub-Frames 4, 9	Bits	456		2772	2772	6624	6336	6624	6624	6624
For Sub-Frame 5	Bits	360		2484	2484	6336	6048	6336	6336	6336
For Sub-Frame 0	Bits	176		1932	1932	5784	5520	5784	5784	5784
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0		0	2772	0	0	6624	0	6624
Max. Throughput averaged over 1	kbps	37.6		332.8	913.6	800	765	2053	800	2053
frame										

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5 MHz channel BW.

Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].

Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].

Note 4: Allocation is located in the middle of bandwidth.

Note 5: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)

Note 6: PDSCH allocation applies only to subframes not configured as PRS subframes.

#### A.3.1.1.2 TDD

Table A.3.1.1.2-1: PDSCH Reference Measurement Channels for TDD UL/DL configuration1

Parameter	Unit	Value					
Reference channel		R.2		R.4	R.0	R.1	R.3
		TDD		TDD	TDD	TDD	TDD
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas		1		1	1	2	1
Allocated resource blocks (Note 4)		2		11	24	24	24
Uplink-Downlink Configuration (Note 5)		1		1	1	1	1
Special Subframe Configuration (Note 6)		6		6	6	6	6
Allocated subframes per Radio Frame		6		6	6	6	6
Modulation		QPSK		QPSK	QPSK	QPSK	QPSK
Target Coding Rate		1/3		1/3	1/3	1/3	1/3
Information Bit Payload							
For Sub-Frames 4,9	Bits	120		968	2088	2088	2088
For Sub-Frame 5	Bits	104		968	2088	2088	2088
For Sub-Frame 0	Bits	56		616	2088	1736	2088
For Sub-Frame 1, 6 (DwPTS)	Bits	56		472	1032	1032	1032
Number of Code Blocks per Sub-Frame		1		1	1	1	1
(Note 7)							
For Sub-Frames 4,9		1		1	1	1	1
For Sub-Frame 5		1		1	1	1	1
For Sub-Frame 0		1		1	1	1	1
For Sub-Frame 1, 6 (DwPTS)		1		1	1	1	1
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits	456		2772	6624	6336	6624
For Sub-Frame 5	Bits	408		2628	6480	6192	6480
For Sub-Frame 0	Bits	224		2076	5928	5664	5928
For Sub-Frame 1, 6 (DwPTS)	Bits	272		1616	3696	3504	3696
Max. Throughput averaged over 1 frame	Mbps	0.051		0.446	1.041	1.006	1.0416
		2		4	6	4	

- Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
- Note 2: Reference signal, synchronization signals and PBCH allocated as defined in TS 36.211 [16].
- Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in TS 36.213 [3].
- Note 4: Allocation is located in the middle of bandwidth.
- Note 5: As per Table 4.2-2 in TS 36.211 [16]
- Note 6: As per Table 4.2-1 in TS 36.211 [16]
- Note 7: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
- Note 8: PDSCH allocation applies only to subframes not configured as PRS subframes.

Table A.3.1.1.2-2: PDSCH Reference Measurement Channels for TDD UL/DL configuration0

Parameter	Unit	t Value					
Reference channel					R.5 TDD		
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas					1		
Allocated resource blocks (Note 4)					24		
Uplink-Downlink Configuration (Note 5)					0		
Special Subframe Configuration (Note 6)					6		
Allocated subframes per Radio Frame					4		
Modulation					QPSK		
Target Coding Rate					1/3		
Information Bit Payload							
For Sub-Frames 4,9	Bits				N/A		
For Sub-Frame 5	Bits				2088		
For Sub-Frame 0	Bits				2088		
For Sub-Frame 1, 6 (DwPTS)	Bits				1032		
Number of Code Blocks per Sub-Frame (Note 7)					1		
For Sub-Frames 4,9					N/A		
For Sub-Frame 5					1		
For Sub-Frame 0					1		
For Sub-Frame 1, 6 (DwPTS)					1		
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits				N/A		
For Sub-Frame 5	Bits				6480		
For Sub-Frame 0	Bits				5928		
For Sub-Frame 1, 6 (DwPTS)	Bits				3696		
Max. Throughput averaged over 1 frame	Mbps				0.624		

- 2 symbols allocated to PDCCH for 10 MHz channel BW. 3 OFDM symbols allocated to PDCCH for Note 1: 5MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
- Note 2: Reference signal, synchronization signals and PBCH allocated as defined in TS 36.211 [16].
- Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in TS 36.213 [3].
- Allocation is located in the middle of bandwidth. Note 4:
- Note 5:
- As per Table 4.2-2 in TS 36.211 [16] As per Table 4.2-1 in TS 36.211 [16] Note 6:
- If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to Note 7: each Code Block (otherwise L = 0 Bit)
- Note 8: PDSCH allocation applies only to subframes not configured as PRS subframes.

# A.3.1.1.3 FDD for UE category 0

Table A.3.1.1.3-1: PDSCH Reference Measurement Channels for FDD

Parameter	Unit		Value	
Reference channel		R.13 FDD	R.14 FDD	R.15 FDD
Channel bandwidth	MHz	10	10	10
Number of transmitter antennas		1	2	2
Allocated resource blocks (Note 4)		24	24	24
Allocated subframes per Radio Frame		10	10	10
Modulation		QPSK	QPSK	QPSK
Target Coding Rate		1/10	1/10	1/10
Information Bit Payload				
For Sub-Frames 4, 9	Bits	648	648	648
For Sub-Frame 5	Bits	648	648	648
For Sub-Frame 0	Bits	648	648	648
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0	648
Number of Code Blocks per Sub-Frame				
(Note 5)				
For Sub-Frames 4, 9		1	1	1
For Sub-Frame 5		1	1	1
For Sub-Frame 0		1	1	1
For Sub-Frame 1, 2, 3, 6, 7, 8		1	1	1
Binary Channel Bits Per Sub-Frame				
For Sub-Frames 4, 9	Bits	6624	6336	6636
For Sub-Frame 5	Bits	6336	6048	6408
For Sub-Frame 0	Bits	5784	5520	5520
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0	6636
Max. Throughput averaged over 1 frame	kbps	259.2	259.2	648

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5 MHz channel BW.

Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].

Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].

Note 4: Allocation is located in the middle of bandwidth.

Note 5: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)

Note 6: PDSCH allocation applies only to subframes not configured as PRS subframes.

# A.3.1.1.4 HD-FDD for UE category 0

Table A.3.1.1.4-1: PDSCH Reference Measurement Channels for HD-FDD

Parameter	Unit		Value
Reference channel		R.1 HD-FDD	R.2 HD-FDD
Channel bandwidth	MHz	10	10
Number of transmitter antennas		1	2
Allocated resource blocks (Note 4)		24	24
Allocated subframes per Radio Frame		10	10
Modulation		QPSK	QPSK
Target Coding Rate		1/10	1/10
Information Bit Payload			
For Sub-Frames 4, 9,	Bits	0	0
For Sub-Frame 5 (Note 7)	Bits	424	424
For Sub-Frame 0 (Note 7)		648	648
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0
For Sub-Frame 1, 6	Bits		
Number of Code Blocks per Sub-Frame			
(Note 5)			
For Sub-Frames 4, 9		1	1
For Sub-Frame 5		1	1
For Sub-Frame 0		1	1
For Sub-Frame 1, 2, 3, 6, 7, 8		1	1
Binary Channel Bits Per Sub-Frame			
For Sub-Frames 4, 9	Bits	0	0
For Sub-Frame 5	Bits	6336	6048
For Sub-Frame 0	Bits	5784	5520
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0
Max. Throughput averaged over 1 frame	kbps		

- Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5 MHz channel BW.
- Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].
- Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].
- Note 4: Allocation is located in the middle of bandwidth.
- Note 5: If more than one Code Block is present, an additional CRC sequence of L=24 Bits is attached to each Code Block (otherwise L=0 Bit)
- Note 6: PDSCH allocation applies only to subframes not configured as PRS subframes.
- Note 7: Sub-frame 0 or sub-frame 5 is randomly scheduled in downlink.

## A.3.1.1.5 TDD for UE category 0

Table A.3.1.1.5-1: PDSCH Reference Measurement Channels for TDD UL/DL configuration1

Parameter	Unit	Va	lue
Reference channel		R.12 TDD	R.13 TDD
Channel bandwidth	MHz	10	10
Number of transmitter antennas		1	2
Allocated resource blocks (Note 4)		24	24
Uplink-Downlink Configuration (Note 5)		1	1
Special Subframe Configuration (Note 6)		6	6
Allocated subframes per Radio Frame		6	6
Modulation		QPSK	QPSK
Target Coding Rate		1/10	1/10
Information Bit Payload			
For Sub-Frames 4,9	Bits	648	648
For Sub-Frame 5	Bits	648	648
For Sub-Frame 0	Bits	648	648
For Sub-Frame 1, 6 (DwPTS)	Bits	488	488
Number of Code Blocks per Sub-Frame		1	1
(Note 7)			
For Sub-Frames 4,9		1	1
For Sub-Frame 5		1	1
For Sub-Frame 0		1	1
For Sub-Frame 1, 6 (DwPTS)		1	1
Binary Channel Bits Per Sub-Frame			
For Sub-Frames 4,9	Bits	6624	6336
For Sub-Frame 5	Bits	6580	6192
For Sub-Frame 0	Bits	5928	5664
For Sub-Frame 1, 6 (DwPTS)	Bits	3696	3408
Max. Throughput averaged over 1 frame	Mbps	0.3552	0.3552

- Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
- Note 2: Reference signal, synchronization signals and PBCH allocated as defined in TS 36.211 [16].
- Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in TS 36.213 [3].
- Note 4: Allocation is located in the middle of bandwidth.
- Note 5: As per Table 4.2-2 in TS 36.211 [16]
- Note 6: As per Table 4.2-1 in TS 36.211 [16]
- Note 7: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
- Note 8: PDSCH allocation applies only to subframes not configured as PRS subframes.

## A.3.1.2 PCFICH/PDCCH/PHICH

#### A.3.1.2.1 FDD

Table A.3.1.2.1-1: PCFICH/PDCCH/PHICH Reference Channel for FDD

Parameter	Unit	Value							
Reference channel		R.8 FDD	R.11	R.12	R.10	R.13	R.6	R.7	R.9
			FDD						
Channel bandwidth	MHz	1.4	5	5	20	20	10	10	10
Number of transmitter antennas		1	1	2	1	2	1	2	2
Control region OFDM symbols Note1	symbols	4	3	3	2	2	2	2	3
Aggregation level	CCE	2	8	8	8	8	8	8	8
		(Note 6)							
DCI Format		Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
Cell ID		Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Payload (without CRC)	Bits	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5

Note 1: The control region consists of PCFICH, PHICH and PDCCH.

Note 2: DCI formats are defined in TS 36.212.

Note 3: DCI format shall depend upon the test configuration.

Note 4: Cell ID shall depend upon the test configuration.

Note 5: Payload size shall depend upon the test configuration.

Note 6: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.

## A.3.1.2.2TDD

Table A.3.1.2.2-1: PCFICH/PDCCH/PHICH Reference Channel for TDD

Parameter	Unit	Value							
Reference channel		R.8	R.11	R.12	R.10	R.13	R.6	R.7	R.9
		TDD	TDD	TDD	TDD	TDD	TDD	TDD	TDD
Channel bandwidth	MHz	1.4	5	5	20	20	10	10	10
Number of transmitter antennas		1	1	2	1	2	1	2	2
Control region OFDM symbols Note1	symbols	4	3	3	2	2	2	2	3
		(Note 6)							
Aggregation level	CCE	2	8	8	8	8	8	8	8
		(Note 7)							
DCI Format		Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
Cell ID		Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Payload (without CRC)	Bits	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5

Note 1: The control region consists of PCFICH, PHICH and PDCCH.

Note 2: DCI formats are defined in TS 36.212.

Note 3: DCI format shall depend upon the test configuration.

Note 4: Cell ID shall depend upon the test configuration.

Note 5: Payload size shall depend upon the test configuration.

Note 6: Only 2 OFDM symbols for special subframes 1 and 6.

Note 7: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.

#### A.3.1.2.3 HD-FDD for UE category 0

Table A.3.1.2.3-1: PCFICH/PDCCH/PHICH Reference Channel for HD-FDD

Parameter	Unit	Value					
Reference channel		R.3 HD-FDD	R.4 HD-FDD	R.5 HD-FDD			
Channel bandwidth	MHz	10	10	10			
Number of transmitter antennas		1	2	2			
Control region OFDM symbols Note1	symbols	2	2	3			
Aggregation level	CCE	8	8	8			
DCI Format		Note 3	Note 3	Note 3			
Cell ID		Note 4	Note 4	Note 4			
Payload (without CRC)	Bits	Note 5	Note 5	Note 5			

Note 1: The control region consists of PCFICH, PHICH and PDCCH.

Note 2: DCI formats are defined in TS 36.212.

Note 3: DCI format shall depend upon the test configuration.

Note 4: Cell ID shall depend upon the test configuration.

Note 5: Payload size shall depend upon the test configuration.

Note 6: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.

Note 7: Sub-frame 0 or sub-frame 5 is randomly scheduled in downlink.

# A.3.2 OFDMA Channel Noise Generator (OCNG)

#### A.3.2.1 OCNG Patterns for FDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test) and/or allocations used for MBSFN. The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG\_RA and OCNG\_RB which together with a relative power level ( $\gamma$ ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols without and with reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i RA/OCNG RA = PDSCH_i RB/OCNG RB,$$

where  $\gamma_i$  denotes the relative power level of the *i:th* virtual UE. The parameter settings of OCNG\_RA, OCNG\_RB, and the set of relative power levels  $\gamma$  are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a constant transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. The number of PDCCH OFDM symbols in the non-MBSFN subframes is the same as specified in the RMC used in the test. The number of PDCCH OFDM symbols in the MBSFN subframe is the maximal allowed according to TS 36.213 [16]. For any aggregation and PHICH allocation, the PDCCH and any unused PHICH groups are padded with resource element groups with a power level given by PDCCH\_RA/RB and PHICH\_RA/RB as specified in the test case such that a total power spectral density in the control region that is constant on an OFDM symbol basis is targeted.

For subframes configured as PRS subframes the PDSCH allocation defined in the OCNG pattern does not apply.

For subframes configured as ABS subframes the PDSCH and PMCH allocation defined in the OCNG pattern does not apply.

The system information is scheduled in the allocations reserved for the OCNG patterns, in the subframes not configured for MBSFN. For this purpose the number of the RB-s allocated with PDSCH defined in the OCNG pattern can be reduced as necessary.

# A.3.2.1.1 OCNG FDD pattern 1: outer resource blocks allocation in 10 MHz

Table A.3.2.1.1-1: OP.1 FDD: OCNG FDD Pattern 1

Allocation	Relative power level $\gamma_{\it PRB}$ [dB]					PMCH Data
$n_{\it PRB}$		Subframe				
	0	5	4,9	1-3, 6-8		
0 – 12	0	0	0	N/A	Note 1	N/A
37 – 49	0	0	0	N/A	INOLE I	14/74
0-49	N/A	N/A	N/A	Note 4	N/A	Note 2

- Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter  $\gamma_{PRB}$  is used to scale the power of PMCH.
- Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
- Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

## A.3.2.1.2 OCNG FDD pattern 2: full bandwidth allocation in 10 MHz

Table A.3.2.1.2-1: OP.2 FDD: OCNG FDD Pattern 2

Allocation	Re	Relative power level $\gamma_{\it PRB}$ [dB]				
$n_{PRB}$		Data	Data			
	0	5	4, 9	1 – 3, 6 – 8		

0 – 49	0	0	0	N/A	Note 1	N/A
0 – 49	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter  $\gamma_{PRB}$  is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

#### A.3.2.1.3 OCNG FDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.1.3-1: OP.3 FDD: OCNG FDD Pattern 3

Allocation	Allocation Relative power level $\gamma_{PRB}$ [dB]					
$n_{\it PRB}$		Subframe				
	0	5	4,9	1-3, 6-8		
0 – 1	0	0	0	N/A	Note 1	N/A
4 – 5	0	0	0	N/A	Note	IN/A
			-			
0 – 5	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRR}$  is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter  $\gamma_{PRB}$  is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

## A.3.2.1.4 OCNG FDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.1.4-1: OP.4 FDD: OCNG FDD Pattern 4

Allocation	Re	lative power I	evel $\gamma_{\it PRB}$ [d	B]	PDSCH Data	PMCH Data
$n_{\it PRB}$		Subframe				
	0	5	4, 9	1 – 3, 6 – 8		
0 – 5	0	0	0	N/A	Note 1	N/A
0 – 5	N/A	N/A	N/A	Note 4	N/A	Note 2

- Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter  $\gamma_{PRB}$  is used to scale the power of PMCH.
- Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
- Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

PDSCH

N/A:

Allocation

Not Applicable

#### A.3.2.1.5 OCNG FDD pattern 5: outer resource blocks allocation in 10 MHz (without MBSFN)

Table A.3.2.1.5-1: OP.5 FDD: OCNG FDD Pattern 5

Alloc		Re	Relative power level $\gamma_{\it PRB}$ [dB]					
$n_{P}$	'RB		Subframe	(Note 1)		Data		
		0	5	4,9	1-3, 6-8			
0 –	12	0	0 0 0 N/A					
37 -	- 49	0	0	0	N/A	Note 2		
0 –	49	N/A	N/A	N/A	0			
Note 1: Note 2:	The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.  These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is							
Note 3:	PDSCH If two or part of C antenna	QPSK modulated. The parameter $\gamma_{PRB}$ is used to scale the power of PDSCH. If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2.						
	transmit transmit	ameter $\gamma_{PRB}$ appower of the Pantennas with are specified in	DSCH part of CRS used in tl	OCNG is equa	ıl between all t	he		

#### OCNG FDD pattern 6: full bandwidth allocation in 10 MHz (without MBSFN) A.3.2.1.6

Table A.3.2.1.6-1: OP.6 FDD: OCNG FDD Pattern 6

Alloc	ation	Re	Relative power level $\gamma_{\it PRB}$ [dB]							
$n_P$	RB		Subframe	(Note 1)		Data				
		0	5	4, 9	1 - 3, 6 - 8					
0 – 49		0	0	0	0	Note 2				
Note 1:		cation of any PI			pplies only to	the				
Note 2:		es not configure			arbitrary numb	or of				
Note 2.		hysical resource Es with one PD								
		PDSCHs shall b								
	QPSK m	nodulated. The	parameter $\gamma_{_I}$	$c_{RB}$ is used to $s$	scale the powe	er of				
	PDSCH.									
Note 3:	If two or	more transmit	antennas with	CRS are used	I in the test, the	е				
		part of OCNG			•					
	transmit	antennas with	CRS and acco	ording to the ar	ntenna transmi	ssion				
	mode 2.	The parameter	$\gamma_{\it PRB}$ applies	to each anten	na port separa	ately, so				
		smit power of th								
		antennas with			ntenna transmi	ssion				
NI/A.		are specified in	clause 7.1 in T	S 36.213.						
N/A:	Not App	licable								

**PDSCH** 

Data

(1-3, 6-8)<sup>Note</sup>

Allocation

 $n_{PRB}$ 

N/A:

Not Applicable

# A.3.2.1.7 OCNG FDD pattern 7: full bandwidth allocation in 1.4 MHz (without MBSFN)

Table A.3.2.1.8-1: OP.7 FDD: OCNG FDD Pattern 7

Alloc	ation	Re	B]	PDSCH Data				
$n_P$	'RB		Dutu					
		0	5	4, 9	1 - 3, 6 - 8			
		_			_			
0 -		0	0	0	0	Note 2		
Note 1:	subfram	e allocation of any PDSCH with or without SIB1 applies only to the frames not configured as PRS subframes.						
Note 2:	virtual Ü	e physical resource blocks are assigned to an arbitrary number of I UEs with one PDSCH per virtual UE; the data transmitted over the G PDSCHs shall be uncorrelated pseudo random data, which is						
	QPSK m	nodulated. The p	parameter $\gamma_{\scriptscriptstyle F}$	$_{ m PRB}$ is used to ${ m s}$	scale the powe	er of		
Note 3:	PDSCH	· IND						
	mode 2.	The parameter	$\gamma_{\it PRB}$ applies	to each anten	na port separa	ately, so		
N/A:	transmit	smit power of the antennas with the are specified in the licable	CRS used in the	ne test. The ar				

# A.3.2.1.8 OCNG FDD pattern 8: outer resource blocks allocation in 10 MHz for MBSFN ABS

Table A.3.2.1.8-1: OP.8 FDD: OCNG FDD Pattern 8

Relative power level  $\gamma_{PRB}$  [dB]

Subframe (Note 1)

0 -	12	0	0	0	N/A		
37 –	- 49	0	0	0	N/A	Note 2	
0 -	49	N/A	N/A	N/A	0		
Note 1: Note 2:	subframes.  Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the						
Note 3:	QPSK m PDSCH. If two or part of C	OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter $\gamma_{PRB}$ is used to scale the power of PDSCH. If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2.					
Note 4:	transmit transmit modes a The sub PMCH o slot. The	power of the antennas with are specified if frame(s) conflata and shall e subframe(s)	PDSCH part of h CRS used in clause 7.1 in igured as MBS contain CRS of	of OCNG is ender the test. The state of TS 36.213. SFN ABS in a conly in the firm MBSFN ABS	ort separately, so to qual between all to a antenna transmi a test shall not con st symbol of the fi S depend upon the	he ission ntain any rst time	

#### OCNG FDD pattern 9: full bandwidth allocation in 10 MHz for MBSFN ABS A.3.2.1.9

Table A.3.2.1.9-1: OP.9 FDD: OCNG FDD Pattern 9

Alloc	ation	R	elative pow	er level $\gamma_{\it PRB}$	[dB]	PDSCH Data		
$n_P$	RB		Subfra	me (Note 1)		Data		
		0	5	4, 9	(1-3, 6-8) <sup>Note4</sup>			
0 –	49	0	0	0	0	Note 2		
Note 1:	PDSCH allocation applies only to subframes not configured as PRS subframes.							
Note 2:	These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is							
	QPSK m	nodulated. The	e parameter	$\gamma_{\it PRB}$ is used t	o scale the powe	r of		
Note 3:	PDSCH	RPSK modulated. The parameter $\gamma_{PRB}$ is used to scale the power of PDSCH. two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the ransmit antennas with CRS and according to the antenna transmission						
	mode 2.	The paramete	er $\gamma_{_{PRB}}$ appl	ies to each an	tenna port separa	ately, so		
Note 4:	transmit modes a The sub PMCH o slot. The MBSFN	and 2. The parameter $\gamma_{PRB}$ applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the ansmit antennas with CRS used in the test. The antenna transmission odes are specified in clause 7.1 in TS 36.213. The subframe(s) configured as MBSFN ABS in a test shall not contain any MCH data and shall contain CRS only in the first symbol of the first time of the subframe(s) configured as MBSFN ABS depend upon the BSFN ABS pattern used in the test.						
N/A:	Not App	licable						

#### OCNG FDD pattern 10: outer resource blocks allocation in 10 MHz with user A.3.2.1.10 data in every subframe (without MBSFN)

Table A.3.2.1.10-1: OP.10 FDD: OCNG FDD Pattern 10

Allocation	on	Rel	ative power le	evel $\gamma_{{\scriptscriptstyle PRB}}$ [dE	3]	PDSCH Data		
$n_{PRB}$			Subframe	(Note 1)				
		0	5	4, 9	1 - 3, 6 - 8			
0 - 12		0	0	0	0	Note 2		
37 - 49	)	0	0	0	0	NOIG Z		
Note 1:	The	allocation of a	ny PDSCH wit	h or without S	IB1 applies on	ly to the subframes		
		configured as F						
Note 2:						number of virtual		
		s with one PDS						
	PD	SCHs shall be เ	uncorrelated p	seudo random	ı data, which is	QPSK modulated.		
Note 3:	If tv		smit antennas	with CRS are	used in the tes	st, the PDSCH part		
						. The parameter		
	PD: in tl	applies to each antenna port separately, so the transmit power of the DSCH part of OCNG is equal between all the transmit antennas with CRS used the test. The antenna transmission modes are specified in section 7.1 in 3GPP 36.213.						
N/A:	Not	Applicable						

### A.3.2.1.11 OCNG FDD pattern 11: outer resource blocks allocation in 20 MHz

Table A.3.2.1.11-1: OP.11 FDD: OCNG FDD Pattern 11

Allocation	Re	lative power l	B]	PDSCH Data	PMCH Data	
$n_{\it PRB}$		Subfr		Data	Data	
	0	5	4,9	1-3, 6-8		
0 – 37	0	0	0	N/A	Note 1	N/A
62 – 99	0	0	0	N/A	NOIG 1	IN/A
0-99	N/A	N/A	N/A	Note 4	N/A	Note 2

- Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter  $\gamma_{PRB}$  is used to scale the power of PMCH.
- Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
- Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS N/A: Not Applicable

Note 4:

Not Applicable

N/A:

# A.3.2.1.12 OCNG FDD pattern 12: full bandwidth allocation in 20 MHz

Table A.3.2.1.12-1: OP.12 FDD: OCNG FDD Pattern 12

Alloc		Re	lative power l	evel $\gamma_{\it PRB}$ [d	B]	PDSCH Data	PMCH Data	
$n_{P}$	PRB		Subfi	ame		Data	Data	
		0	5	4, 9	1 - 3, 6 - 8			
0 –	99	0	0	0	N/A	Note 1	N/A	
0 -	99	N/A	N/A	N/A Note 4 N/A Note				
Note 1:	with one be unco	These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter						
Note 2:	Each ph each PR measure	used to scale the specifical resource RB shall be uncomment. The MBS cell-specific Ref	block (PRB) is orrelated with o SFN data shal	s assigned to I data in other P I be QPSK mo	RBs over the publicated. PMCI	period of and subframe	ny es shall	
Note 3:	The parameter $\gamma_{PRB}$ is used to scale the power of PMCH.  If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS							
	and acc	ording to the an	tenna transmi	ssion mode 2.	The paramete	er $\gamma_{_{PRB}}$ app	olies to	
	equal be	tenna port sepa etween all the tr ssion modes are	ansmit antenn	as with CRS u	sed in the test	. The anter		

0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

PDSCH

N/A:

Allocation

Not Applicable

#### OCNG FDD pattern 13: outer resource blocks allocation in 20 MHz (without A.3.2.1.13 MBSFN)

Table A.3.2.1.13-1: OP.13 FDD: OCNG FDD Pattern 13

Alloc		Re	Relative power level $\gamma_{PRB}$ [dB]						
$n_P$	RB		Subframe	(Note 1)		Data			
		0	5	4,9	1-3, 6-8				
0 –	37	0	0 0 N/A		N/A				
62 –	- 99	0	0	0	N/A	Note 2			
0 –	99	N/A	N/A	N/A	0				
Note 1: Note 2:	subframes not configured as PRS subframes.								
Note 3:	If two or PDSCH transmit	PDSCH.  If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission							
	the trans transmit	The parameter smit power of the antennas with are specified in	ne PDSCH par CRS used in tl	t of OCNG is e he test. The ar	equal between ntenna transmi	all the			

#### OCNG FDD pattern 14: full bandwidth allocation in 20 MHz (without MBSFN) A.3.2.1.14

Table A.3.2.1.14-1: OP.14 FDD: OCNG FDD Pattern 14

Alloca		Re	B]	PDSCH Data				
$n_{P}$	RB		Subframe	(Note 1)		Data		
		0	5	4, 9	1 - 3, 6 - 8			
0 - 99 0 0 0				0	Note 2			
Note 1:		cation of any PI			pplies only to	the		
Note 2:	These p virtual U	ubframes not configured as PRS subframes. hese physical resource blocks are assigned to an arbitrary number of irtual UEs with one PDSCH per virtual UE; the data transmitted over the DCNG PDSCHs shall be uncorrelated pseudo random data, which is						
	QPSK m	nodulated. The	parameter $\gamma_{\scriptscriptstyle I}$	$c_{RB}$ is used to $s$	scale the powe	r of		
Note 3:	PDSCH	more transmit a part of OCNG s antennas with	shall be transn	nitted to the vir	tual users by a	all the		
	mode 2.	The parameter	$\gamma_{\it PRB}$ applies	to each anten	na port separa	ately, so		
N/A:	transmit	smit power of the antennas with are specified in s licable	CRS used in tl	ne test. The ar	ntenna transmi			

#### A.3.2.1.15 OCNG FDD pattern 15: outer resource blocks allocation in 5 MHz

Table A.3.2.1.15-1: OP.15 FDD: OCNG FDD Pattern 15

Allocation	Re	lative power I	B]	PDSCH Data	PMCH Data	
$n_{\it PRB}$		Subfr		Data	Data	
	0	5	4,9	1-3, 6-8		
0 – 6	0	0	0	N/A	Note 1	N/A
18 – 24	0	0	0	N/A	Note	IN/A
0-24	N/A	N/A	N/A	Note 4	N/A	Note 2

- Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter  $\gamma_{PRB}$  is used to scale the power of PMCH.
- Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
- Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

#### A.3.2.1.16 OCNG FDD pattern 16: full bandwidth allocation in 5 MHz

Table A.3.2.1.16-1: OP.16 FDD: OCNG FDD Pattern 16

Allocation	Re	PDSCH Data	PMCH Data				
$n_{\it PRB}$		Subframe					
	0	5	4, 9	1 - 3, 6 - 8			

0 –	24	0	0	0	N/A	Note 1	N/A	
0 –	24	N/A	N/A	N/A	Note 4	N/A	Note 2	
Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter $\gamma_{PRB}$ is used to scale the power of PDSCH.								
Note 2:	2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot.							
Note 3:	The parameter $\gamma_{PRB}$ is used to scale the power of PMCH. If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter $\gamma_{PRB}$ applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna							
Note 4:		ssion modes are 1 transmit anter					3	

A.3.2.1.17 OCNG FDD pattern 17: outer resource blocks allocation in 20 MHz with user data in every subframe (without MBSFN)

Table A.3.2.1.17-1: OP.17 FDD: OCNG FDD Pattern 17

	Allocation Relat			evel $\gamma_{\it PRB}$ [dE	PDSCH Data			
$n_{{\scriptscriptstyle PRB}}$			Subframe	(Note 1)				
		0	5	4, 9	1 - 3, 6 - 8			
0 - 37		0	0	0	0	Note 2		
62 - 99		0	0	0	0	Note 2		
Note 1:	The	allocation of a	ny PDSCH wit	h or without S	IB1 applies on	ly to the subframes		
		configured as F						
Note 2:	Note 2: These physical resource blocks are assigned to an arbitrary number of virtual							
	UEs with one PDSCH per virtual UE; the data transmitted over the OCNG							
	PD	SCHs shall be u	uncorrelated p	seudo random	data, which is	s QPSK modulated.		

The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter

 $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

N/A: Not Applicable.

N/A: Not Applicable

PDSCH

#### A.3.2.1.18 OCNG FDD pattern 18: outer resource blocks allocation in 5 MHz (without MBSFN)

Table A.3.2.1.18-1: OP.18 FDD: OCNG FDD Pattern 18

Alloc	ation	Re	lative power I	evel $\gamma_{\it PRB}$ [d	B]	PDSCH Data		
$n_P$	'RB		Subframe	(Note 1)		Data		
		0	5	4,9	1-3, 6-8			
0 – 6		0 0 N/A						
18 -	- 24	0	0	0	N/A	Note 2		
0 -	24	N/A	N/A	N/A	0			
Note 1: Note 2:	subfram These p virtual U OCNG F	cation of any Places not configure hysical resource IEs with one PD PDSCHs shall b	ed as PRS sub e blocks are as SCH per virtus se uncorrelated	oframes. ssigned to an a al UE; the data d pseudo rando	arbitrary numb a transmitted o om data, which	er of over the n is		
Note 3:	PDSCH If two or PDSCH transmit	QPSK modulated. The parameter $\gamma_{PRB}$ is used to scale the power of PDSCH.  If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission						
	the trans transmit	The parameter smit power of the antennas with are specified in	ie PDSCH par CRS used in tl	t of OCNG is $\epsilon$ he test. The ar	equal between ntenna transmi	all the		

#### OCNG FDD pattern 19: full bandwidth allocation in 5 MHz (without MBSFN) A.3.2.1.19

Not Applicable

N/A:

Allocation

Table A.3.2.1.19-1: OP.19 FDD: OCNG FDD Pattern 19

Alloc		Relative power level $\gamma_{PRB}$ [dB] Subframe (Note 1)					
$n_P$	RB		Data				
		0	5	4, 9	1 - 3, 6 - 8		
0 –	24	0	0	0	0	Note 2	
Note 1:							
Note 2:	subframes not configured as PRS subframes.  These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is						
		nodulated. The	parameter $\gamma_{\scriptscriptstyle I}$	$ ho_{RB}$ is used to $s$	scale the powe	er of	
Note 3:	PDSCH.  If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission						
	mode 2.	The parameter	$\gamma_{\it PRB}$ applies	to each anten	na port separa	ately, so	
	the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.						
N/A:	Not App	licable					

# A.3.2.1.20 OCNG FDD pattern 20: outer resource blocks allocation in 5 MHz with user data in every subframe (without MBSFN)

Table A.3.2.1.20-1: OP.20 FDD: OCNG FDD Pattern 20

Allocation		Rel	3]	PDSCH Data					
$n_{PRB}$			Subframe	(Note 1)					
		0	5	4, 9	1 - 3, 6 - 8				
0 - 6		0	0	0	0	Note 2			
18 - 24		0	0	0	0	Note 2			
Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.									
Note 2:	UE	These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.							
Note 3:	The parameter $\gamma_{PRB}$ is used to scale the power of PDSCH.  If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter								
$\gamma_{PRB}$ applies to each antenna port separately, so the transmer PDSCH part of OCNG is equal between all the transmit anter in the test. The antenna transmission modes are specified in TS 36.213.					nnas with CRS used				
N/A:	Not	t Applicable.							

#### A.3.2.2 OCNG Patterns for TDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test). The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG\_RA and OCNG\_RB which together with a relative power level ( $\gamma$ ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols without and with reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i RA/OCNG RA = PDSCH_i RB/OCNG RB,$$

where  $\gamma_i$  denotes the relative power level of the *i:th* virtual UE. The parameter settings of OCNG\_RA, OCNG\_RB, and the set of relative power levels  $\gamma$  are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. The number of PDCCH OFDM symbols in the non-MBSFN subframes is the same as specified in the RMC used in the test. The number of PDCCH OFDM symbols in the MBSFN subframe is the maximal allowed according to TS 36.213 [16]. For any aggregation and PHICH allocation, the PDCCH and any unused PHICH groups are padded with resource element groups with a power level given by PDCCH\_RA/RB and PHICH\_RA/RB as specified in the test case such that a total power spectral density in the control region that is constant on an OFDM symbol basis is targeted.

For subframes configured as PRS subframes the PDSCH allocation defined in the OCNG pattern does not apply.

For subframes configured as ABS subframes the PDSCH and PMCH allocation defined in the OCNG pattern does not apply.

The system information is scheduled in the allocations reserved for the OCNG patterns, in the subframes not configured for MBSFN. For this purpose the number of the RB-s allocated with PDSCH defined in the OCNG pattern can be reduced as necessary.

#### A.3.2.2.1 OCNG TDD pattern 1: outer resource blocks allocation in 10 MHz

Table A.3.2.2.1-1: OP.1 TDD: OCNG TDD Pattern 1 for 5ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]						
$n_{\it PRB}$		Subframe (Note 1)						
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe)				
0 – 12	0	0	0	Table	Nete 0			
37 – 49	0	0	0	A.3.2.2.1-2	Note 2			

- Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in TS 36.211 [16].
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Table A.3.2.2.1-2: OP.1 TDD: OCNG TDD Pattern 1 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation	Relative power level $\gamma_{PRB}$ [dB]								
$n_{\it PRB}$	Special subframe configuration								
	0	1	2	3	4	5	6	7	8
	Control region OFDM symbols								
	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2
0 – 12	0	0	_	_	_	0	0	0	0
0 – 12	U	U	U	U	U	U	U	><	$\times$
37 – 49	0	0	_	_	_	0	_	0	0
31 – 49	U	U	U	U	U	U	U	><	$>\!\!<$
Note 1: Special su	Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].								

#### A.3.2.2.2 OCNG TDD pattern 2: full bandwidth allocation in 10 MHz

Table A.3.2.2.2-1: OP.2 TDD: OCNG TDD Pattern 2 for 5ms downlink-to-uplink switch-point periodicity

Allocation		PDSCH Data			
$n_{{\scriptscriptstyle PRB}}$					
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) <sup>Note 3</sup>	1 and 6 (as special subframe) Note 3	

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(	) – 49	Note 2						
Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.								
Note 2:	Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK							
	modulated. The parameter $\gamma_{\scriptscriptstyle PRR}$ is used to scale the power of PDSCH.							
Note 3:	· 110							
Note 4:	If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The							
	parameter $\gamma_{PRB}$ applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in							

#### A.3.2.2.3 OCNG TDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.2.3-1: OP.3 TDD: OCNG TDD Pattern 3 for 5 ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]				
$n_{\it PRB}$						
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe)		
0 – 1	0	0	0	0		
4 – 5	0	0	0	0	Note 2	

- Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRR}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in TS 36.211 [16].
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

#### A.3.2.2.4 OCNG TDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.2.4-1: OP.4 TDD: OCNG TDD Pattern 4 for 5 ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]						
$n_{\it PRB}$								
	0	5	3 , 4, 8, 9 and 6 (as normal subframe)	1 and 6 (as special subframe)				

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,	0 – 5	0	0	0	0	Note 2			
Note 1:	Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.								
Note 2:									
	modulated.The parameter $\gamma_{_{PRB}}$ is used to scale the power of PDSCH.								
Note 3:	Subframes at 36.211 [16].	vailable for DL trar	nsmission depends on	the Uplink-Downlink co	onfiguration in Ta	ble 4.2-2 in TS			
Note 4:	• •								
	parameter $\gamma_{PRB}$ applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in								

# A.3.2.2.5 OCNG TDD pattern 5: outer resource blocks allocation in 10 MHz for MBSFN ABS

Table A.3.2.2.5-1: OP.5 TDD: OCNG TDD Pattern 5 for 5ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]						
$n_{\it PRB}$		Subframe (	Note 1)					
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe)				
0 – 12	0	0	0	Table	Nata 0			
37 – 49	0	0	0	A.3.2.2.1-2	Note 2			

- Note 1: PDSCH allocation does not apply to subframes configured as PRS subframes.
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in TS 36.211 [16]. Any of the subframes 3, 4, 8 and 9 configured as MBSFN ABS in a test shall not contain any PMCH data and shall contain CRS only in the first symbol of the first time slot. The subframe(s) configured as MBSFN ABS depend upon the MBSFN ABS pattern used in the test.
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Table A.3.2.2.5-2: OP.5 TDD: OCNG TDD Pattern 5 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{{\scriptscriptstyle PRB}}$ [dB]									
$n_{\it PRB}$			Sı	oecial sub	frame cor	nfiguration	1				
	0	0 1 2			4	5	6	7	8		
		Control region OFDM symbols									
	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2		
0 – 12	0	0	0	0	0	0	0	0	0		
0 - 12	U	U	U	U	U	U	U	><	><		
37 – 49	0	0	0	0	0	0	0	0	0		
37 - 49	0	0	U	0	U	0	0	><			
Note 1: Special	subframe of	configuration	ns are defir	ned in Tab	le 4.2-1 in	TS 36.211	[16].				

#### A.3.2.2.6 OCNG TDD pattern 6: full bandwidth allocation in 10 MHz for MBSFN ABS

Table A.3.2.2.6-1: OP.6 TDD: OCNG TDD Pattern 6 for 5ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{{\scriptscriptstyle PRB}}$ [dB]						
$n_{PRB}$		Subframe (Note 1)						
	0	5						
0 – 49	0	0	0	0	Note 2			

- Note 1: PDSCH allocation does not apply to subframes configured as PRS subframes.
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRR}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in TS 36.211 [16]. Any of the subframes 3, 4, 8 and 9 configured as MBSFN ABS in a test shall not contain any PMCH data and shall contain CRS only in the first symbol of the first time slot. The subframe(s) configured as MBSFN ABS depend upon the MBSFN ABS pattern used in the test.
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

#### A.3.2.2.7 OCNG TDD pattern 7: outer resource blocks allocation in 20 MHz

Table A.3.2.2.7-1: OP.7 TDD: OCNG TDD Pattern 7 for 5ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]						
$n_{\it PRB}$		Subframe (Note 1)						
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe)				
0 – 37	0	0	0	Table				
62 – 99	0	0	0	A.3.2.1.7-2	Note 2			

- Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [16].
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table A.3.2.2.7-2: OP.7 TDD: OCNG TDD Pattern 7 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation	£		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]																
$n_{\it PRB}$	length		Special subframe configuration																
	1	(	)		1		2		3		4	,	5	0	6	-	7		3
	S		Control region OFDM symbols																
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 37	N		<b>1</b>		<b>1</b>		Λ		0		0		Λ		n	(	)	(	)
0 – 37		,	,	,	J		U		U		U	'	U	'	0	>	<	$\bigwedge$	<
62 – 99	N	,	1		)		Λ		Ω		0	١.,	Λ	١ ،	n	(	)	(	)
02 - 99		,	J	<u>'</u>	J		U		U		U	<u> </u>	U	<u>'</u>	J	$\wedge$	<	$\wedge$	<
Note 1: Special	subfram	e con	nfigura	ations	are o	define	d in Ta	able	4.2-1	in TS	36.2	11 [16	6].						

#### A.3.2.2.8 OCNG TDD pattern 8: full bandwidth allocation in 20 MHz

Table A.3.2.2.8-1: OP.8 TDD: OCNG TDD Pattern 8 for 5ms downlink-to-uplink switch-point periodicity

Allocation		Relative power level $\gamma_{\scriptscriptstyle PRB}$ [dB]						
$n_{PRB}$		Subframe (Note 1)						
	0	5	5 3 , 4, 8, 9 and 6 (as 1 and 6 (as normal subframe) subframe) Note 3 subframe)					
0 – 99	0	0	0	0	Note 2			

- Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [16].
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

#### A.3.2.2.9 OCNG TDD pattern 9: outer resource blocks allocation in 5 MHz

Table A.3.2.2.9-1: OP.9 TDD: OCNG TDD Pattern 9 for 5ms downlink-to-uplink switch-point periodicity

Allocation		]	PDSCH Data		
$n_{PRB}$		Data			
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	
0 – 6	0	0	0	Table A.3.2.1.7-	Nata O
18 – 24	0	0	0	2	Note 2

- Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
- Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter  $\gamma_{PRB}$  is used to scale the power of PDSCH.
- Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [16].
- Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table A.3.2.2.9-2: OP.9 TDD: OCNG TDD Pattern 9 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation	£		Relative power level $\gamma_{PRB}$ [dB]							
$n_{\it PRB}$	length		Special subframe configuration							
	<u>a</u>	0	1	2	3	4	5	6	7	8
	G G		Control region OFDM symbols							
		1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2
0 – 6	N	0	0	0	0	0	0	0	0	0
0 – 0		0	O	O	O	U	U	0	> <	> <
18 – 24	N	0	0	_	0	0	0	0	0	0
10 - 24		O	U	U	U	U	U	0	$\nearrow$	$>\!\!<$
Note 1: Special	subfram	Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].								

### A.3.2.2.10 OCNG TDD pattern 10: full bandwidth allocation in 5 MHz

Table A.3.2.2.10-1: OP.10 TDD: OCNG TDD Pattern 10 for 5ms downlink-to-uplink switch-point periodicity

	Allocation Relative power level $\gamma_{PRB}$ [dB]							
$n_{\it PRB}$	**************************************							
	0	5 3 , 4, 8, 9 and 6 ( normal subframe) <sup>Note 3</sup>		1 and 6 (as special subframe)				
0 – 24			0	0	Note 2			
Note 1: Note 2:	configured as PR These physical re	S subframes. source blocks are	or without SIB1 applies or assigned to an arbitrar nsmitted over the OCNO	y number of virtual UE	Es with one			
	pseudo random data, which is QPSK modulated. The parameter $\gamma_{_{PRR}}$ is used to scale the							
Note 3:		- 1 ND						

Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter  $\gamma_{PRB}$  applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The

antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

# A.3.3 Reference DRX Configurations

Table A.3.3-1: Reference DRX Configurations

Parameter	Va	lue	Comments				
Reference configuration	DRX_S	DRX_L	As defined in 4.8.2.1.5 in TS 36.508				
onDurationTimer	psf2	psf6					
drx-InactivityTimer	psf100	psf1920					
drx-RetransmissionTimer	psf16	psf16					
longDRX-CycleStartOffset	sf40, 0	sf1280, 0					
shortDRX	disabled	disabled					
Note: For further information see clause 6.3.2 in TS 36.331.							

# A.3.4 ABS Transmission Configurations

# A.3.4.1 Non-MBSFN ABS Transmission Configurations

#### A.3.4.1.1 Non-MBSFN ABS Transmission, 1x2 antenna with PBCH

Table A.3.4.1.1-1: Transmission configuration with non-MBSFN ABS, 1x2 with PBCH

Physical	Parameters	EPRE	E, [dB]
Channels and Signals		Non-ABS	ABS
PBCH	PBCH_RA	0	0
FBCIT	PBCH_RB	0	0
PSS	PSS_RA	0	0
SSS	SSS_RA	0	0
PCFICH	PCFICH_RB	0	0 Note 1
PHICH	PHICH_RA	0	-Inf
FILCH	PHICH_RB	0	-Inf
PDCCH	PDCCH_RA	0	0 Note 1
РЬССП	PDCCH_RB	0	0 Note 1
PDSCH	PDSCH_RA	0	0 Note 1
РИЗСП	PDSCH_RB	0	0 Note 1
OCNG	OCNG_RA	0	-Inf
OCNG	OCNG_RB	0	-Inf
NOTE 1: Only used	for SIB1, otherwis	e EPRE is -In	ıf

NOTE 1: Only used for SIB1, otherwise EPRE is –Inf NOTE 2: 1x2 antenna configuration is assumed

## A.3.4.1.2 Non-MBSFN ABS Transmission, 2x2 antenna without PBCH

Table A.3.4.1.2-1: Transmission configuration #1 with non-MBSFN ABS, 2x2 without PBCH

Physica		EPRI	E, [dB]
Channels Signals		Non-ABS	ABS
PBCH	PBCH_RA	-3	-Inf
РВСП	PBCH_RB	-3	-Inf
PSS	PSS_RA	-3	-3
SSS	SSS_RA	-3	-3
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
РПСП	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	1	-Inf
PDCCH	PDCCH_RB	1	-Inf
PDSCH	PDSCH_RA	-3	-Inf
РОЗСП	PDSCH_RB	-3	-Inf
OCNC	OCNG_RA	-3	-Inf
OCNG	OCNG_RB	-3	-Inf
NOTE: 2x	2 antenna configuration is	assumed	

Table A.3.4.1.2-2: Transmission configuration #2 with non-MBSFN ABS, 2x2 without PBCH

Physical		EPRE	E, [dB]
Channels and Signals	Parameters	Non-ABS	ABS
PBCH	PBCH_RA	-3	-Inf
FBCII	PBCH_RB	-3	-Inf
PSS	PSS_RA	-3	-3
SSS	SSS_RA	-3	-3
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
FILICIT	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	-3	-Inf
РИССП	PDCCH_RB	-3	-Inf
PDSCH	PDSCH_RA	-3	-Inf
РИЗСП	PDSCH_RB	-3	-Inf
OCNG	OCNG_RA	-3	-Inf
OCING	OCNG_RB	-3	-Inf
NOTE: 2x2 anten	na configuration is	assumed	

# A.3.4.2 MBSFN ABS Transmission Configurations

#### A.3.4.2.1 MBSFN ABS Transmission, 1x2 antenna

Table A.3.4.2.1-1: Transmission configuration with MBSFN ABS, 1x2

Physical		EPRE	E, [dB]
Channels and Signals	Parameters	Non-ABS	ABS
PBCH	PBCH_RA	0	N/A
РВСП	PBCH_RB	0	N/A
PSS	PSS_RA	0	N/A
SSS	SSS_RA	0	N/A
PCFICH	PCFICH_RB	0	-Inf
PHICH	PHICH_RA	0	-Inf
PRICE	PHICH_RB	0	-Inf
DDCCH	PDCCH_RA	0	-Inf
PDCCH	PDCCH_RB	0	-Inf
PDSCH	PDSCH_RA	0	-Inf
PDSCH	PDSCH_RB	0	-Inf
DMCH	PMCH_RA	0	-Inf
PMCH	PMCH_RB	0	-Inf
OCNG	OCNG_RA	0	-Inf
OCING	OCNG_RB	0	-Inf
NOTE: 1x2 anter	nna configuration is	assumed	

### A.3.4.2.2 MBSFN ABS Transmission, 2x2 antenna

Table A.3.4.2.2-1: Transmission configuration #1 with MBSFN ABS, 2x2

Physical		EPRE	E, [dB]
Channels and Signals	Parameters	Non-ABS	ABS
PBCH	PBCH_RA	-3	N/A
РВСП	PBCH_RB	-3	N/A
PSS	PSS_RA	-3	N/A
SSS	SSS_RA	-3	N/A
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
PRICE	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	1	-Inf
PDCCH	PDCCH_RB	1	-Inf
PDSCH	PDSCH_RA	-3	-Inf
PDSCH	PDSCH_RB	-3	-Inf
DMCH	PMCH_RA	-3	-Inf
PMCH	PMCH_RB	-3	-Inf
OCNG	OCNG_RA	-3	-Inf
OCING	OCNG_RB	-3	-Inf
NOTE: 2x2 anten	na configuration is	assumed	

Table A.3.4.2.2-2: Transmission configuration # 2 with MBSFN ABS, 2x2

Physical		EPRE, [dB]		
Channels and Signals	Parameters	Non-ABS	ABS	
PBCH	PBCH_RA	-3	N/A	
РВСП	PBCH_RB	-3	N/A	
PSS	PSS_RA	-3	N/A	
SSS	SSS_RA	-3	N/A	
PCFICH	PCFICH_RB	1	-Inf	
PHICH	PHICH_RA	-3	-Inf	
PHICH	PHICH_RB	-3	-Inf	
PDCCH	PDCCH_RA	-3	-Inf	
PDCCH	PDCCH_RB	-3	-Inf	
PDSCH	PDSCH_RA	-3	-Inf	
РИЗСП	PDSCH_RB	-3	-Inf	
PMCH	PMCH_RA	-3	-Inf	
FIVICH	PMCH_RB	-3	-Inf	
OCNG	OCNG_RA	-3	-Inf	
OCING	OCNG_RB	-3	-Inf	
NOTE: 2x2 anten	na configuration is	assumed		

# A.3.5 Impact of Reference Sensitivity Degradation with Carrier Aggregation on Test Cases

# A.3.5.1 Impact of Reference Sensitivity Degradation due to Insertion Loss

For a UE supporting inter-band carrier aggregation configuration with uplink in one E-UTRA band, if there is a relaxation of receiver sensitivity  $\Delta R_{IB,c} > 0$  dB as defined in TS 36.101 [5], 7.3.1-1A, there is no adjustment of test parameters in the tests specified in TS 36.133 when  $\Delta R_{IB,c} \le 1$  dB.

# A.3.6 Carrier Aggregation Test Cases with Different Channel Bandwidth Combinations

#### A.3.6.1 Introduction

In Annex A carrier aggregation test cases may be defined with different channel bandwidth combinations to verify the same RRM requirement.

If multiple carrier aggregation test cases with different channel bandwidth combinations are defined to verify the same RRM requirement that is channel bandwidth independent, then the UE needs to be tested only with one bandwidth combination out of the bandwidth combination sets supported by that UE.

# A.3.7 Test Cases with Different Channel Bandwidths

## A.3.7.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for single carrier operation.

## A.3.7.2 Principle of testing

Test cases defined for 5MHz channel bandwidth that reference this clause are applicable to UEs that support only Band 31.

# A.3.8 Antenna Configuration

Unless otherwise specified, E-UTRA FDD or E-UTRA TDD cells in all RRM Test cases in AWGN propagation condition are configured with Antenna Configuration 1x2.

# A.3.9 Carrier Aggregation Test Cases with Different Duplex Modes

#### A.3.9.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for carrier aggregation.

# A.3.9.2 Principle of testing

In Annex A carrier aggregation test cases may be defined for different duplex modes or combination of duplex modes (E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD) to verify the same RRM requirement.

If multiple carrier aggregation test cases are defined for different duplex modes (E-UTRA FDD or E-UTRA TDD) or for combination of duplex modes (E-UTRA TDD-FDD) to verify the same RRM requirement which is independent of the duplex mode and is identical for different duplex modes or combination of duplex modes, then from UE the performance point of view the test coverage can be considered fulfilled by executing only the corresponding test case(s) with one of the duplex modes supported by the UE.

# A.3.10 Carrier Aggregation Test Cases with Different CA Configurations

#### A.3.10.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for carrier aggregation.

## A.3.10.2 Principle of testing

In Annex A carrier aggregation test cases may be defined for two CCs as well as for more than two CCs to verify the same RRM requirement.

If multiple carrier aggregation test cases are defined for two CCs as well as for more than two CCs to verify the same RRM requirement, then from the UE performance point of view the test coverage can be considered fulfilled by executing only the test cases with the maximum number of CCs supported by the UE.

Editor's note: whether it is sufficient to test for any one of the band combinations supported by the UE is FFS.

# A.3.11 Test Cases for Synchronous and Asynchronous Dual Connectivity

#### A.3.11.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for dual connectivity (DC) operation in synchronous and asynchronous scenarios.

# A.3.11.2 Principle of Testing

In Annex A test cases may be defined in both synchronous DC and asynchronous DC scenarios to verify the same RRM requirement.

If test cases are defined in both synchronous and asynchronous DC scenarios to verify the same RRM requirement then the UE capable of both synchronous and asynchronous DC operations needs to be tested with one of the tests in either synchronous or asynchronous DC scenarios.

# A.3.12 Proximity-based Services

### A.3.12.1 Introduction

This clause also defines the principle and the reference configurations that are applicable to test cases verifying RRM core requirements for ProSe Direct Discovery and ProSe Direct Communication.

# A.3.12.2 Reference DRX configurations for ProSe tests

Table A.3.12.2-1: Reference DRX Configurations

Parameter	Value		
Reference configuration	DRX_P1		
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset	sf320, 0		
shortDRX	Disabled		
Note: For further information see clause 6.3.2 in TS 36.331.			

## A.3.12.3 Test Cases with Different Channel Bandwidths

#### A.3.12.3.1 Introduction

This clause defines a principle which is applicable to test cases verifying ProSe RRM requirements with different channel bandwidths.

#### A.3.12.3.2 Principle of testing

Some ProSe test cases are defined for different channel bandwidths to verify the same RRM requirement.

If test cases with different channel bandwidth are defined to verify the same RRM requirement then the UE is required to pass the test cases only with one of the channel bandiwdths.

# A.3.12.4 Reference resource pool configurations for ProSe Direct Discovery

Table A.3.12.4-1: ProSe Direct Discovery configuration for E-UTRA FDD (Configuration #1)

Information Element				Value
discRxPool	cp-Len			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	prb-Num		12
		prb-Start		0
		prb-End		23
		offsetIndicator		160
		subframeBitmap		11000000 00000000 00000000 00000000 000000
	txParameters			not present
	rxParameters			not present
discTxPoolCommon	cp-Len			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	prb-Num		2
		prb-Start		3
		prb-End		5
		offsetIndicator		160
		subframeBitmap		1000000 0000000 0000000 0000000 0000000
	txParameters	txParametersGeneral	alpha	al0
			p0	31
		ue- SelectedResourceConfig	poolSelection	random
			txProbability	p100
	rxParameters			not present
discTxPowerInfo	discMaxTxPower			23
SL-SyncConfig	syncCP-Len			Normal
	syncOffsetIndicator			35 (155 mod 40)
	slssid			30
	txParameters	txParametersGeneral	alpha	al0
			p0	31
		syncTxThreshIC	,	0 (-infinity)
	rxParamsNCell			not present
discInterFreqList				not present

Table A.3.12.4-2: ProSe Direct Discovery configuration for E-UTRA FDD (Configuration #2)

Information Element			Value
discRxPool	cp-Len		Normal
	discPeriod		rf32
	numRetx		0
	numRepetition		1
	tf-ResourceConfig	prb-Num	12
		prb-Start	0
		prb-End	23
		offsetIndicator	160
		subframeBitmap	11000000
			00000000
			00000000
			00000000
			00000000
	txParameters		not present
	rxParameters	tdd-Config	not present
		syncConfigIndex	0
discTxPoolCommon			not present
discTxPowerInfo	discMaxTxPower		23
SL-SyncConfig	syncCP-Len		Normal
	syncOffsetIndicator		20 (140
			mod 40)
	slssid		30
	txParameters		not present
	rxParamsNCell	physCellId	1
		discSyncWindow	w1
discInterFreqLis			not present

Table A.3.12.4-3: ProSe Direct Discovery configuration for E-UTRA TDD Config 0 (Configuration #3)

Information Element			Value
discRxPool	cp-Len		Normal
	discPeriod		rf32
	numRetx		0
	numRepetition		1
	tf-ResourceConfig	prb-Num	12
		prb-Start	0
		prb-End	23
		offsetIndicator	163
		subframeBitmap	11000000
			00000000
			00000000
			00000000
			00000000
			00
	txParameters		not present
	rxParameters		not present
discTxPoolCommon	cp-Len		Normal
	discPeriod		rf32
	numRetx		0
	numRepetition		1
	tf-ResourceConfig	prb-Num	2
		prb-Start	3
		prb-End	5
		offsetIndicator	163
		subframeBitmap	10000000
			00000000
			00000000
			00000000
			00000000
			00

	txParameters	txParametersGeneral	alpha	al0
			p0	31
		ue-	poolSelection	random
		SelectedResourceConfig		
			txProbability	p100
	rxParameters			not present
discTxPowerInfo	discMaxTxPower			23
SL-SyncConfig	syncCP-Len			Normal
	syncOffsetIndicator			38 (158
				mod 40)
	slssid			30
	txParameters	txParametersGeneral	alpha	al0
			p0	31
		syncTxThreshIC		0 (-infinity)
	rxParamsNCell			not present
discInterFreqList				not present

# A.3.12.5 Reference resource pool configurations for ProSe Direct Communication

Table A.3.12.5-1: ProSe Direct Communication configuration for E-UTRA FDD (Configuration #1)

Information Element				Value (5MHz)	Value (10MHz)
commRxPool	sc-CP-Len			No	rmal
	sc-Period			Si	f40
	sc-TF-ResourceConfig	prb-Num		12	25
		prb-Start		0	0
		prb-End		23	49
		offsetIndicator			0
		subframeBitmap		0000 0000 0000	11000 00000 00000 00000 00000
	data-CP-Len				rmal
	dataHoppingConfig	hoppingParameter			0
		numSubbands			s1
		rb-Offset			0
	ue- SelectedResourceConfig	data-TF- ResourceConfig	prb-Num	12	25
			prb-Start	0	0
			prb-End	23	49
			offsetIndicator		0
			subframeBitmap	111 <i>1</i> 111 <i>1</i> 111 <i>1</i>	00000 11111 11111 11111 11111
		trpt-Subset-r12		0	01
	rxParametersNCell			not p	resent
	txParameters			not p	resent
commTxPoolNormalCommon	sc-CP-Len				rmal
	sc-Period				f40
	sc-TF-ResourceConfig	prb-Num		12	25
		prb-Start		0	0
		prb-End		24	49
		offsetIndicator			0
		subframeBitmap		00011000 00000000 00000000 00000000 000000	
	data-CP-Len			No	rmal

	dataHoppingConfig	hoppingParameter		(	)
		numSubbands		ns	s1
		rb-Offset		(	)
	ue- SelectedResourceConfig	data-TF- ResourceConfig	prb-Num	12	25
	_	-	prb-Start	0	0
			prb-End	23	49
			offsetIndicator	(	)
			subframeBitmap	0000 1111 1111 1111 1111	1111 1111 1111
		trpt-Subset-r12		00	)1
	rxParametersNCell			not pr	esent
	txParameters	sc-TxParameters	alpha	a	10
			p0	3	1
		dataTxParameters	alpha	a	10
			p0	3	1
SL-SyncConfig	syncCP-Len			Nor	mal
	syncOffsetIndicator			2	2
	slssid			3	0
	txParameters	txParametersGeneral	alpha	a	0
			p0	3	1
		syncTxThreshIC		0 (-in	finity)
	rxParamsNCell	_		not pr	esent

Table A.3.12.5-2: ProSe Direct Communication pre-configuration for E-UTRAN FDD for out-of-network coverage operation (Configuration #2)

Information Eleme	nt			Value (5MHz)	Value (10MHz)
preconfigSync	syncCP-Len-r12			No	rmal
	syncOffsetIndicator1				2
	syncOffsetIndicator2				1
	syncTxParameters			(	31
					0
	syncTxThreshOoC			(-110	dBm /
				15	kHz)
	filterCoefficient				c0
	syncRefMinHyst				B0
	syncRefDiffHyst			d	B0
preconfigComm	sc-CP-Len			No	rmal
	sc-Period			S	f40
	sc-TF-ResourceConfig	prb-Num		12	25
		prb-Start		0	0
		prb-End		23	49
		offsetIndicator			0
					11000
					00000
		subframeBitmap			00000
					00000
	11.00.1				00000
	data-CP-Len	+,			rmal
	dataHoppingConfig	hoppingParameter			0
		numSubbands			s1
		rb-Offset			0
	ue-	data-TF-	prb-Num	12	25
	SelectedResourceConfig	ResourceConfig			
			prb-Start	0	0
	prb-End offsetIndicator			23	49
			orrsetinalcator		0
			l. fu Dit		00000
			subframeBitmap		11111
				1111	11111

		11111111
		11111111
	trpt-Subset-r12	001

# A.3.12.6 Reference Measurement Channels for ProSe Direct Discovery

#### A.3.12.6.1 FDD

Table A.3.12.6-1: PSDCH Reference Measurement Channels for FDD

Unit	Value
	D.1 FDD
MHz	5
	2
	12
	1
	11
	QPSK
	232
Bits	24
	1
Bits	528
	MHz

NOTE1: PSDCH transmissions are rate-matched for 12 DFT-OFDM symbols per subframe, and the last symbol shall be punctured as per TS 36.211.

# A.3.12.7 Reference measurement channels for ProSe Direct Communication

#### A.3.12.7.1 FDD

Table A.3.12.7-1: PSCCH Reference Measurement Channels for FDD

	Parameter	Unit	Value		
Reference ch	nannel		CC.1 FDD	CC.2 FDD	
Channel ban	dwidth	MHz	5	10	
Allocated res	ource blocks		1	1	
Subcarriers p	per resource block		12	12	
DFT-OFDM S	Symbols per subframe		11	11	
(see Note 1)					
Modulation			QPSK	QPSK	
Information E	Bit Payload	Bits	41	43	
	Frequency hopping flag		0		
	RB assignment		Set as per PSSCH RB		
	ND assignment		allocation spec	ific in the test	
Information	Time resource pattern (I <sub>TRP</sub> )		0 (Note 2)		
bits	Modulation and coding		Set as the Page	SSCH MCS	
	scheme		specified in the test		
	Timing advance indication		0	)	
	Group destination ID		As set by hi	gher layers	
Transport blo	ock CRC	Bits	16	16	
Maximum number of HARQ transmissions			2	2	
Binary Chan	nel Bits (see Note 1)	Bits	264	264	

NOTE1: PSCCH transmissions are rate-matched for 12 DFT-OFDM symbols per subframe, and the last symbol shall be punctured as per TS 36.211.

NOTE 2: For  $N_{TRP} = 8$  (FDD) and trpt-Subset = 001,  $I_{TRP} = 0$  corresponds to a time repetition pattern of (1,0,0,0,0,0,0,0) as per TS 36.213.

Table A.3.12.7-1: PSSCH Reference Measurement Channels for FDD

Parameter		Value		
Reference channel		CD.1 FDD	CD.2 FDD	
Channel bandwidth	MHz	5	10	
Allocated resource blocks		2	3	
Subcarriers per resource block		12	12	
DFT-OFDM Symbols per subframe (see Note 1)		11	11	
Modulation		QPSK	QPSK	
Target Code Rate		1/3	1/3	
Information Bit Payload		176	256	
Transport block CRC	Bits	24	24	
Maximum number of HARQ transmissions		3	3	
Binary Channel Bits (see note)	Bits	528	1056	
NOTE 4 DODOLLA : :		40 DET OFBIA		

NOTE1: PSDCH transmissions are rate-matched for 12 DFT-OFDM symbols per subframe, and the last symbol shall be punctured as per TS 36.211.

#### A.3.12.8 ProSe Receive Traffic Generator

This clause defines the configuration for active Sidelink UEs used to generate receive traffic in ProSe RRM tests.

#### A.3.12.8.1 ProSe Direct Communication Receive Traffic Generator for FDD

Table A.3.12.8.1-1: Active Sidelink UE configuration for ProSe Direct Communication

Configuration			PCP.1.FDD
Channel BW	Channel BW		5 or 10
Number of Active Sidelink UEs per sc-period			5 MHz: 12
	· · ·		10 MHz: 16
	PSCCH RMC		5 MHz: CC.1 FDD
	(defined in A.3.12.7)		10 MHz: CC.2 FDD
	PSCCH resource allocation		5MHz: [2i:2i], for Sidelink UE i=0,,11
	PSCCH resource allocation		10MHz:[3i:3i], for Sidelink UE i = 0,, 15
Active Sidelink	PSSCH RMC		5 MHz: CD.1 FDD
UEs	(defined in A.3.12.7)		10 MHz: CD.2 FDD
			Non-overlapping RBs
	PSSCH resource allocation		5MHz: [2i:2i+1], for Sidelink UE i = 0,, 11
			10MHz:[3i:3i+2], for Sidelink UE i = 0,, 15
	RSRP	dBm/15kHz	-98

### A.3.12.8.2 ProSe Direct Discovery Receive Traffic Generator for FDD

Table A.3.12.8.2-1: Active Sidelink UE configuration for ProSe Direct Discovery

Configuration			PDP.1.FDD	PDP.2.FDD	
Channel BW		MHz	,	5	
Number of Active Sidelink UEs per Discovery subframe			12		
Active Sidelink UEs	Sidelink UE Transmissions		PSDCH (RMC D.1 FDD)	PSDCH (RMC D.1 FDD) + SLSS on synchronization subframe	
	Resource allocation		Non overlapping RBs in a subframe		
	RSRP	dBm/15kHz	-95		

### A.3.13 Time Offset between Cells

#### A.3.13.1 Introduction

In Annex A in some test cases a parameter called, 'time offset between cells' is used. The meaning of this parameter is defined in this clause.

#### A.3.13.2 Definition

Unless explicitly stated otherwise, the time offset between cells for a pair of cells is defined as the difference between radio frame start timings of the pair of cells.

# A.4 E-UTRAN RRC\_IDLE state

#### A.4.2 Cell Re-Selection

#### A.4.2.1 E-UTRAN FDD – FDD Intra frequency case

#### A.4.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency cell reselection requirements specified in clause 4.2.2.3.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.4.2.1.1-1 and A.4.2.1.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Only Cell 1 is already identified by the UE prior to the start of the test, i.e. Cell 2 is not identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

Table A.4.2.1.1-1: General test parameters for FDD intra frequency cell reselection test case

	Parameter		Value	Comment
Initial	Active cell		Cell1	
condition	Neighbour cells		Cell2	
T2 end	Active cell		Cell2	
condition	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA R	F Channel Number		1	Only one FDD carrier frequency is used.
Channel Ba	andwidth (BW <sub>channel</sub> )	MHz	10	
	t between cells		3 ms	Asynchronous cells
Access Ba	Access Barring Information		Not Sent	No additional delays in random access procedure.
PRACH co	nfiguration		4	As specified in table 5.7.1-2 in TS 36.211
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1	T1		>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2	T2		40	T2 need to be defined so that cell re- selection reaction time is taken into account.
Т3		S	15	T3 need to be defined so that cell re- selection reaction time is taken into account.

Table A.4.2.1.1-2: Cell specific test parameters for FDD intra frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2			
		T1	T2	T3	T1	T2	Т3	
E-UTRA RF Channel Number			1		1			
BW <sub>channel</sub>	MHz		10		10			
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		C	P.2 FDD		OP.2 FDD			
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB	dB		0			0		
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA <sup>Note 1</sup>	_							
OCNG_RB <sup>Note 1</sup>			1			1		
Qrxlevmin	dBm	-140	-140	-140	-140	-140	-140	
Pcompensation	dB	0	0	0	0	0	0	
Qhysts	dB	0	0	0	0	0	0	
Qoffset <sub>s, n</sub>	dB	0	0	0	0	0	0	
Cell_selection_and_ reselection_quality_ measurement			RSRP		RSRP			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16	-3.11	2.79	-infinity	2.79	-3.11	
$N_{oc}^{ m Note2}$	dBm/15 kHz							
$\hat{E}_s/N_{oc}$	dB	16	13	16	-infinity	16	13	
RSRP Note3	dBm/15 kHz	-82	-85	-82	-infinity	-82	-85	
Treselection	S	0	0	0	0	0	0	
Sintrasearch	dB	Not sent Not sent						
Propagation Condition					AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.4.2.1.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell shall be less than  $8\ s.$ 

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as:  $T_{\text{detect,EUTRAN\_Intra}} + T_{\text{SI}}$ , and to an already detected cell can be expressed as:  $T_{\text{evaluateFDD.intra}} + T_{\text{SI}}$ ,

#### Where:

 $T_{detect,EUTRAN\_Intra}$  See Table 4.2.2.3-1 in clause 4.2.2.3

T<sub>evaluateFDD,intra</sub> See Table 4.2.2.3-1 in clause 4.2.2.3

T<sub>SI</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell and 7.68 s, allow 8 s for the cell re-selection delay to an already detected cell in the test case.

#### A.4.2.2 E-UTRAN TDD – TDD Intra frequency case

#### A.4.2.2.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency cell reselection requirements specified in clause 4.2.2.3.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.4.2.2.1-1 and A.4.2.2.1-2. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.2.1-1: General test parameters for TDD intra frequency cell re-selection test case

Parameter		Unit	Value	Comment		
Initial	Active cell		Cell1			
condition	Neighbour cells		Cell2			
T2 end	Active cell		Cell2			
condition	Neighbour cells		Cell1			
Final condition	Visited cell		Cell1			
	F Channel Number		1	Only one TDD carrier frequency is used.		
Channel Ba	andwidth (BW <sub>channel</sub> )	MHz	10			
Time offset	between cells	μs	3	Synchronous cells		
Access Bai	Access Barring Information		Not Sent	No additional delays in random access procedure.		
Special sub	oframe configuration		6	As specified in table 4.2-1 in TS 36.211		
Uplink-dow	nlink configuration		1	As specified in table 4.2-2 in TS 36.211		
PRACH co	nfiguration index		53	As specified in table 5.7.1-3 in TS 36.211		
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.		
T1		S	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2		
T2	T2		40	T2 need to be defined so that cell re-selection reaction time is taken into account.		
Т3		S	15	T3 need to be defined so that cell re-selection reaction time is taken into account.		

Table A.4.2.2.1-2: Cell specific test parameters for TDD intra frequency cell re-selection test case in AWGN

					Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
3W <sub>channel</sub>	MHz		10			10		
OCNG Pattern								
defined in A.3.2.2.2		OF	P.2 TDD		OI	P.2 TDD		
OP.2 TDD)								
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB	dB		0		0			
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
DCNG_RA <sup>Note 1</sup>								
OCNG_RB <sup>Note 1</sup>								
Qrxlevmin	dBm		-140		-140			
Compensation	dB		0		0			
Qhyst <sub>s</sub>	dB		0		0			
Qoffset <sub>s, n</sub>	dB		0		0			
Cell_selection_and_								
eselection_quality_			RSRP			RSRP		
neasurement								
$\hat{E}_{s}/I_{ot}$	dB	16	-3.11	2.79	-infinity	2.79	-3.11	
$N_{oc}^{ m Note2}$	dBm/15 kHz			-	98			
$\hat{E}_s/N_{oc}$	dB	16	13	16	-infinity	16	13	
RSRP Note3	dBm/15 kHz	-82	-85	-82	-infinity	-82	-85	
Treselection	S	0	0	0	0	0	0	
Sintrasearch	dB	N	ot sent		N	lot sent		
Propagation Condition		AWGN						
	be used such that	hoth cells	are fully s	allocated	l and a const	tant total		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate

power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.4.2.2.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as:  $T_{\text{detect,EUTRAN\_Intra}} + T_{\text{SI-EUTRAN}}$ , and to an already detected cell can be expressed as:  $T_{\text{evaluate, E-UTRAN\_intra}} + T_{\text{SI-EUTRAN}}$ ,

#### Where:

 $T_{detect,EUTRAN\_Intra}$  See Table 4.2.2.3-1 in clause 4.2.2.3

 $T_{evaluate,E-UTRAN\ intra}$  See Table 4.2.2.3-1 in clause 4.2.2.3

T<sub>SI-EUTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell and 7.68 s, allow 8 s for the cell re-selection delay to an already detected cell in the test case.

#### A.4.2.3 E-UTRAN FDD – FDD Inter frequency case

#### A.4.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 2 E-UTRA FDD cells on 2 different carriers as given in tables A.4.2.3.1-1 and A.4.2.3.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.3.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	-
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA R	F Channel Number		1, 2	Two FDD carrier frequencies are used.
Time offset between cells			3 ms	Asynchronous cells
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Ba	rring Information	-	Not Sent	No additional delays in random access procedure.
DRX cycle	length	s	1.28	The value shall be used for all cells in the test.
T1			15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		S	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.3.1-2: Cell specific test parameters for FDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	(	Cell 1		Cell 2			
			T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		2			
number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns defined in								
A.3.2.1.2 (OP.2 FDD)		OP	.2 FDD			OP.2 FDD		
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		_		0			
PHICH_RB	dB		0					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Qrxlevmin	dBm		-140		-140			
$N_{oc}^{$	dBm/15 kHz				-98			
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86	
$\hat{E}_{s}/I_{ot}$	dB	14	14	14	-4	-infinity	12	
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12	
Treselection <sub>EUTRAN</sub>	S	0				0		
Snonintrasearch	dB	50			Not sent			
Thresh <sub>x, high</sub>	dB	48			48			
Thresh <sub>serving, low</sub>	dB	44			44			
Thresh <sub>x, low</sub>	dB	50			50			
Propagation Condition		AWGN						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.4.2.3.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as:  $T_{higher\_priority\_search} + T_{evaluateFDD,inter} + T_{SI}$ , and to lower priority cell can be expressed as:  $T_{evaluateFDD,inter} + T_{SI}$ ,

#### Where:

 $T_{higher\_priority\_search}$  See clause 4.2.2

T<sub>evaluateFDD,inter</sub> See Table 4.2.2.4-1 in clause 4.2.2.4

 $T_{SI}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

#### A.4.2.4 E-UTRAN FDD – TDD Inter frequency case

#### A.4.2.4.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-TDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 1 E-UTRA FDD cell and 1 E-UTRA TDD cell as given in tables A.4.2.4.1-1 and A.4.2.4.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.4.1-1: General test parameters for FDD-TDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
Cell 1 E-UTRA RF Channel Number			1	One FDD carrier frequency is used. And Cell 1 is on RF channel number 1.
Cell 2 E-UTRA RF Channel Number			2	One TDD carrier frequencies is used. And Cell 2 is on RF channel number 2.
Time offset between cells			3 ms	Asynchronous cells
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
E-UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
E-UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		S	1.28	The value shall be used for all cells in the test.
T1		S	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
Т3		S	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.4.1-2: Cell specific test parameters for FDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	(	Cell 1		Cell 2				
		T1	T1 T2 T3		T1	T2	T3		
E-UTRA RF Channel		1			2				
number									
BW <sub>channel</sub>	MHz		10			10			
OCNG Patterns defined in									
A.3.2.1.2 (OP.2 FDD) and		OP	.2 FDD			OP.2 TDD			
A.3.2.2.2 (OP.2 TDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB		_						
PHICH_RB	dB		0		0				
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
Qrxlevmin	dBm		-140		-140				
$N_{oc}^{$	dBm/15 kHz				-98				
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86		
$\hat{ extsf{E}}_{ extsf{s}}/ extsf{I}_{ ext{ot}}$	dB	14	14	14	-4	-infinity	12		
$\hat{E}_s/N_{oc}$	dB	14	14 14 14		-4	-infinity	12		
Treselection <sub>EUTRAN</sub>	S	0				0			
Snonintrasearch	dB	50				Not sent			
Thresh <sub>x, high</sub>	dB		48			48			
Thresh <sub>serving, low</sub>	dB		44			44			
Thresh <sub>x, low</sub>	dB	50			50				
Propagation Condition		AWGN					·		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.4.2.4.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as:  $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$ , and to lower priority cell can be expressed as:  $T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$ ,

#### Where:

 $T_{higher\_priority\_search}$  See clause 4.2.2

T<sub>evaluate,E-UTRAN\_inter</sub> See Table 4.2.2.4-1 in clause 4.2.2.4

T<sub>SI-EUTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

#### A.4.2.5 E-UTRAN TDD – FDD Inter frequency case

# A.4.2.5.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-FDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 1 E-UTRA TDD cell and 1 E-UTRA FDD cell as given in tables A.4.2.5.1-1 and A.4.2.5.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.5.1-1: General test parameters for TDD-FDD inter frequency cell re-selection test case

	Parameter	Unit	Value	Comment
Initial	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation
condition				phase, so that reselection to cell 1 occurs during
			0 "1	the first T1 phase
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
Cell 1 E-U	TRA RF Channel		1	One TDD carrier frequency is used. And Cell 1 is
Number				on RF channel number 1.
Cell 2 E-U	TRA RF Channel		2	One FDD carrier frequencies is used. And Cell 2
Number				is on RF channel number 2.
Time offset	t between cells		3 ms	Asynchronous cells
E-UTRA TI	E-UTRA TDD PRACH		53	As specified in table 5.7.1-3 in TS 36.211
configuration	configuration			
Special sul	Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-dow	Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211
E-UTRA FI	DD PRACH		4	As specified in table 5.7.1-2 in TS 36.211
configuration				
E-UTRA FI	DD Access Barring	-	Not Sent	No additional delays in random access
Information	ו			procedure.
E-UTRA TI	DD Access Barring	-	Not Sent	No additional delays in random access
Information	1			procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1		S	15	T1 need to be defined so that cell re-selection
				reaction time is taken into account.
T2		S	>7	During T2, cell 2 shall be powered off, and
				during the off time the physical cell identity shall
				be changed, The intention is to ensure that cell 2
				has not been detected by the UE prior to the
				start of period T3.
T3		S	75	T3 need to be defined so that cell re-selection
				reaction time is taken into account.

Table A.4.2.5.1-2: Cell specific test parameters for TDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	C	ell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel		1			2			
number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns defined in								
A.3.2.1.2 (OP.2 FDD) and		OP	.2 TDD			OP.2 FDD		
A.3.2.2.2 (OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		_			_		
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB				ļ.			
Qrxlevmin	dBm	-	-140		-140			
$N_{oc}^{ m Note~2}$	dBm/15 kHz				-98			
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86	
$\hat{E}_{s}/I_{ot}$	dB	14	14	14	-4	-infinity	12	
$\hat{E}_s/N_{oc}$	dB	14	14 14 14		-4	-infinity	12	
Treselection <sub>EUTRAN</sub>	S	0				0		
Snonintrasearch	dB	50				Not sent		
Thresh <sub>x, high</sub>	dB		48	•		48		
Thresh <sub>serving, low</sub>	dB		44		44			
Thresh <sub>x, low</sub>	dB		50			50		
Propagation Condition		AWGN					_	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.4.2.5.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as:  $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$ , and to lower priority cell can be expressed as:  $T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$ ,

#### Where:

 $T_{higher\_priority\_search}$  See clause 4.2.2

 $T_{evaluate, E\text{-}UTRAN\_inter} \quad \text{See Table 4.2.2.4-1 in clause 4.2.2.4}$ 

T<sub>SI-EUTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

#### A.4.2.6 E-UTRAN TDD – TDD: Inter frequency case

# A.4.2.6.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 2 E-UTRA TDD cells on 2 different carriers as given in tables A.4.2.6.1-1 and A.4.2.6.1-2. The test consists of three successive time periods, with time duration of T1, T2, and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.6.1-1: General test parameters for TDD-TDD inter frequency cell reselection test case

	Parameter	Unit	Value	Comment
Initial	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation
condition				phase, so that reselection to cell 1 occurs during
				the first T1 phase
T1 end	Active cells		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA R	F Channel Number		1, 2	Two TDD carrier frequencies are used.
Time offset	Time offset between cells		3 μs	Synchronous cells
Access Ba	Access Barring Information		Not Sent	No additional delays in random access
	-			procedure.
Special sul	Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-dow	nlink configuration		1	As specified in table 4.2-2 in TS 36.211
PRACH co	nfiguration index		53	As specified in table 5.7.1-3 in TS 36.211
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		S	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.6.1-2: Cell specific test parameters for TDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	(	Cell 1			Cell 2		
		T1	T1 T2 T3			T2	T3	
E-UTRA RF Channel		1			2			
number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Pattern defined in								
A.3.2.2.2 (OP.2 TDD)		OF	2.2 TDD		0	P.2 TDD		
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB					_		
PHICH_RA	dB		0			0		
PHICH_RB	dB							
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Qrxlevmin	dBm		-140		-140			
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-	.98			
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86	
$\hat{E}_{s}/I_{ot}$	dB	14	14	14	-4	-infinity	12	
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12	
Treselection <sub>EUTRAN</sub>	S	0				0		
Snonintrasearch	dB	50			1	Not sent		
Thresh <sub>x, high</sub>	dB	48				48		
Thresh <sub>serving, low</sub>	dB		44		44			
Thresh <sub>x, low</sub>	dB	50 50						
Propagation Condition		AWGN						

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.4.2.6.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as:  $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$ , and to lower priority cell can be expressed as:  $T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$ ,

#### Where:

 $T_{higher\_priority\_search}$  See clause 4.2.2

 $T_{evaluate, E\text{-}UTRAN\_inter} \quad \text{See Table 4.2.2.4-1 in clause 4.2.2.4}$ 

T<sub>SI-EUTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

# A.4.2.7 E-UTRAN FDD – FDD Inter frequency case in the existence of nonallowed CSG cell

# A.4.2.7.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements specified in clause 4.2.2.4 when there is the interference from non-allowed CSG cell and the layers have equal priority.

The test scenario comprises of 2 E-UTRA FDD cells on 2 different carriers and 1 non-allowed E-UTRA FDD CSG cell as given in tables A.4.2.7.1-1 and A.4.2.7.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 3 is a non-allowed CSG cell. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.7.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case with non-allowed CSG cell

	Parameter	Unit	Value	Comment
Initial	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation
condition				phase
Final	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition				
E-UTRA R	F Channel Number		1, 2	Two FDD carrier frequencies are used.
Time offset	t between cells		3 ms	Asynchronous cells
PRACH co	PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
Access Ba	Access Barring Information		Not Sent	No additional delays in random access
				procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1		S	15	T1 need to be defined so that the non-allowed
				CSG cell is identified.
T2		S	40	T2 need to be defined so that cell re-selection
				reaction time is taken into account.
T3	T3		15	T3 need to be defined so that whether cell re-
				selection would not occur is insured.

Table A.4.2.7.1-2: Cell specific test parameters for FDD-FDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter	Unit	Cell 1  T1 T2 T3				Cell 2			Cell 3(Non-allowed CSG cell)			
					T1	T2	Т3	T1	T2	Т3		
E-UTRA RF Channel Number		1			2			1				
BW <sub>channel</sub>	MHz		10			10			10			
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD			OP.2 FDD			OP.2 FDD				
PBCH_RA	dB											
PBCH_RB	dB											
PSS_RA	dB											
SSS_RA	dB											
PCFICH_RB	dB											
PHICH_RA	dB											
PHICH_RB	dB					0						
PDCCH_RA	dB		0			0		0				
PDCCH_RB	dB											
PDSCH_RA	dB											
PDSCH_RB	dB											
OCNG_RA <sup>Note 1</sup>	dB											
OCNG_RB <sup>Note 1</sup>	dB											
Qrxlevmin	dBm		-140		-140			-140				
Qqualmin	dB				1	-20						
$N_{oc}^{ m Note  2}$	dBm/15 kHz					-98						
RSRP Note 3	dBm/15 kHz	-90	-90	-85	-Infinity	-85	-90	-90	-85	-60		
RSRQ Note 3	dB	-14.1	-17.1	-35.8				-14.1	-12.1	-10.8		
${f \hat{E}}_{ m s}/{ m I}_{ m ot}$	dB	-0.64	-5.21	-25	-Infinity	13	8	-0.64	4.36	24.8		
$\hat{E}_s/N_{oc}$	dB	8	8	13	-Infinity	13	8	8	13	38		
Treselection	S		0			0			0			
Snonintrasearch	dB	-10			Not sent			Not sent				
Propagation Condition			AWGN									

Note 3: RSRP and RSRQ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.4.2.7.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than  $34\ s.$ 

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

The probability of reselection from Cell 2 to Cell 1 during T3 observed during testing shall be less than 10%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as:  $T_{\text{detect}, \text{EUTRAN\_Inter}} + T_{\text{SI}}$ ,

#### Where:

T<sub>detect,EUTRAN Inter</sub> See Table 4.2.2.4-1 in clause 4.2.2.4

 $T_{SI}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell in the test case.

# A.4.2.8 E-UTRAN TDD – TDD Inter frequency case in the existence of nonallowed CSG cell

#### A.4.2.8.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements specified in clause 4.2.2.4 when there is the interference from non-allowed CSG cell and the layers have equal priority.

The test scenario comprises of 2 E-UTRA TDD cells on 2 different carriers and 1 non-allowed E-UTRA TDD CSG cell as given in tables A.4.2.8.1-1 and A.4.2.8.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 3 is a non-allowed CSG cell. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.8.1-1: General test parameters for TDD-TDD inter frequency cell re-selection test case with non-allowed CSG cell

	Parameter	Unit	Value	Comment
Initial	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation
condition				phase
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
E-UTRA R	F Channel Number		1, 2	Two TDD carrier frequencies are used.
Time offset	t between cells	μs	3	Synchronous cells
Uplink-dow	nlink configuration		1	As specified in table 4.2-2 in TS 36.211
Special sub	Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
PRACH co	PRACH configuration		53	As specified in table 5.7.1-3 in TS 36.211
Access Ba	rring Information	-	Not Sent	No additional delays in random access procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1	-	S	15	T1 need to be defined so that the non-allowed CSG cell is identified.
T2		S	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
Т3		S	15	T3 need to be defined so that whether cell reselection would not occur is insured.

Table A.4.2.8.1-2: Cell specific test parameters for TDD-TDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter	Unit		Cell 1			ell 2		(Non-a	Cell 3 (Non-allowed CSG cell)		
		T1	T2	Т3	T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			2			1		
Number											
BW <sub>channel</sub>	MHz		10			10			10		
OCNG Pattern defined in		l ,	OP.2 TDI	`	OB	2 TDD			OP.2 TDD	1	
A.3.2.2.2 (OP.2 TDD)		`	JF.Z 1DL		OF.	2 100			OF.Z TDD		
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB		0			0			0		
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG_RB <sup>Note 1</sup>	dB										
Qrxlevmin	dBm		-140		-140			-140			
Qqualmin	dB					-20					
$N_{oc}^{\text{Note 2}}$	dBm/					-98					
	15kHz										
RSRP Note 3	dBm/	-90	-90	-85	-Infinity	-85	-90	-90	-85	-60	
	15kHz										
RSRQ Note 3	dB	-14.1	-17.1	-35.8				-14.1	-12.1	-10.8	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	-0.64	-5.21	-25	-Infinity	13	8	-0.64	4.36	24.8	
$\hat{E}_s/N_{oc}$	dB	8	8	13	-Infinity	13	8	8	13	38	
Treselection	S		0	•	0				0	•	
Snonintrasearch	dB		-10		Not sent				Not sent		
Propagation Condition						AWGN	I				
	ucod cuch	AVVOIN  Avvoin  Avvoin									

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for  $\frac{N_{oc}}{N_{oc}}$  to be fulfilled.

Note 3: RSRP and RSRQ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.4.2.8.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

The probability of reselection from Cell 2 to Cell 1 during T3 observed during testing shall be less than 10%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as:  $T_{\text{detect,EUTRAN\_Inter}} + T_{\text{SI}}$ ,

#### Where:

 $T_{detect,EUTRAN\_Inter}$  See Table 4.2.2.4-1 in clause 4.2.2.4

T<sub>SI</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell in the test case.

# A.4.2.9 E-UTRAN FDD – FDD Intra frequency case for 5MHz bandwidth

#### A.4.2.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.4.2.1.1.

The parameters of this test are the same as defined in Subclause A.4.2.1.1 except that the values of the parameters in the Table A.4.2.9.1-1 will replace the values of the corresponding parameters in A.4.2.1.1-1, and the values of the parameters in the Table A.4.2.9.1-2 will replace the values of the corresponding parameters in A.4.2.1.1-2.

Table A.4.2.9.1-1: General test parameters for FDD intra frequency cell reselection test case for 5MHz bandwidth

Parameter	Unit Value		Comment					
Channel Bandwidth (BW <sub>channel</sub> )	MHz							
Note 1: See Table A.4.2.1.1-	1 for the ot	her parameters.						
Note 2: This is according to t	This is according to the principle defined in section A.3.7.2.							

Table A.4.2.9.1-2: Cell specific test parameters for FDD intra frequency cell reselection test case in AWGN for 5MHz

Parameter	Unit	Cell 1			Cell 2				
		T1 T2 T3			T1	T2	T3		
BW <sub>channel</sub>	MHz		5		5				
OCNG Patterns									
defined in A.3.2.1.16		OP.16 FDD			OP.16 FDD				
(OP.16 FDD)									
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power									

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: See Table A.4.2.1.1-2 for the other parameters.

#### A.4.2.9.2 Test Requirements

The test requirements defined in section A.4.2.1.2 shall apply to this test case.

# A.4.2.10 E-UTRAN FDD – FDD reselection using an increased number of carriers

#### A.4.2.10.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 E-UTRA FDD interfrequency cells on 8 different carriers in the neighbour list of cell 1 as given in tables A.4.2.10.1-1 and A.4.2.10.1-2. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2, 3 and 4 which are chosen from the 8 intefrequency layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2, 3 and 4 are identified by the UE during time phase T0. Cell 1, cell 2, cell 3 and cell 4 all belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2, 3 or 4. Cells 1, 2, 3 and 4 all have equal absolute priority.

Table A.4.2.10.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment			
ТО	Active cell		Cell1	To is repeated on each repetition of the test. In To the test equipment selects frequencies for cell 2, 3, 4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.			
T1 start condition	Active cell		Cell 1				
T1 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T1			
	Neighbour cell		Cell 1, cell 3, cell 4				
T2 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T2			
	Neighbour cell		Cell 1, cell 2, cell 4				
T3 end condition	Active cell		Cell 4	UE shall perform reselection to cell 4 during T3			
	Neighbour cell		Cell 1, cell 2, cell 3				
T4 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T4			
	Neighbour cell		Cell 2, cell 3, cell 4				
UE configured E-U Channel Number	TRA RF		1, 2,3,4,5,6,7,8,9	Serving cell and eight xDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance			
Test eqipment conf	garaton		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9				
PRACH configuration	on		4	As specified in table 5.7.1-2 in TS 36.211 [16]			
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.			
DRX cycle length		S	1.28	The value shall be used for all cells in the test.			
ТО	ТО		(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.			
T1	T1		25	T1 need to be defined so that cell reselection reaction time is taken into account.			
T2		S	200	T2 need to be defined so that cell reselection reaction time is taken into account			
T3		S	200	T3 need to be defined so that cell reselection reaction time is taken into account.			
T4		S	25	T4 need to be defined so that cell re- selection reaction time is taken into account			

Table A.4.2.10.1-2: Cell specific test parameters for FDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit			Cell 1					Cell 2				Cel	I 3		Cell 4			
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2
E-UTRA RF Channel		1				Randomly selected from 2,3,4			Randomly selected from			from	Rande	omly se	elected	from			
number						such that cell 2 is in the normal			5,6,7,8,9 such that cell 3				8,9 suc						
								perfor	mance	group		is in the reduced							
										performance group			performance group						
BW <sub>channel</sub>	MHz			Iz: N <sub>RB</sub>				5MHz: N <sub>RB,</sub> = 25			$5MHz: N_{RB} = 25$			5MHz: N <sub>RB</sub> = 25					
				Hz: N <sub>RB</sub>				10MHz: N <sub>RB,</sub> = 50			10MHz: N <sub>RB</sub> = 50			10MHz: N <sub>RB,</sub> = 50					
OCNG patterns				FDD (					FDD (				.16 FDI				OP.16 FDD (5MHz)		
	<u> </u>		OP.2 I	FDD (1	OMHz)			OP.2 FDD (10MHz)			OP.2 FDD (10MHz)			OP	OP.2 FDD (10MHz)		lz)		
PBCH_RA	dB			0				0				0			1	0			
PBCH_RB	dB																		
PSS_RA	dB															1			
SSS_RA	dB															1			
PCFICH_RB	dB															1			
PHICH_RA	dB															1			
PHICH_RB	dB																		
PDCCH_RA	dB																		
PDCCH_RB	dB																		
PDSCH_RA	dB												!						
PDSCH_RB	dB																		
OCNG_RA <sup>Note 1</sup>	dB																		
OCNG_RB <sup>Note 1</sup>	dB																		
Qrxlevmin	dBm			-140			-140			-140			-140						
$N_{oc}^{ m Note~2}$	dBm/15			-98			-98			-98			-98						
	kHz		1	1	1	1		1		1				1			т	1	•
$\hat{E}_s/N_{oc}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
RSRP Note 3	dBm/15	-84	-90	-90	-90	-84	-90	-84	-90	-90	-90	-90	-90	-84	-90	-90	-90	-90	-90
	kHz															ĺ	,		
Treselection <sub>EUTRAN</sub>	S			0			0				0				0				
Snonintrasearch	dB	62			62				62				62						
Propagation Condition				AWGN			AWGN			AWGN			AWGN						
Antenna Configuration			1x2				1x2			1x2			1x2						
Timing offset to Cell 1				-					3ms				3m	ıs			3m	ıs	
Nete 4: OONO electible			4 11	, ,					1.1	*** 1						II OF	514		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.

Note 3: Es/lot and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.4.2.10.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.2.10.2-1.

Table A.4.2.10.2-1: Reselection delay requirements

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	20.5
T2	Cell 3 (reduced performance group)	193.3
T3	Cell 4 (reduced performance group)	193.3
T4	Cell 1 (normal performance group)	20.5

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as:  $K_{carrier,normal} * T_{evaluate,E-UTRAN\_Inter}, + T_{SI}$ , and to a reduced performance group cell can be expressed as:  $6* K_{carrier,reduced} * T_{evaluate,E-UTRAN\_Inter}, + T_{SI}$ ,

This gives a total of 20.48 s for normal performance group reselection and 193.28 s for reduced performance group reselection, allow 20.5 s for normal performance group and 193.3 s for reduced performance group in the test case. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

# A.4.2.11 E-UTRAN TDD – TDD reselection using an increased number of carriers

# A.4.2.11.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 E-UTRA TDD interfrequency cells on 8 different carriers in the neighbour list of cell 1 as given in tables A.4.2.11.1-1 and A.4.2.11.1-2. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2, 3 and 4 which are chosen from the 8 intefrequency layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2, 3 and 4 are identified by the UE during time phase T0. Cell 1, cell 2, cell 3 and cell 4 all belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2, 3 or 4. Cells 1, 2, 3 and 4 all have equal absolute priority.

Table A.4.2.11.1-1: General test parameters for TDD-TDD inter frequency cell re-selection test case

Para	meter	Unit	Value	Comment				
ТО			Cell1	To is repeated on each repetition of the test. In To the test equipment selects frequencies for cell 2,3,4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.				
T1 start condition	Active cell		Cell 1	115 1 11 ( 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
T1 end condition			Cell 2	UE shall perform reselection to cell 2 during T1				
	Neighbour cell		Cell 1, cell 3, cell 4					
T2 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T2				
	Neighbour cell		Cell 1, cell 2, cell 4					
T3 end condition	Active cell		Cell4	UE shall perform reselection to cell 4 during T3				
	Neighbour cell		Cell 1, cell 2, cell 3					
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T4				
	Neighbour cell		Cell 2, cell 3, cell 4					
UE configured E-UTRA RF Channel Number			1, 2,3,4,5,6,7,8,9	Serving cell and eight xDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance				
Test eqipment confi	guration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9					
PRACH configuration	on		4	As specified in table 5.7.1-2 in TS 36.211 [16]				
Access Barring Info	rmation	-	Not Sent	No additional delays in random access procedure.				
DRX cycle length		S	1.28	The value shall be used for all cells in the test.				
ТО			(Test equipment frequency selection and configuration time) + 960	To is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.				
T1		S	25	T1 need to be defined so that cell reselection reaction time is taken into account.				
T2			200	T2 need to be defined so that cell re- selection reaction time is taken into account				
Т3							200	T3 need to be defined so that cell reselection reaction time is taken into account.
T4		S	25	T4 need to be defined so that cell re- selection reaction time is taken into account				

Table A.4.2.11.1-2: Cell specific test parameters for TDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit			Cell 1					Cell 2				Ce	II 3			Ce	II 4	
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2
E-UTRA RF Channel			1			Randomly selected from 2,3,4 such that			Randomly selected from 5,6,7,8,9			Randor	nly select	ed from 5	,6,7,8,9				
number							cell 2 is in the normal performance group				such that cell 3 is in the reduced			such that cell 4 is in the reduced					
												performance group			performance group				
BW <sub>channel</sub>	MHz		5MHz: N <sub>RB</sub> = 25			5MHz: N <sub>RB</sub> ,= 25			5MHz: N <sub>RB</sub> = 25			5MHz: N <sub>RB</sub> = 25							
			10MHz: N <sub>RB</sub> = 50			10MHz: N <sub>RB,</sub> = 50			10MHz: $N_{RB} = 50$			10MHz: N <sub>RB,</sub> = 50							
OCNG Patterns				z: OP.10			5MHz: OP.10 TDD				5MHz: OI			5MHz: OP.10 TDD					
			10MF	tz: OP.2	2 TDD			10M	Hz: OP.2	TDD			10MHz: (	P.2 TDD	)	10MHz: OP.2 TDD			
PBCH_RA	dB			0					0				(	)			(	)	
PBCH_RB	dB																		
PSS_RA	dB																		
SSS_RA	dB																		
PCFICH_RB	dB																		
PHICH_RA	dB																		
PHICH_RB	dB																		
PDCCH_RA	dB																		
PDCCH_RB	dB																		
PDSCH_RA	dB																		
PDSCH RB	dB																		
OCNG_RA <sup>Note 1</sup>	dB																		
OCNG_RB <sup>Note 1</sup>	dB																		
Qrxlevmin	dBm			-140			-140			-140			-140						
$N_{oc}^{ m Note 2}$	dBm15			-98			-98				-98			-98					
TV oc	kHz													_					
$\hat{E}_s/N_{oc}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
RSRP Note 3	dBm/15	-84	-90	-90	-90	-84	-90	-84	-90	-90	-90	-90	-90	-84	-90	-90	-90	-90	-90
	kHz																		
Treselection <sub>EUTRAN</sub>	S			0					0				(					)	
Snonintrasearch	dB	62			62				62			62							
Propagation Condition		AWGN			AWGN				AWGN			AWGN							
Antenna Configuration			1x2			1x2			1x2			1x2							
Timing offset to Cell 1				-					3ms					ns		3ms			
		l- 4l4 l	-4111-	£ .11	11 4							Hansity is achieved for all OEDM symbols							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.

Note 3: Es/lot and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.4.2.11.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.2.11.2-1

Table A.4.2.11.2-1: Reselection delay requirements

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	20.5
T2	Cell 3 (reduced performance group)	193.3
T3	Cell 4 (reduced performance group)	193.3
T4	Cell 1 (normal performance group)	20.5

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as:  $K_{carrier,normal} * T_{evaluate,E-UTRAN\_Inter}, + T_{SI}$ , and to a reduced performance group cell can be expressed as:  $6*K_{carrier,reduced} * T_{evaluate,E-UTRAN\_Inter}, + T_{SI}$ ,

This gives a total of 20.48 s for normal performance group reselection and 193.28 s for reduced performance group reselection, allow 20.5 s for normal performance group and 193.3 s for reduced performance group in the test case. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

# A.4.3 E-UTRAN to UTRAN Cell Re-Selection

#### A.4.3.1 E-UTRAN FDD – UTRAN FDD:

# A.4.3.1.1 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of higher priority

#### A.4.3.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5 when the UTRA cell is of higher priority.

The test scenario comprises of one E-UTRA FDD and one UTRA FDD cells as given in tables A.4.3.1.1.1-1, A.4.3.1.1.1-2 and A.4.3.1.1.1-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Table A.4.3.1.1.1-1: General test parameters for E-UTRA FDD- higher priority UTRA FDD inter RAT cell re-selection test case

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell 1	
T3 end	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
condition	Neighbour cell		Cell 2	
E-UTRA P	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring		-	Not Sent	No additional delays in random access
Information	1			procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1			>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		S	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
Т3		S	25	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.1.1.1-2: Cell specific test parameters for cell 1(E-UTRA)

Parameter	Unit		Cell 1				
		T1	T2	T3			
E-UTRA RF Channel			1				
number							
BW <sub>channel</sub>	MHz						
OCNG Patterns defined in							
A.3.2.1.2 (OP.2 FDD)		(	OP.2 FDD				
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0				
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB	]					
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
Qqualmin for UTRA	dB	-20					
neighbour cell	uБ		-20				
Qrxlevmin for UTRA	dBm	-115					
neighbour cell	dDill	-115					
Qrxlevmin	dBm		-140				
$N_{oc}$	dBm/15 kHz		-98				
RSRP	dBm/15 KHz	-84	-84	-84			
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	14	14	14			
$\hat{E}_s/N_{oc}$	dB	14	14	14			
Treselection <sub>EUTRAN</sub>	S	0					
Snonintrasearch	dB	50					
Thresh <sub>x, high</sub> (Note 2)	dB	40					
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated							

Note 2: This refers to the value of Thresh<sub>x, high</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell

Table A.4.3.1.1.1-3: Cell specific test parameters for cell 2(UTRA)

Parameter	Unit	Ce	ell 2 (UTRA)			
		T1	T2	T3		
UTRA RF Channel Number		Channel	2			
CPICH_Ec/lor	dB	-10				
PCCPCH_Ec/lor	dB	-12				
SCH_Ec/lor	dB	-12				
PICH_Ec/lor	dB	-15				
OCNS_Ec/lor	dB	-0.941				
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	11	-5		
$I_{oc}$	dBm/3,84 MHz	-70				
CPICH_Ec/lo	dB	-Infinity	-10.33	-16.19		
CPICH_RSCP	dBm	-Infinity	-69	-85		
Propagation Condition		AWGN				
Qqualmin	dB	-20				
Qrxlevmin	dBm	-115				
QrxlevminEUTRA	dBm	-140				
UE_TXPWR_MAX_RACH	dBm	21				
Treselection	S	0				
Sprioritysearch1	dB	62				
Sprioritysearch2	dB	0				
Thresh <sub>serving, low</sub>	dB	36				
Thresh <sub>x, low</sub> (Note 1)  Note 1: his refers to the value	dB	50				

Note 1: his refers to the value of Thresh<sub>x, low</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

#### A.4.3.1.1.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as:  $T_{higher\_priority\_search} + T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ 

#### Where:

T<sub>higher\_priority\_search</sub> See clause 4.2.2; 60s is assumed in this test case

 $T_{evaluateUTRA-FDD}$  See Table 4.2.2.5.1-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s for higher priority cell search, allow 81 s for higher priority cell reselection in the test case.

#### A.4.3.1.2 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of lower priority

#### A.4.3.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.1 when the UTRA cell is of lower priority.

The test scenario comprises of one UTRA FDD and one E-UTRA FDD cells as given in tables A.4.3.1.2.1-1, A.4.3.1.2.1-2 and A.4.3.1.2.1-3. The test consists of two successive time periods, with time duration of T1 and T2

respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.1.2.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

	Parameter	Unit	Value	Comment						
Initial condition	Active cell		Cell1	E-UTRAN cell						
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test						
	Neighbour cell		Cell2							
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2						
condition	Neighbour cell		Cell1							
E-UTRA P	RACH configuration		4	As specified in table 5.7.1-2 in TS 36.211						
E_UTRA A Information	access Barring	-	Not Sent	No additional delays in random access procedure.						
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.						
T1	-	S	85	T1 need to be defined so that cell re-selection reaction time is taken into account.						
T2	T2		2				s		25	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.1.2.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit		Cell 1			
		T1	T2			
E-UTRA RF Channel			1			
number						
BW <sub>channel</sub>	MHz		10			
OCNG Patterns defined in						
A.3.2.1.2 (OP.2 FDD)		OP.2 FDD				
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
Qqualmin for UTRA	dB	-20				
neighbour cell	ub		-20			
Qrxlevmin for UTRA	dBm	-115				
neighbour cell						
Qrxlevmin	dBm		-140			
$N_{oc}$	dBm/15 kHz		-98			
RSRP	dBm/15 KHz	-86	-102			
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	12	-4			
	dB	12	-4			
$\hat{E}_s/N_{oc}$	UD.	12				
Treselection <sub>EUTRAN</sub>	S		0			
Snonintrasearch	dB	N	ot sent			
Thresh <sub>serving, low</sub>	dB		44			
Thresh <sub>x, low</sub> (Note 2)	dB	42				
Propagation Condition			AWGN			
Note 1: OCNG shall be used such that both colls are fully allocated						

Note 2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA target cell

Table A.4.3.1.2.1-3: Cell specific test parameters for cell 2 (UTRA)

Unit	Cell 2 (UTRA)			
	T1	T2		
	Channel 2	2		
dB	-10			
dB	-12			
dB	-12			
dB	-15			
dB	-0.941			
dB	13	13		
dBm/3,84 MHz	-70			
dB	-10.21	-10.21		
dBm	-67	-67		
	AWGN			
dB	-20			
dBm	-115			
dBm	-140			
dBm	21			
S	0	`		
dB	42			
dB	0			
dB	48			
	dB d	T1 Channel 2 dB -10 dB -12 dB -12 dB -15 dB -0.941 dB 13 dBm/3,84 MHz -70 dB -10.21 dBm -67 AWGN dB -20 dBm -115 dBm -140 dBm 21 s 0 dB 42 dB 0		

Note 1: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

#### A.4.3.1.2.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ 

#### Where:

 $T_{evaluateUTRA-FDD}$  See Table 4.2.2.5.1-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

to early on a cen, 1200 ms is assumed in this test ear

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

# A.4.3.1.3 EUTRA FDD-UTRA FDD cell reselection in fading propagation conditions: UTRA FDD is of lower priority

#### A.4.3.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.1 when the UTRA cell is of lower priority, and to verify the robustness of the UE measurement filtering in a fading environment. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

The test scenario comprises of one UTRA FDD and one E-UTRA FDD cells as given in tables A.4.3.1.3.1-1, A.4.3.1.3.1-2 and A.4.3.1.3.1-3. The test consists of four successive time periods, with time duration of T1 T2, T3 and

T4 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.1.3.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

	Parameter	Unit	Value	Comment			
Initial condition	Active cell		Cell1	E-UTRAN cell			
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test			
	Neighbour cell		Cell2				
T3 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T3			
condition	Neighbour cell		Cell1				
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211			
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.			
DRX cycle length		S	1.28	The value shall be used for all cells in the test.			
T1		S	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1			
T2		S	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1			
ТЗ		S	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send preambles to cell 2			
T4		S	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2			

Table A.4.3.1.3.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit			Cell 1		
		T1	T2	T3	T4	
E-UTRA RF Channel number		1				
BW <sub>channel</sub>	MHz	10				
Correlation Matrix and Antenna			1	x2 Low		
Configuration						
OCNG Patterns defined in						
A.3.2.1.2 (OP.2 FDD)			OI	P.2 FDD		
PSS_RA	dB			0		
SSS_RA	dB			0		
PCFICH_RB	dB			0		
PHICH_RA	dB			0		
PHICH_RB	dB			0		
PDCCH_RA	dB			0		
PDCCH_RB	dB			0		
PDSCH_RA	dB	0				
PDSCH_RB	dB			0		
OCNG_RA <sup>Note 1</sup>	dB			0		
OCNG_RB <sup>Note 1</sup>	dB			0		
Qqualmin for UTRA neighbour	dB			-20		
cell	uБ			-20		
Qrxlevmin for UTRA neighbour	dBm			-115		
cell						
Qrxlevmin	dBm			-140		
$N_{oc}$	dBm/15			-104		
	kHz		•			
RSRP	dBm/15	-82	-82	-107	-107	
	KHz					
$\hat{E}_{s}/I_{ot}$	dB	22	22	-3	-3	
	-ID	00	00		-	
$\hat{E}_s/N_{oc}$	dB	22 22 -3 -3			-3	
Treselection <sub>EUTRAN</sub>	S			0		
Snonintrasearch	dB		N	lot sent		
Thresh <sub>serving, low</sub>	dB			44		
Thresh <sub>x, low</sub> (Note 2)	dB			42		
Propagation Condition				ETU70		

Note 2: This refers to the value of Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.

Table A.4.3.1.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit		Cell 2	2 (UTRA)		
		T1	T2	T3	T4	
UTRA RF Channel Number			Cha	annel 2		
CPICH_Ec/lor	dB			-10		
PCCPCH_Ec/lor	dB			-12		
SCH_Ec/lor	dB			-12		
PICH_Ec/lor	dB			-15		
OCNS_Ec/lor	dB		-(	0.941		
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13	
$I_{oc}$	dBm/3,84 MHz	-70				
CPICH_Ec/lo	dB	-10.21	-10.21	-10.21	-10.21	
CPICH_RSCP	dBm	-67	-67	-67	-67	
Propagation Condition			Α	WGN		
Qqualmin	dB			-20		
Qrxlevmin	dBm			-115		
QrxlevminEUTRA	dBm			-140		
UE_TXPWR_MAX_RACH	dBm	21				
Treselection	S	0				
Sprioritysearch1	dB	42				
Sprioritysearch2	dB	0				
Thresh <sub>x, high</sub> (Note 1)	dB			44		
Note 1: This refers to the val	ue of Threshx	high Which	is included	in UTRA sv	stem	

Note 1: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

#### A.4.3.1.3.2 Test Requirements

The probability of reselection from cell 1to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ 

#### Where:

T<sub>evaluateUTRA-FDD</sub> See Table 4.2.2.5.1-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

# A.4.3.1.4 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of lower priority for 5MHz bandwidth

#### A.4.3.1.4.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.4.3.1.2.1

The parameters of this test are the same as defined in Subclause A.4.3.1.2.1 except that the values of the parameters in the Table A.4.3.1.4.1-2 will replace the values of the corresponding parameters in A.4.3.1.2.1-2.

This is according to the principle defined in section A.3.7.2.

Table A.4.3.1.4.1-2: Cell specific test parameters for cell 1 (E-UTRA) for 5MHz bandwidth

Parameter	Unit	Cell 1			
		T1 T2			
BW <sub>channel</sub>	MHz	5			
OCNG Patterns defined in		OP	.16 FDD		
A.3.2.1.16 (OP.16 FDD)					
Note 1: See Table A.4.3.1.2.1-2 for the other parameters.					

#### A.4.3.1.4.2 Test Requirements

The test requirements defined in section A.4.3.1.2.1 shall apply to this test case.

# A.4.3.1.5 Idle mode FDD to UTRA FDD interRAT reselection

#### A.4.3.1.5.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD-UTRA FDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 UTRA FDD interfrequency cells on 6 different carriers in the neighbour list of cell 1 as given in table A.4.3.1.5-1 and cells 2 and 3 as given in table A.4.3.1.5-2. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 6 inter-RAT layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2 and 3 are identified by the UE during time period T0. Cell 1, cell 2 and cell 3 all belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3. Cells 2 and 3 all have lower absolute priority than cell 1.

Table A.4.3.1.5-1: General test parameters for E-UTRAN FDD- UTRAN FDD inter frequency cell reselection test case

Parai	meter	Unit	Value	Comment
Т0	Active cell		Cell 1	To is repeated on each repetition of the test. In To the test equipment selects frequencies for cell 2 and 3, and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell 1, cell 3	
T2 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T2
	Neighbour cell		Cell 2, cell 3	
T3 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T3
	Neighbour cell		Cell 1, cell 2	
T4 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T4
	Neighbour cell		Cell 2, cell 3	
UE configured E-UTF Number		1	Serving cell and six UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance	
UE configured UTRA Number	RF Channel		2,3,4,5,6,7	
Test eqipment config	uration		Cell 1 uses E- UTRA RF channel number 1	
			Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7	
PRACH configuration	า		4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Inform	mation	-	Not Sent	No additional delays in random access procedure.
DRX cycle length		S	1.28	The value shall be used for all cells in the test.
ТО		s	(test equipment frequency selection and configuration time) + 960	Initialisation time need to be defined so that cell detection time is taken into account.
T1		S	25	T1 need to be defined so that cell reselection reaction time is taken into account.
T2		S	25	T2 need to be defined so that cell reselection reaction time is taken into account
Т3		S	200	T3 need to be defined so that cell reselection reaction time is taken into account.
T4		S	25	T4 need to be defined so that cell re- selection reaction time is taken into account

Table A.4.3.1.5-2: Cell specific test parameters for E-UTRAN FDD- UTRAN FDD inter-RAT cell reselection test case in AWGN cell 1 (E-UTRAN)

Parameter	Unit			Cell 1		
		T0	T1	T2	T3	T4
E-UTRA RF Channel				1		
number						
BW <sub>channel</sub>	MHz	$5MHz: N_{RB} = 25$				
		$10MHz: N_{RB} = 50$				
lo	dBm/4.	59.0	64.5	59.0	64.5	59.0
	5MHz(2	6	9	6	9	6
	5RB)					
	dBm/9	56.0	61.5	56.0	61.5	56.0
	Mhz	50.0	8	50.0	8	50.0
	(50RB)	3	0	3	0	3
PDSCH parameters:	(OUTE)		OP 16	FDD (5	i SMHz)	
DL Reference				FDD (10		
Measurement				(	·····-,	
Channel			OP.10	D TDD(5	MHz)	
		OP.2 TDD (10MHz)				
Time offset with				0		
respect to cell1						
PBCH RA	dB			0		
PBCH RB	dB					
PSS RA	dB					
SSS RA	dB					
PCFICH RB	dB					
PHICH RA	dB					
PHICH RB	dB					
PDCCH RA	dB					
PDCCH RB	dB					
PDSCH RA	dB					
PDSCH RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB			1.10		
Qrxlevmin	dBm			-140		
$N_{oc}$ Note 2	dBm			-98		
RSRP Note 3	dBm	-84	-90	-84	-90	-84
$\hat{E}_{s}/I_{ot}$	dB	14	8	14	8	14
$\hat{E}_s/N_{oc}$	dB	14	8	14	8	14
Treselection <sub>EUTRAN</sub>	S			0		
Snonintrasearch	dB		-	62	-	-
Propagation				AWGN		
Condition						
Note 1: OCNC shall be	so used our	sh that t	المم مط	s fully al	located	anda

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.4.3.1.5-3: Cell specific test parameters for cells 2 and 3 (UTRA)

Davometer	Unit	Cell 2				Cell 3					
Parameter	Unit	T0 T1 T2 T3 T4			T0	T1	T2	T3	T4		
UTRA RF Channel Number			that cell	ected fro 2 is in th rmance	e norma		Randomly selected from 4, 5, 6 such that cell 3 is in the reduced performance group				
CPICH_Ec/lor	dB		•	-10			-10				
PCCPCH_Ec/lor	dB			-12					-12		
SCH_Ec/lor	dB			-12					-12		
PICH_Ec/lor	dB			-15					-15		
OCNS_Ec/lor	dB			-0.941			0.941				
$\hat{I}_{or}/I_{oc}$	dB	-11	-5	-11	-11	-11	-11	-11	-11	-5	-11
$I_{oc}$	dBm/3,84 MHz			-70					-70		
CPICH_Ec/lo	dB	10.3 3	- 16.1 9	10.3 3	10.3 3	10.3 3	10.3 3	10.3 3	10.3 3	- 16.1 9	10.3 3
CPICH_RSCP	dBm	-69	-85	-69	-69	-69	-69	-69	-69	-85	-69
Propagation Condition			•	AWGN	•				AWGN		
Qqualmin	dB			-20					-20		
Qrxlevmin	dBm			-115					-115		
QrxlevminEUTRA	dBm			-140					-140		
UE_TXPWR_MAX_RACH	dBm			21					21		
Treselection	S	0					0				
Sprioritysearch1	dB	62			62						
Sprioritysearch2	dB			0					0		
Thresh <sub>serving, low</sub>	dB			36					36		
Thresh <sub>x, low</sub> (Note 1)	dB			50					50		

#### A.4.3.1.5.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.1.5.2-1

Table A.4.3.1.5.2-1

Time phase	Target cell	Requirement for reselection delay (seconds)
T0	Cell 1	
T1	Cell 2 (normal performance group)	21
T2	Cell 1 (normal performance group)	8
T3	Cell 3 (reduced performance group)	148
T4	Cell 1 (normal performance group)	8

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as:  $(N_{UTRA\_carrier,normal}) * T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$  and to a reduced performance group cell can be expressed as:  $6 * N_{UTRA\_carrier,reduced} * T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ .

#### Where:

 $T_{evaluateUTRA-FDD}$  See Table 4.2.2.5.1-1

 $T_{\text{SI-UTRA}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for normal performance group reselection, allow 21 s, and gives a total of 147.6 s for reduced performance group reselection, allow 148 s for reduced performance group in the test case. For reselections back to cell 1 since only one frequency is configured, the requirement is  $T_{\text{evaluate,E-UTRAN\_Inter}}$ , +  $T_{\text{SI}}$  = 7.68s, allow 8s.

# A.4.3.2 E-UTRAN FDD – UTRAN TDD:

#### A.4.3.2.1 Test Purpose and Environment

#### A.4.3.2.1.1 Void

#### A.4.3.2.1.2 1.28Mcps TDD option

This test is to verify the requirement for the E-UTRA FDD to UTRA TDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.2 when the UTRA cell is of lower priority.

This test scenario comprised of 1 E-UTRA FDD serving cell (Cell 1), and 1 UTRA TDD cell (Cell 2) to be re-selected. Test parameters are given in table A.4.3.2.1.2-1, A.4.3.2.1.2-2, and A.4.3.2.1.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Cell 2 is of lower priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.2.1.2-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD OPTION) Cell Re-selection

Pai	rameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end Active cell condition			Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	E-UTRA FDD cell
CP length of	CP length of cell 1		normal	
E-UTRA PRA	E-UTRA PRACH		4	As specified in table 5.7.1-2 in TS 36.211
Time offset b	etween cells		3 ms	Asynchronous cells
Access Barri	ng Information	-	Not sent	No additional delays in random access procedure.
Treselection		S	0	
DRX cycle le	ngth	S	1,28	
HCS			Not used	
T1	T1		85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	25	

Table A.4.3.2.1.2-2: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 1)

Parameter	Unit	Ce	ll 1	
		T1	T2	
E-UTRA RF Channel		1		
Number				
BW <sub>channel</sub>	MHz	1	0	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note1</sup>	dB			
OCNG_RB <sup>Note1</sup>	dB			
Qrxlevmin	dBm/15kHz	-140	-140	
$N_{oc}$	dBm/15kHz	-(	98	
RSRP	dBm/15kHz	-87	-101	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	11	-3	
S <sub>nonintrasearch</sub>	dB	Not	sent	
Thresh <sub>serving, low</sub>	dB	46 (-94dBm)		
Thresh <sub>x, low</sub> (Note2)	dB	24 (-7	9dBm)	
Propagation Condition		AW	/GN	
Note 1: OCNG shall be u	sad such that call is	fully allocated	d and a	

Note2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell

Table A.4.3.2.1.2-3: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 2)

Unit		Cell 2 (UTRA)			
	0		Dwl	PTS	
	T1	T2	T1	T2	
		Char	nol 2		
		Cilai	IIIEI Z		
dB	-3	-3			
dB			0	0	
dB	-3	-3			
dB	11	11	11	11	
dBm/1.28 MHz	-80				
dBm	-72	-72	n.a.	n.a.	
	AWGN				
dBm	-103				
dB	C1, C2: 0				
dB	0				
dB		46 (-9	4dBm)	•	
	dB dB dB dB dBm/1.28 MHz dBm	dB -3 dB dB 11 dBm/1.28 MHz dBm -72 dBm dB dB dB dB dB	O	0   Dwl   T1   T2   T1     Channel 2     dB   -3   -3     dB   0     dB   -3   -3     dB   11   11   11     dBm/1.28	

Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note2: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

#### A.4.3.2.1.3 Void

#### A.4.3.2.2 Test Requirements

#### A.4.3.2.2.1 1.28Mcps TDD option

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluateUTRA\_TDD} + T_{SI-UTRA}$ 

#### Where:

 $T_{evaluateUTRA\_TDD}$  19.2s, See table table 4.2.2.5.2-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

A.4.3.2.2.2.3 Void

# A.4.3.2A E-UTRA FDD to UTRA TDD cell re-selection for IncMon

#### A.4.3.2A.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD to UTRA TDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4. UTRA TDD cells are of lower priority than E-UTRA serving cell.

The test scenario comprises of indicating 7 UTRA TDD inter-RAT cells on 7 different carriers in the neighbour list of cell 1 as given in tables A.4.3.2A.1-1, A.4.3.2A.1-2 and A.4.3.2A.1-3. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3, and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (E-UTRA serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 7 inter-RAT layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other UTRA TDD frequencies configured to the UE in the test.

Cell 1, 2 and 3 are identified by the UE during time phase T0. Cell 1, cell 2 and cell 3 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3.

Table A.4.3.2A.1-1: General test parameters for E-UTRA FDD to UTRA TDD inter-RAT cell re-selection test case

Pa	rameter	Unit	Value	Comment
ТО	Active cell		Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T1
condition	Neighbour cell		Cell1	
T2 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T2
T3 end	Active cell		Cell3	UE shall perform reselection to cell 3 during T3
condition	Neighbour cell		Cell1	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 in T4 so that next repetition of test can start from T0
UE configuent Channel N	ured UTRA RF lumber		1, 2, 3, 4, 5, 6, 7	Seven UTRA TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 4, 5, 6, and 7 are indicated to have reduced performance
Test eqipriconfigurati			Cell 1, 2, 3	Cell 1 uses E-UTRA RF channel number 1 Cells 2 is randomly selected to use different frequencies selected from UTRA frequencies 1, 2, 3. Cells 3 is randomly selected to use different frequencies selected from UTRA frequencies 4, 5, 6, 7.
CP length	of cell 1		normal	
PRACH co	onfiguration		4	As specified in table 5.7.1-2 in TS 36.211 [16]
Access Ba Informatio		-	Not Sent	No additional delays in random access procedure.
T <sub>reselection</sub>		S	0	
HCS			Not used	
DRX cycle	elength	S	1.28	The value shall be used for all cells in the test.
ТО		S	(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		S	60	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	25	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		S	500	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		S	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.3.2A.1-2: E-UTRA Cell specific test parameters for E-UTRA FDD to UTRA TDD inter-RAT cell reselection test case in AWGN

T0   T1   T2	Т3	T4
BW <sub>channel</sub> MHz         5MHz: N <sub>RB</sub> = 10MHz: N <sub>RB</sub> OCNG Patterns         5MHz: OP.16           PBCH_RA         dB           PBCH_RB         dB           PSS_RA         dB           SSS_RA         dB           PHICH_RB         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RA         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA         NOTE 1		1 17
10MHz: N <sub>RB</sub>		•
OCNG Patterns         5MHz: OP.16           PBCH_RA         dB           PBCH_RB         dB           PSS_RA         dB           SSS_RA         dB           PHICH_RB         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB	: 25	
PBCH_RA		
PBCH_RA         dB           PBCH_RB         dB           PSS_RA         dB           SSS_RA         dB           PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PSS_RA         dB           SSS_RA         dB           PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
SSS_RA         dB           PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PHICH_RB         dB         0           PDCCH_RA         dB         0           PDCCH_RB         dB         0           PDSCH_RA         dB         0           PDSCH_RB         dB         0           OCNG_RA NOTE 1         dB         0		
PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA NOTE 1         dB		
PDSCH_RB dB OCNG_RA NOTE 1 dB		
OCNG_RA NOTE 1 dB		
OCNG_RA NOTE 1 dB OCNG_RB NOTE 1 dB		
OCNG RB NOTE 1 dB		
0010_10		
$N_{oc}^{ m NOTE2}$ dBm/15kHz -98		
$\hat{E}_s/N_{oc}$ dB 11 -3 11	-3	11
$\hat{E}_{_{s}}/I_{_{ot}}$ NOTE 3 dB 11 -3 11	-3	11
RSRP NOTE 3 dBm/15kHz -87 -101 -87	-101	-87
Q <sub>rxlevmin</sub> dBm/15kHz -140		•
S <sub>nonintrasearch</sub> dB Not sent		
Thresh <sub>serving, low</sub> dB 46 (-94dBr	n)	
Thresh <sub>X, low</sub>	n)	
Propagation Condition AWGN		
Antenna Configuration 1x2		

NOTE 4: This refers to the value of Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.

NOTE 3: E<sub>s</sub>/I<sub>ot</sub> and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.4.3.2A.1-3: UTRA TDD Cell specific test parameters for E-UTRA FDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit	Cell 2 (UTRA TDD)										
Timeslot Number		0					DwPTS					
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	
UTRA RF Channel Number NOTE 1		Randomly selected from 1, 2, 3 such that cell 2 is in the normal performance group										
PCCPCH_Ec/lor	dB	-3										
DwPCH_Ec/lor	dB	0										
OCNS_Ec/lor	dB	-3										
$I_{oc}$	dBm/ 1.28 MHz	-80										
$\hat{I}_{or}/I_{oc}$	dB	-3	11	-3	-3	-3	-3	11	-3	-3	-3	
PCCPCH RSCP	dBm	-86 -72 -86 -86 -86 n.a.										
Propagation Condition		AWGN										
Q <sub>rxlevmin</sub>	dBm	-103										
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0										
Qhyst1 <sub>s</sub>	dB	0										
Sprioritysearch1	dB	24 (-79dBm)										
Sprioritysearch2	dB	0										
Thresh <sub>x, high</sub> NOTE 2	dB	46 (-94dBm)										
Ssearch <sub>E-UTRA</sub>	dB	Not send										
Time offset to cell1	ms	3										

NOTE 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

NOTE 2: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

Table A.4.3.2A.1-4:

Parameter	Unit	Cell 3 (UTRA TDD)										
Timeslot Number		0					DwPTS					
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	
UTRA RF Channel		Randomly selected from 4, 5, 6, 7 such that cell 3 is in the reduced performance										
Number NOTE 1		group										
PCCPCH_Ec/lor	dB	-3										
DwPCH_Ec/lor	dB	0										
OCNS_Ec/lor	dB	-3										
$I_{oc}$	dBm/ 1.28 MHz	-80										
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	11	-3	-3	-3	-3	11	-3	
PCCPCH RSCP	dBm	-86 -86 -86 -72 -86 n.a.										
Propagation		AWGN										
Condition		AVVGIN										
Q <sub>rxlevmin</sub>	dBm	-103										
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0										
Qhyst1 <sub>s</sub>	dB	0										
Sprioritysearch1	dB	24 (-79dBm)										
Sprioritysearch2	dB	0										
Thresh <sub>x, high</sub> NOTE 2	dB	46 (-94dBm)										
Ssearch <sub>E-UTRA</sub>	dB	Not send										
Time offset to cell1	ms	3										
Time offset to cell2	μs	3										
NOTE 1: In the case of multi-frequency cell, the LITPA PE Channel Number is the primary frequency's channel number												

NOTE 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

NOTE 2: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

# A.4.3.2A.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send the SYNCH-UL sequence in the UpPTS on cell 2, 3 for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.2A.2-1

Table A.4.3.2A.2-1: Test requirements for E-UTRA FDD to UTRA TDD inter-RAT cell reselection

Time phase	Target cell	Requirement for reselection delay (seconds)				
T1	Cell 2 (normal performance group)	58.9				
T3	Cell 3 (reduced performance group)	462.1				

The rate of correct cell reselections observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time.

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as:  $N_{UTRA\_carrier\_TDD,normal} *T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$ , and to a reduced performance group cell can be expressed as:  $6 * N_{UTRA\_carrier\_TDD,reduced} *T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$ ,

#### Where:

T<sub>evaluateUTRA TDD</sub> 19.2s, See Table 4.2.2.5.2-1

T<sub>SI\_UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 3\*19.2+1.28=58.88 s for normal performance group reselection and 6\*4\*19.2+1.28=462.08s for reduced performance group reselection, allow 58.9s for normal performance group and 462.1s for reduced performance group in the test case.

Since only one E-UTRA frequency is configured and signal level of UTRA cell is lower than threshold of  $S_{prioritysearch}$ , the UE shall select back to cell 1 (E-UTRA cell) within  $K_{carrier} * T_{evaluateEUTRA} + T_{SI} = 19.2 + 1.28 = 20.48s$ .

#### A.4.3.3 E-UTRAN TDD – UTRAN FDD:

#### A.4.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA TDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.1 when the UTRA cell is of lower priority.

The test scenario comprises of one UTRA FDD and one E-UTRA TDD cells as given in tables A.4.3.3.1-1, A.4.3.3.1-2 and A.4.3.3.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.3.1-1: General test parameters for EUTRA TDD- lower priority UTRA FDD inter RAT cell reselection test case

	Parameter		Value	Comment				
Initial condition	Active cell		Cell1	E-UTRAN cell				
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test				
	Neighbour cell		Cell2					
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2				
condition	Neighbour cell		Cell1					
E-UTRA P	E-UTRA PRACH configuration		53	As specified in table 5.7.1-3 in TS 36.211				
Uplink-dov	Uplink-downlink configuration of		1	As specified in table 4.2.2 in TS 36.211				
Special sul	Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211				
	E_UTRA Access Barring Information						Not Sent	No additional delays in random access procedure.
DRX cycle length		S	1.28	The value shall be used for all cells in the test.				
T1	T1		85	T1 need to be defined so that cell re-selection reaction time is taken into account.				
T2	T2		25	T2 need to be defined so that cell re-selection reaction time is taken into account.				

Table A.4.3.3.1-2: Cell specific test parameters for cell 1(E-UTRA)

T1   T2	Parameter	Unit	Cell 1				
Number   BW_{channel}							
BW   MHz	E-UTRA RF Channel		1				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	number						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		MHz		10			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	A.3.2.2.2 (OP.2 TDD)		OI	P.2 TDD			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		dB					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	SSS_RA	dB					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	PCFICH_RB	dB					
PDCCH_RA				0			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				U			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		dB					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDSCH_RB	dB					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG_RANOTE I						
neighbour cell		dB					
neighbour cell Qrxlevmin for UTRA neighbour cell dBm -115 $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		dB		-20			
neighbour cell dBm $-115$ Qrxlevmin dBm $-140$ $N_{oc}$ dBm/15 kHz $-98$ RSRP dBm/15 KHz $-86$ $-102$ $\hat{E}_s/I_{ot}$ dB $12$ $-4$ $\hat{E}_s/N_{oc}$ dB $12$ $-4$ Treselection <sub>EUTRAN</sub> $s$ $0$		4.5					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		dBm		-115			
$N_{oc}$ dBm/15 kHz -98 RSRP dBm/15 KHz -86 -102 $\hat{\bf E}_s/{\bf I}_{ot}$ dB 12 -4 $\hat{\bf E}_s/N_{oc}$ dB 12 -4 Treselection <sub>EUTRAN</sub> s 0							
RSRP dBm/15 KHz -86 -102 $\hat{E}_s/I_{ot}$ dB 12 -4 $\hat{E}_s/N_{oc}$ dB 12 -4 Treselection $E_s$ s 0							
$\hat{E}_s/I_{ot}$ dB 12 -4 $\hat{E}_s/N_{oc}$ dB 12 -4 Treselection <sub>EUTRAN</sub> s 0	$N_{oc}$	dBm/15 kHz		-98			
$\hat{E}_{s}/I_{ m ot}$ dB 12 -4 Treselection <sub>EUTRAN</sub> s 0	RSRP	dBm/15 KHz	-86	-102			
$E_s/N_{oc}$ Treselection <sub>EUTRAN</sub> s 0	$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	12 -4				
	$\hat{E}_s/N_{oc}$	dB	12 -4				
	Treselection <sub>EUTRAN</sub>	S					
	Snonintrasearch	dB	Not sent				
Thresh <sub>serving, low</sub> dB 44		dB					
Thresh <sub>x, low</sub> (NOTE 2) dB 42	Thresh <sub>x, low</sub> (NOTE 2)	dB					
Propagation Condition AWGN	Propagation Condition						

NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: This refers to the value of Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell

Table A.4.3.3.1-3: Cell specific test parameters for cell 2 (UTRA)

	T1	T2	
	Chan	nel 2	
dB	-1	10	
dB	-1	12	
dB	-1	12	
dB	-1	15	
dB	-0.9	941	
dB	13	13	
dBm/3,84 MHz	-7	<b>'</b> 0	
dB	-10.21	-10.21	
dBm	-67	-67	
	AW	'GN	
dB	-2	20	
dBm	-1	15	
dBm	-14	40	
dBm	2	1	
S	0		
dB	4	2	
dB	(	)	
dB	48		
	dB dB dB dB dB dB dB dBm/3,84 MHz dB dBm dBm dBm dBm dBm dBm dBm dBm	dB          dB          dB          dB          dB       13         dBm/3,84 MHz       -7         dB       -10.21         dBm       -67         AW       AW         dB       -2         dBm       -1         dBm       -1         dBm       2         s       0         dB       4         dB       4         dB       4         dB       4         dB       4         dB       4         dB       4	

NOTE 1: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

#### A.4.3.3.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ 

Where:

T<sub>evaluateUTRA-FDD</sub> See Table 4.2.2.5.1-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

#### A.4.3.3A Idle mode TDD to UTRA FDD interRAT reselection

#### A.4.3.3A.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA TDD-UTRA FDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 UTRA FDD interfrequency cells on 6 different carriers in the neighbour list of cell 1 as given in table A.4.3.3A.1-2 and table A.4.3.3A.1-3 and cells 2 and 3 as given in table A.4.3.3A.1-4. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 6 inter-RAT layers which are configured in the

UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2 and 3 4 are identified by the UE during time period T0. Cell 1, cell 2 and cell 3 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3. Cells 1, 2 and 3 4 all have lower absolute priority than cell 1.

Table A.4.3.3A.1-1: General test parameters for E-UTRAN TDD- UTRAN FDD inter frequency cell reselection test case

Parameter		Unit	Value	Comment		
ТО	Active cell		Cell 1	To is repeated on each repetition of the test. In To the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific		
T1 start condition	Active cell		Cell 1	parameters for detailed settings.		
T1 start condition T1 end condition	Active cell Active cell		Cell 2	UE shall perform reselection to cell 2 during T1		
	Neighbour cell		Cell 1, cell 3	aug		
T2 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T2		
	Neighbour cell		Cell 2, cell 3			
T3 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T3		
	Neighbour cell		Cell 1, cell 2			
T4 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T4		
HE C LEHTOA	Neighbour cell		Cell 2, cell 3	0 : " ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !		
UE configured E-UTRA		1	Serving cell and six UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance			
UE configured UTRA RF			2,3,4,5,6,7			
Test eqipment configura	liion		Cell 1 uses E- UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7			
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211		
Access Barring Informat	ion	-	Not Sent	No additional delays in random access procedure.		
DRX cycle length		S	1.28	The value shall be used for all cells in the test.		
T1 T2 T3		S	(test equipment frequency selection and configuration time) + 960	Initialisation time need to be defined so that cell detection time is taken into account.		
		S	25	T1 need to be defined so that cell reselection reaction time is taken into account.		
		S	25	T2 need to be defined so that cell re- selection reaction time is taken into account		
		S	200	T3 need to be defined so that cell re- selection reaction time is taken into account.		
T4			25	T4 need to be defined so that cell re- selection reaction time is taken into account		

Table A.4.3.3A.1-2: General test parameters for EUTRA TDD- UTRA FDD inter RAT cell re-selection test case

Parameter	Unit	Value	Comment
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211

Table A.4.3.3A.1-3: Cell specific test parameters for E-UTRAN TDD- UTRAN FDD inter-RAT cell reselection test case in AWGN cell 1 (E-UTRAN)

Parameter	Unit	Cell 1						
		T0	T1	T2	T3	T4		
E-UTRA RF Channel			1					
number								
BW <sub>channel</sub>	MHz		5MH	Iz: N <sub>RB</sub> :	= 25			
			10M	Hz: N <sub>RB</sub>	= 50			
lo	dBm/4.	59.0	64.5	59.0	64.5	59.0		
	5MHz(2	6	9	6	9	6		
	5RB)							
	dBm/9	56.0	61.5	56.0	61.5	56.0		
	Mhz	5	8	5	8	5		
	(50RB)							
PDSCH parameters:				FDD (				
DL Reference			OP.2	FDD (10	OMHz)			
Measurement			05.4	TDD (-				
Channel				) TDD(5				
T			OP.2	TDD (10	JMHZ)			
Time offset with				0				
respect to cell1	-ID			- 0				
PBCH RA	dB			0				
PBCH RB	dB							
PSS RA	dB							
SSS RA	dB							
PCFICH RB	dB							
PHICH RA	dB							
PHICH RB	dB							
PDCCH RA	dB							
PDCCH RB	dB							
PDSCH RA	dB							
PDSCH RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB			4.40				
Qrxlevmin	dBm			-140				
$N_{oc}$ Note 2	dBm	-98						
RSRP Note 3	dBm	-84	-90	-90	00	-84		
	dB	14	-90	-90	-90 8	14		
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	GD.	14	O	0	O	14		
$\hat{E}_s/N_{oc}$	dB	14	8	8	8	14		
Treselection <sub>EUTRAN</sub>	S	0						
Snonintrasearch	dB	62						
Propagation				AWGN				
Condition								
Note 1: OCNG shall						l and		
a constant to				tral den	isity is			
	achieved for all OFDM symbols.							
	ce from other cells and noise sources not specified is assumed to be constant over subcarriers and							
time and sha		ned as A	AVV GIV C	ıı appro	priate po	wer		
for to be full Note 3: RSRP levels		dorive	d from -	thar sa	omoto	for		
Note 3: RSRP levels information								
themselves.	ourposes. I	ney are	1101 261	iavie pa	iaiiielei	၁		
themseives.								

Table A.4.3.3A.1-4: Cell specific test parameters for cells 2 and 3 (UTRA)

Donomotor	Unit	Cell 2					Cell 3				
Parameter	Unit	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number			that cell	ected fro 2 is in th rmance	e norma		Randomly selected from 4, 5, 6 such that cell 3 is in the reduced performance group				
CPICH_Ec/lor	dB			-10					-10		
PCCPCH_Ec/lor	dB			-12					-12		
SCH_Ec/lor	dB			-12					-12		
PICH_Ec/lor	dB			-15					-15		
OCNS_Ec/lor	dB			-0.941					0.941		
$\hat{I}_{or}/I_{oc}$	dB	-11	-5	-11	-11	-11	-11	-11	-11	-5	-11
$I_{oc}$	dBm/3,84 MHz			-70			-70				
CPICH_Ec/lo	dB	- 10.3 3	- 16.1 9	10.3 3	- 10.3 3	10.3 3	- 10.3 3	- 10.3 3	- 10.3 6	- 16.1 9	10.3 3
CPICH_RSCP	dBm	-69	-85	-69	-69	-69	-69	-69	-69	-85	-69
Propagation Condition			•	AWGN	•		AWGN				
Qqualmin	dB			-20			-20				
Qrxlevmin	dBm			-115			-115				
QrxlevminEUTRA	dBm	-140			-140						
UE_TXPWR_MAX_RACH	dBm	21			21						
Treselection	S	0				0					
Sprioritysearch1	dB	62			62						
Sprioritysearch2	dB	0			0						
Thresh <sub>serving, low</sub>	dB			36			36				
Thresh <sub>x, low</sub> (Note 1)	dB			50			50				

# A.4.3.3A.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.1.5-1

Table A.4.3.3A.2-1

Time phase	Target cell	Requirement for reselection delay (seconds)
T0	Cell 1	
T1	Cell 2 (normal performance group)	21
T2	Cell 1 (normal performance group)	8
T3	Cell 3 (reduced performance group)	148
T4	Cell 1 (normal performance group)	8

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as:  $(N_{UTRA\_carrier,normal}) * T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$  and to a reduced performance group cell can be expressed as:  $6 * N_{UTRA\_carrier,reduced} * T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ .

#### Where:

 $T_{evaluateUTRA-FDD}$  See Table 4.2.2.5.1-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for normal performance group reselection, allow 21 s, and gives a total of 147.6 s for reduced performance group reselection, allow 148 s for reduced performance group in the test case. For reselections back to cell 1 since only one frequency is configured, the requirement is  $T_{\text{evaluate,E-UTRAN\_Inter}}$ , +  $T_{\text{SI}}$  = 7.68s, allow 8s.

# A.4.3.4 E-UTRAN TDD – UTRAN TDD:

#### A.4.3.4.1 E-UTRA to UTRA TDD cell re-selection: UTRA is of higher priority

#### A.4.3.4.1.1 Test Purpose and Environment

A.4.3.4.1.1.1 Void

#### A.4.3.4.1.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell re-selection requirements specified in clause 4.2.2.5 when the UTRA cell is of higher priority.

This test scenario comprised of 1 E-UTRA TDD serving cell, and 1 UTRA TDD cell to be re-selected. Test parameters are given in table A.4.3.4.1.1.2-1, A.4.3.4.1.1.2-2, and A.4.3.4.1.1.2-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.4.1.1.2-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell 1	
T3 end	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
condition	Neighbour cell		Cell 2	
Uplink-dow configuration			1	As specified in table 4.2.2 in TS 36.211
Special sub configuration			6	As specified in table 4.2.1 in TS 36.211
	nfiguration of		53	As specified in table 4.7.1-3 in TS 36.211
CP length of	of cell 1		Normal	
Time offset	between cells		3 ms	Asynchronous cells
Access Bar Information		-	Not sent	No additional delays in random access procedure.
T <sub>reselection</sub>		S	0	
DRX cycle	length	S	1,28	
HCS			Not used	
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2 s		85	T2 needs to be defined so that cell re-selection reaction time is taken into account.	
Т3		S	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.4.1.1.2-2: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Unit	Cell 1				
	T1	T2	T3		
		1			
MHz		10			
dB	<u>J</u>				
dB					
dB					
dB	1				
dB	1				
dB	1				
dB	0	0	0		
dB	7				
dB	7				
dB	]				
dB					
dB					
dB	1				
dBm/15kHz	-140	-140	-140		
dBm/15kHz		-98			
dBm/15kHz	-87	-87	-87		
dB	11	11	11		
dB		24(-79dBm)			
dB	46				
		AWGN			
	MHz  dB  dB  dB  dB  dB  dB  dB  dB  dB  d	MHz  dB  dB  dB  dB  dB  dB  dB  dB  dB  d	MHz         10           dB         11           dB         11           dB         11           dB         11           dB         11           dB         11           dB         12           dB		

NOTE 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: This refers to the value of Thresh<sub>x</sub>, high which is included in E-UTRA system information, and is a threshold for the UTRA target cell

Table A.4.3.4.1.1.2-3: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit			Cell 2 (	(UTRA)	JTRA)			
Timeslot Number			0			DwPTS			
		T1	T2	T3	T1	T2	T3		
UTRA RF Channel Number (NOTE 1)		Channel 2							
PCCPCH_Ec/lor	dB	-3	-3	-3					
DwPCH_Ec/Ior	dB				0	0	0		
OCNS_Ec/lor	dB	-3	-3	-3					
$\hat{I}_{or}/I_{oc}$	dB	-inf	11	-3	-inf	11	-3		
$I_{oc}$	dBm/1.28 MHz	-80							
PCCPCH RSCP	dBm	-inf -72 -86 n.			n.a.				
Propagation Condition		AWGN							
Q <sub>rxlevmin</sub>	dBm			-1	03				
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0							
Qhyst1 <sub>s</sub>	dB		0						
Snonintrasearch	dB	Not sent							
Thresh <sub>serving, low</sub>	dB	24 (-79dBm)							
Thresh <sub>x, low</sub> (NOTE 2)	dB		46 (-94dBm)						

NOTE 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

NOTE 2: This refers to the value of Thresh<sub>x, low</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell

A.4.3.4.1.1.3 Void

A.4.3.4.1.2 Test Requirements

A.4.3.4.1.2.1 Void

A.4.3.4.1.2.2 1.28 Mpcs TDD option

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as:  $T_{higher\_priority\_search} + T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$ ,

Where:

 $T_{higher\_priority\_search}$  60s, See clause 4.2.2

T<sub>evaluateUTRA TDD</sub> 19.2s, See Table 4.2.2.5.2-1

T<sub>SI UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s, allow 81 s for higher priority cell reselection in the test case.

A.4.3.4.1.2.3 Void

A.4.3.4.2 E-UTRA to UTRA TDD cell re-selection: UTRA is of lower priority

A.4.3.4.2.1 Test Purpose and Environment

A.4.3.4.2.1.1 Void

A.4.3.4.2.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell re-selection requirements specified in clause 4.2.2.5 when the UTRA cell is of lower priority.

This test scenario comprised of 1 E-UTRA TDD serving cell (Cell 1), and 1 UTRA TDD cell (Cell 2) to be re-selected. Test parameters are given in table A.4.3.4.2.1.2-1, A.4.3.4.2.1.2-2, and A.4.3.4.2.1.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Cell 2 is of lower priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.4.2.1.2-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Re-selection

Paran	neter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN cell
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1 for
condition				subsequent iterations of the test
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	E-UTRA TDD cell
Uplink-downlink of cell 1	configuration of		1	As specified in table 4.2.2 in TS 36.211
Special subframe of cell 1	Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
PRACH configura	ation of cell 1		53	As specified in table 4.7.1-3 in TS 36.211
CP length of cell	1		Normal	
Time offset between	een cells		3 ms	Asynchronous cells
Access Barring Ir	nformation	-	Not	No additional delays in random access procedure.
			sent	
Treselection		S	0	
DRX cycle length		S	1,28	
HCS			Not	
			used	
T1		S	85	
T2		S	25	

Table A.4.3.4.2.1.2-2: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Се	II 1	
		T1	T2	
E-UTRA RF Channel			1	
Number				
BW <sub>channel</sub>	MHz	1	0	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note1</sup>	dB			
OCNG_RB <sup>Note1</sup>	dB			
Qrxlevmin	dBm/15kHz	-140	-140	
$N_{oc}$	dBm/15kHz	-6	98	
RSRP	dBm/15kHz	-87	-101	
$\hat{E}_s/I_{ot}$	dB	11	-3	
Snonintrasearch	dB	Not	sent	
Thresh <sub>serving, low</sub>	dB	46 (-9	4dBm)	
Thresh <sub>x, low</sub> (Note2)	dB	24 (-7	9dBm)	
Propagation Condition AWGN				
	used such that cel			
constant total tr	ansmitted power s	pectral density	is achieved	
for all OFDM symbols.				
	e value of Thresh <sub>x</sub>			
UTRA system in	nformation, and is	a threshold for	the UTRA	

target cell

Table A.4.3.4.2.1.2-3: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)				
Timeslot Number		(	)	DwPTS		
		T1	T2	T1	T2	
UTRA RF Channel Number (Note1)			Char	nel 2		
PCCPCH_Ec/lor	dB	-3	-3			
DwPCH_Ec/lor	dB			0	0	
OCNS_Ec/lor	dB	-3	-3			
$\hat{I}_{or}/I_{oc}$	dB	11	11	11	11	
$I_{oc}$	dBm/1.28 MHz		-8	30		
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.	
Propagation Condition		AWGN				
Qrxlevmin	dBm	-103				
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0				
Qhyst1 <sub>s</sub>	dB	0				
Thresh <sub>x, high</sub> (Note2)	dB		46 (-9	4dBm)		

Note1: In the case of multi-frequency cell, the UTRA RF Channel

Number is the primary frequency's channel number.

Note2: This refers to the value of  $\mathsf{Thresh}_{\mathsf{x},\,\mathsf{high}}$  which is included in

UTRA system information, and is a threshold for the E-

UTRA target cell

A.4.3.4.2.1.3 Void

A.4.3.4.2.2 Test Requirements

A.4.3.4.2.2.1 Void

A.4.3.4.2.2.2 1.28 Mpcs TDD option

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$ ,

Where:

T<sub>evaluateUTRA\_TDD</sub> 19.2s, See Table 4.2.2.5.2-1

 $T_{SI\_UTRA}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

A.4.3.4.2.2.3 Void

# A.4.3.4.3 EUTRA TDD-UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority

### A.4.3.4.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA TDD- UTRA TDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.2 when the UTRA cell is of lower priority, and to verify the robustness of the UE measurement filtering in a fading environment. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

The test scenario comprises of one UTRA TDD and one E-UTRA TDD cells as given in tables A.4.3.4.3.1-1, A.4.3.4.3.1-2 and A.4.3.4.3.1-3. The test consists of four successive time periods, with time duration of T1 T2, T3 and T4 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.4.3.1-1: General test parameters for EUTRA TDD- lower priority UTRA TDD inter RAT cell re-selection test case

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T3 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
condition	Neighbour cell		Cell1	
E-UTRA P	RACH configuration		53	As specified in table 5.7.1-3 in TS 36.211
Uplink-dow cell 1	nlink configuration of		1	As specified in table 4.2.2 in TS 36.211
Special sul cell 1	Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
E_UTRA A Information	ccess Barring	-	Not Sent	No additional delays in random access procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1		S	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		S	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
ТЗ		S	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send PRACH preambles to cell 2
T4		S	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

Table A.4.3.4.3.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1						
		T1	T2	T3	T4			
E-UTRA RF Channel				1				
number								
BW <sub>channel</sub>	MHz		1	0				
Correlation Matrix and			1x2	Low				
Antenna Configuration								
OCNG Patterns defined in			OP.2	TDD				
A.3.2.2.2 (OP.2 TDD)								
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDCCH_RA	dB		(	0				
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Qrxlevmin for UTRA	dBm		-1	03				
neighbour cell								
Qrxlevmin	dBm			40				
$N_{oc}$	dBm/15 kHz		-1	04				
RSRP	dBm/15 KHz	-82	-82	-107	-107			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	22	22	-3	-3			
$\hat{E}_s/N_{oc}$	dB	22 22 -3 -3						
Treselection <sub>EUTRAN</sub>	S	0						
Snonintrasearch	dB		Not	sent				
Thresh <sub>serving, low</sub>	dB			4				
Thresh <sub>serving, low</sub> Thresh <sub>x, low</sub> (Note 2)	dB	24						
Propagation Condition			ET	U70				
N ( A CONO I III	1 1 (1 (1 (1							

OCNG shall be used such that both cells are fully allocated and a constant total Note 1:

transmitted power spectral density is achieved for all OFDM symbols. This refers to the value of Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell. Note 2:

Table A.4.3.4.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)							
Timeslot Number			(	)			Dwl	PTS	
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number (Note1)		Channel 2							
PCCPCH_Ec/lor	dB		-	3					
DwPCH_Ec/lor	dB						(	)	
OCNS_Ec/lor	dB		-	3					
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13	13	13	13	13
$I_{oc}$	dBm/1.28 MHz	-80							
PCCPCH RSCP	dBm	-70	-70	-70	-70	n.a.	n.a.	n.a.	n.a.
Propagation Condition					AW	′GN			
Qrxlevmin	dBm				-1	03			
Qrxlevmin <sub>EUTRA</sub>	dBm				-1	40			
UE_TXPWR_MAX_RACH	dBm				2	1			
Treselection	S				(	)			
Thresh <sub>x, high</sub> (Note2)	dB	44							
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.  Note2: This refers to the value of Thresh <sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell									

# A.4.3.4.3.2 Test Requirements

The probability of reselection from cell 1 to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequene in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: TevaluateUTRA TDD + TSI-UTRA

Where:

T<sub>evaluateUTRA TDD</sub> 19.2s, See Table 4.2.2.5.2-1

T<sub>SI-UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

# A.4.3.4.4 E-UTRA TDD to UTRA TDD cell re-selection for IncMon

#### A.4.3.4.4.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4. UTRA TDD cells are of lower priority than E-UTRA serving cell.

The test scenario comprises of indicating 7 UTRA TDD inter-RAT cells on 7 different carriers in the neighbour list of cell 1 as given in tables A.4.3.4.4.1-1, A.4.3.4.4.1-2 and A.4.3.4.4.1-3. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3, and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (E-UTRA serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 7 inter-RAT layers which are configured in the UE neighbour

cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other UTRA TDD frequencies configured to the UE in the test.

Cell 1, 2, and 3 are identified by the UE during time phase T0. Cell 1, cell 2, and cell 3 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3.

Table A.4.3.4.4.1-1: General test parameters for E-UTRA TDD to UTRA TDD inter-RAT cell re-selection test case

Pa	rameter	Unit	Value	Comment
ТО	Active cell		Cell1	To is repeated on each repetition of the test. In To the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T1
condition	Neighbour cell		Cell1	
T2 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T2
T3 end	Active cell		Cell3	UE shall perform reselection to cell 3 during T3
condition	Neighbour cell		Cell1	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 in T4 so that next repetition of test can start from T0
Channel N			1, 2, 3, 4, 5, 6, 7	Seven UTRA TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 4, 5, 6, and 7 are indicated to have reduced performance
Test eqipm configuration	on		Cell 1, 2, 3	Cell 1 uses E-UTRA RF channel number 1 Cells 2 is randomly selected to use different frequencies selected from UTRA frequencies 1, 2, 3. Cells 3 is randomly selected to use different frequencies selected from UTRA frequencies 4, 5, 6, 7.
Uplink-dow configuration	on of cell 1		1	As specified in table 4.2.2 in TS 36.211 [16]
Special sul configuration	on of cell 1		6	As specified in table 4.2.1 in TS 36.211 [16]
CP length			normal	
	nfiguration		53	As specified in table 5.7.1-3 in TS 36.211 [16]
Access Ba Information		ı	Not Sent	No additional delays in random access procedure.
Treselection		S	0	
HCS			Not used	
DRX cycle	length	s	1.28	The value shall be used for all cells in the test.
ТО		S	(Test equipment frequency selection and configuration time) + 960	To is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		S	60	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2	T2		25	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		S	500	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4	T4		25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.3.4.4.1-2: E-UTRA Cell specific test parameters for E-UTRA TDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit			Cell 1			
		T0	T1	T2	T3	T4	
E-UTRA RF Channel number			•	1		•	
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB</sub> = 25					
				MHz: N <sub>RB</sub> =			
OCNG Patterns				Hz: OP.10			
DDOLL DA			101	/IHz: OP.2	TDD		
PBCH_RA	dB	ļ					
PBCH_RB	dB						
PSS_RA	dB	ļ					
SSS_RA	dB	ļ					
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB			0			
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG RB Note 1	dB						
N <sub>oc</sub> Note 2	dBm/15kHz			-98			
$\hat{E}_s/N_{oc}$	dB	11	-3	11	-3	11	
$\hat{E}_{s}/I_{ot}$ Note 3	dB	11	-3	11	-3	11	
RSRP Note 3	dBm/15kHz	-87	-101	-87	-101	-87	
Q <sub>rxlevmin</sub>	dBm/15kHz			-140			
S <sub>nonintrasearch</sub>	dB	Not sent					
Thresh Note 4	dB	46 (-94dBm)					
Thresh <sub>x, low</sub> Note 4	dB		2	24 (-79dBn	າ)		
Propagation Condition				ÁWGN			
Antenna Configuration				1x2			
Note 1: OCNG shall be used su spectral density is achie			ated and a	constant to	tal transmit	ted powe	

spectral density is achieved for all OFDM symbols. Interference from other cells and noise sources not specified in the test is assumed to be constant

Note 2: over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.

Note 3: E<sub>s</sub>/I<sub>ot</sub> and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.

Table A.4.3.4.4.1-3: UTRA TDD Cell specific test parameters for E-UTRA TDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit					Cell 2 (U	ITRA TDI	D)			
Timeslot Number		0							DwPTS		
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number Note1		Randomly selected from 1, 2, 3 such that cell 2 is in the normal performance gro							group		
PCCPCH_Ec/lor	dB			-3							
DwPCH_Ec/lor	dB								0		
OCNS_Ec/lor	dB			-3							
$I_{oc}$	dBm/ 1.28 MHz					-	-80				
$\hat{I}_{or}/I_{oc}$	dB	-3	11	-3	-3	-3	-3	11	-3	-3	-3
PCCPCH RSCP	dBm	-86	-72	-86	-86	-86			n.a.		
Propagation Condition						AV	VGN				
Q <sub>rxlevmin</sub>	dBm					-	103				
Qoffset1 <sub>s,n</sub>	dB					C1,	C2: 0				
Qhyst1 <sub>s</sub>	dB						0				
Sprioritysearch1	dB					24 (-	79dBm)				
Sprioritysearch2	dB	0									
Thresh <sub>x, low</sub> Note2	dB	46 (-94dBm)									
Ssearch <sub>E-UTRA</sub>	dB	Not send									
Time offset to cell1	ms						3				
Note1: In the case	of multi-frequ	iency ce	II, the UT	RA RF (	Channel	Number	is the prir	mary fred	uency's o	channel n	umber.

This refers to the value of Thresh<sub>x, low</sub> which is included in UTRA system information, and is a threshold for the Note2: E-UTRA target cell

Table A.4.3.4.4.1-4:

Parameter	Unit				C	ell 3 (U	TRA TDE	))			
Timeslot Number				0					DwPTS		
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number Note1		Randomly selected from 4, 5, 6, 7 such that cell 3 is in the reduced performance group						ance			
PCCPCH_Ec/lor	dB			-3							
DwPCH_Ec/lor	dB								0		
OCNS_Ec/lor	dB			-3							
$I_{oc}$	dBm/ 1.28 MHz					-8	30				
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	11	-3	-3	-3	-3	11	-3
PCCPCH RSCP	dBm	-86	-86	-86	-72	-86		n.a.			
Propagation Condition						AW	'GN				
Q <sub>rxlevmin</sub>	dBm					-1	03				
Qoffset1 <sub>s,n</sub>	dB					C1, (	C2: 0				
Qhyst1 <sub>s</sub>	dB					(	)				
Sprioritysearch1	dB					24 (-7	9dBm)				
Sprioritysearch2	dB					(	)				
Thresh <sub>x, high</sub> Note2	dB					46 (-9	4dBm)				
Ssearch <sub>E-UTRA</sub>	dB					Not	send				
Time offset to cell1	ms	3									
Time offset to cell2	μs	3									
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel nu Note2: This refers to the value of Thresh <sub>x, high</sub> which is included in UTRA system information, and is a threshold for E-UTRA target cell											

#### A.4.3.4.4.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send the SYNCH-UL sequence in the UpPTS on cell 2, 3 for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.4.4.2-1

Table A.4.3.4.4.2-1: Test requirements for E-UTRA TDD to UTRA TDD inter-RAT cell reselection

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	58.9
T3	Cell 3 (reduced performance group)	462.1

The rate of correct cell reselections observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time.

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as:  $N_{UTRA\_carrier\_TDD,normal} *T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$ , and to a reduced performance group cell can be expressed as:  $6 * N_{UTRA\_carrier\_TDD,reduced} *T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$ ,

#### Where:

T<sub>evaluateUTRA TDD</sub> 19.2s, See Table 4.2.2.5.2-1

T<sub>SI\_UTRA</sub> Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 3 \* 19.2 + 1.28 = 58.88 s for normal performance group reselection and 6 \* 4 \* 19.2 + 1.28 = 462.08s for reduced performance group reselection, allow 58.9s for normal performance group and 462.1s for reduced performance group in the test case.

Since only one E-UTRA frequency is configured and signal level of UTRA cell is lower than threshold of  $S_{prioritysearch}$ , the UE shall select back to cell 1 (E-UTRA cell) within  $K_{carrier} * T_{evaluateEUTRA} + T_{SI} = 19.2 + 1.28 = 20.48s$ .

# A.4.4 E-UTRAN to GSM Cell Re-Selection

#### A.4.4.1 E-UTRAN FDD – GSM:

#### A.4.4.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to GSM cell re-selection delay reported in clause 4.2.2.5.

This scenario implies the presence of 1 E-UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 E-UTRA carrier and 12 GSM cells. Test parameters are given in Table, A.4.4.1-1, A.4.4.1-2, A.4.4.1-3. E-UTRA FDD cell (Cell 1) and GSM cell (cell 2) shall belong to different Location Areas. The test comprises two successive time periods, T1 and T2. During initialization before the start of the test, the UE is camped on cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of cell 2 but the signal levels do not meet the reselection criterion during T1. At the start of T2, the signal levels change such that cell 2 satisfies reselection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA FDD layer.

Table A.4.4.1-1: General test parameters for E-UTRA FDD GSM cell re-selection test case

	Parameter	Unit	Value	Comment				
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1 . Cell 1 is an E-UTRA FDD cell.				
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.				
E-UTRA R	F Channel Number		1	1 E-UTRA FDD carrier frequency				
GSM ARFO	SSM ARFCN		ARFCN		1	12 GSM BCCH carriers are used		
PRACH co	RACH configuration		4	As specified in table 5.7.1-2 in TS 36.211				
Access Ba	rring Information	-	Not Sent	No additional delays in random access procedure.				
CP length	of cell 1		Normal					
DRX cycle	length	s	1.28	The value shall be used for all cells in the test.				
T1		S	35	T1 need to be defined so that cell re-selection reaction time is taken into account.				
T2		S	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.				
Propagatio	n channel		AWGN					

Table A.4.4.1-2: Cell-specific test parameters for Cell 1 – E-UTRA FDD cell

	1	Cell 1			
	T1	T2			
		1			
MHz		10			
	O	P.2 FDD			
dB					
dB		0			
dB					
dBm		-140			
dBm/15 kHz		-98			
dBm/15 KHz	-89	-102			
dB	9	-4			
dB	9 -4				
S	0				
dB	N	Not sent			
dB	44				
dB	24				
	dB d	MHz  OF  dB  dB  dB  dB  dB  dB  dB  dB  dB  d			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for GSM target cell.

Table A.4.4.1-3: Cell-specific test parameters for Cell 2 - GSM cell

Parameter	Unit	Cell 2 (GSM)		
Parameter	Parameter Onit	T1 T2		
Absolute RF Channel Number		ARFO	CN 1	
RXLEV	dBm	-90	-75	
RXLEV_ACCESS_MIN	dBm	-1(	)5	
MS_TXPWR_MAX_CCH	dBm	24	4	

# A.4.4.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than  $26 \text{ s} + T_{BCCH}$ , where  $T_{BCCH}$  is the maximum time allowed to read BCCH data from GSM cell [8].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $4*T_{measureGSM} + T_{BCCH}$ , where:

 $T_{measureGSM}$  See Table 4.2.2.5.3-1 in clause 4.2.2.5.3.

T<sub>BCCH</sub> Maximum time allowed to read BCCH data from GSM cell [8].

According to [8], the maximum time allowed to read the BCCH data, when being synchronized to

a BCCH carrier, is 1.9 s.

This gives a total of 25.6 s +  $T_{BCCH}$ , allow 26 s +  $T_{BCCH}$  in the test case.

#### A.4.4.2 E-UTRAN TDD – GSM:

#### A.4.4.2.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to GSM cell re-selection delay reported in clause 4.2.2.5.

This scenario implies the presence of 1 E-UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 E-UTRA carrier and 12 GSM cells. Test parameters are given in Table, A.4.4.2-1, A.4.4.2-2, A.4.4.2-3. E-UTRA TDD cell (Cell 1) and GSM cell (cell 2) shall belong to different Location Areas. The test comprises two successive time periods, T1 and T2. During initialization before the start of the test, the UE is camped on cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of cell 2 but the signal levels do not meet the reselection criterion during T1. At the start of T2, the signal levels change such that cell 2 satisfies reselection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA TDD layer.

Table A.4.4.2-1: General test parameters for E-UTRA TDD GSM cell re-selection test case

•	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1. Cell 1 is an E-UTRA TDD cell.
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.
E-UTRA R	F Channel Number		1	1 E-UTRA TDD carrier frequency
GSM ARF	CN		1	12 GSM BCCH carriers are used
Uplink-dov cell 1	wnlink configuration of		1	As specified in table 4.2.2 in TS 36.211
Special su for cell 1	bframe configuration		6	As specified in table 4.2.1 in TS 36.211
PRACH co	onfiguration for cell 1		53	As specified in table 5.7.1-3 in TS 36.211
CP length	of cell 1		Normal	
Access Ba	arring Information	-	Not Sent	No additional delays in random access procedure.
DRX cycle	elength	S	1.28	The value shall be used for all cells in the test.
T1	-	S	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.
Propagation	on channel		AWGN	

Table A.4.4.2-2: Cell-specific test parameters for Cell 1 – E-UTRA TDD cell

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel		1		
number				
BW <sub>channel</sub>	MHz		10	
OCNG Patterns defined in				
A.3.2.2.2 (OP.2 TDD)		OI	P.2 TDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB		_	
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
Qrxlevmin	dBm		-140	
$N_{oc}$	dBm/15 kHz		-98	
RSRP	dBm/15 KHz	-89	-102	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	9 -4		
$\hat{E}_s/N_{oc}$	dB	9 -4		
TreselectionEUTRAN	S	0		
Snonintrasearch	dB	N	lot sent	
Thresh <sub>serving, low</sub>	dB	44		
Thresh <sub>x, low</sub> (Note 2)	dB	24		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved

for all OFDM symbols.

Note 2: This refers to Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for GSM target cell.

Table A.4.4.2-3: Cell-specific test parameters for Cell 2 - GSM cell

Parameter	Unit	Cell 2 (GSI		
Parameter	Offic	T1	T2	
Absolute RF Channel Number		ARFCN <sup>2</sup>	1	
RXLEV	dBm	-90	-75	
RXLEV_ACCESS_MIN	dBm	-105		
MS_TXPWR_MAX_CCH	dBm	24		

# A.4.4.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than  $26 \text{ s} + T_{BCCH}$ , where  $T_{BCCH}$  is the maximum time allowed to read BCCH data from GSM cell [8].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $4*T_{measureGSM} + T_{BCCH}$ , where:

 $T_{measureGSM}$  See Table 4.2.2.5.3-1 in clause 4.2.2.5.3.

T<sub>BCCH</sub> Maximum time allowed to read BCCH data from GSM cell [8].

According to [8], the maximum time allowed to read the BCCH data, when being synchronized to

a BCCH carrier, is 1.9 s.

This gives a total of 25.6 s +  $T_{BCCH}$ , allow 26 s +  $T_{BCCH}$  in the test case.

# A.4.5 E-UTRAN to HRPD Cell Re-Selection

# A.4.5.1 E-UTRAN FDD – HRPD

# A.4.5.1.1 E-UTRAN FDD – HRPD Cell Reselection: HRPD is of Lower Priority

#### A.4.5.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD- HRPD inter-RAT cell reselection requirements specified in clause 4.2.2.5.4 when the HRPD cell is of lower priority.

The test scenario comprises of one HRPD and one E-UTRAN FDD cells as given in tables A.4.5.1.1.1-1, A.4.5.1.1.1-2 and A.4.5.1.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN FDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.5.1.1.1-1: General Test Parameters for E-UTRAN FDD - lower priority HRPD Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
DRX cycle length		S	1.28	
E-UTRA FDD RF	Channel Number		1	Only one FDD carrier frequency is used.
E-UTRA FDD Cha	nnel Bandwidth (BW <sub>channel</sub> )	MHz	10	
HRPD RF Channel Number			1	Only one HRPD carrier
				frequency is used.
E-UTRA FDD PRA	ACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random
				access procedure.
T1		S	30	
T2		s	30	

Table A.4.5.1.1.1-2: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Ce	II 1
		T1	T2
E-UTRA RF Channel number		1	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in A.3.2.1.2			
(OP.2 FDD)		OP.2	FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	(	)
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$N_{oc}$	dBm/15 kHz	-9	8
RSRP	dBm/15 KHz	-89	-102
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
Treselection <sub>EUTRAN</sub>	S	(	)
Snonintrasearch	dB	Not	sent
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-14	40
Qrxlevminoffset	dB	(	)
Pcompensation	dB	(	)
SservingCell	dB	51	38
Thresh <sub>serving, low</sub>	dB	4	4
Propagation Condition		AW	
N ( 4 OONO 1 III 1 1 II		11 11 4 1 1 4	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Parameter Unit Cell 2 T1 T2 HRPD RF Channel Number Control E<sub>b</sub> (38.4 kbps) dB 21 Control E<sub>b</sub> (76.8 kbps) dB 18 N,  $\hat{I}_{or}/I_{oc}$ dB 0 0 dBm/ 1.2288 -55 MHz CDMA2000 HRPD Pilot Strength dΒ -3 -3 **Propagation Condition AWGN** SnonServingCell,x -6 Treselection 0 s hrpd-CellReselectionPriority 0 Thresh<sub>x, low</sub> -14

Table A.4.5.1.1.1-3: Cell Specific Test Parameters for HRPD (cell # 2)

### A.4.5.1.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: T<sub>evaluateHRPD</sub> + T<sub>SI-HRPD</sub>

#### Where:

T<sub>evaluatHRPD</sub> See Table 4.2.2.5.4-1

T<sub>SI-HRPD</sub> Maximum repetition period of relevant system information blocks that need to be received by

the UE to camp on cell 2; 1704 ms is assumed in this test case.

This gives a total of 20.904 s for the lower priority cell reselection, allow 21 s in the test case.

#### A.4.5.2 E-UTRAN TDD – HRPD

#### A.4.5.2.1 E-UTRAN TDD – HRPD Cell Reselection: HRPD is of Lower Priority

#### A.4.5.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD- HRPD inter-RAT cell reselection requirements specified in clause 4.2.2.5.4 when the HRPD cell is of lower priority.

The test scenario comprises of one HRPD and one E-UTRAN TDD cells as given in tables A.4.5.2.1.1-1, A.4.5.2.1.1-2 and A.4.5.2.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN TDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.5.2.1.1-1: General Test Parameters for E-UTRAN TDD - lower priority HRPD Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
Uplink-downlink o	onfiguration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe	configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
DRX cycle length		S	1.28	
E-UTRA TDD RF	Channel Number		1	Only one TDD carrier frequency is used.
E-UTRA TDD Cha	annel Bandwidth (BWchannel)	MHz	10	
HRPD RF Channe	el Number		1	Only one HRPD carrier frequency is used.
E-UTRA TDD PRA	ACH configuration of cell 1		53	As specified in table 4.7.1-3 in TS 36.211
E_UTRA TDD Acc	cess Barring Information	-	Not Sent	No additional delays in random access procedure.
T1		S	30	
T2	·	S	30	

Table A.4.5.2.1.1-2: Cell Specific Test Parameters for E-UTRAN TDD (Cell # 1)

Parameter	Unit	Ce	II 1	
		T1	T2	
E-UTRA RF Channel number		1		
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in A.3.2.2.2				
(OP.2 TDD)		OP.2	TDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	(	)	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB	7		
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$N_{oc}$	dBm/15 kHz	-g	98	
RSRP	dBm/15 KHz	-89	-102	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	9	-4	
$\hat{E}_s/N_{oc}$	dB	9	-4	
Treselection <sub>EUTRAN</sub>	S	(	)	
Snonintrasearch	dB	Not	sent	
cellReselectionPriority	-	1		
Qrxlevmin	dBm	-14	40	
Qrxlevminoffset	dB	(	)	
Pcompensation	dB	(	)	
S <sub>Serving</sub> Cell	dB	51	38	
Thresh <sub>serving, low</sub>	dB	4	4	
Propagation Condition		AW	GN	
Note 1: OCNG shall be used such th	at hoth cells are fu	illy allocated and a const	ant total transmitted	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

**Parameter** Unit Cell 2 T1 T2 HRPD RF Channel Number Control E<sub>b</sub> (38.4 kbps) dB 21 Control E<sub>b</sub> (76.8 kbps) dB 18 N,  $\hat{I}_{or}/I_{oc}$ dB 0 0 dBm/ 1.2288 -55 MHz CDMA2000 HRPD Pilot Strength dΒ -3 -3 **Propagation Condition AWGN** SnonServingCell,x -6 Treselection 0 s hrpd-CellReselectionPriority 0 Thresh<sub>x, low</sub> -14

Table A.4.5.2.1.1-3: Cell Specific Test Parameters for HRPD (cell # 2)

### A.4.5.2.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluateHRPD} + T_{SI-HRPD}$ 

#### Where:

T<sub>evaluatHRPD</sub> See Table 4.2.2.5.4-1

 $T_{\text{SI-HRPD}}$  Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1704 ms is assumed in this test case.

This gives a total of 20.904 s for the lower priority cell reselection, allow 21 s in the test case.

#### A.4.6 E-UTRAN to cdma2000 1X Cell Re-Selection

#### A.4.6.1 E-UTRAN FDD – cdma2000 1X

# A.4.6.1.1 E-UTRAN FDD – cdma2000 1X Cell Reselection: cdma2000 1X is of Lower Priority

#### A.4.6.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD- cdma2000 1X inter-RAT cell reselection requirements specified in clause 4.2.2.5.5 when the cdma2000 1X cell is of lower priority.

The test scenario comprises of one cdma2000 1X and one E-UTRAN FDD cells as given in tables A.4.6.1.1.1-1, A.4.6.1.1.1-2 and A.4.6.1.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN FDD cell 1 and cdma2000 1X cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.6.1.1.1-1: General Test Parameters for E-UTRAN FDD - lower priority cdma2000 1X Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting
				during T2
DRX cycle length		S	1.28	
E-UTRA FDD RF	Channel Number		1	Only one FDD carrier frequency
				is used.
E-UTRA FDD Cha	annel Bandwidth (BW <sub>channel</sub> )	MHz	10	
cdma2000 1X RF	Channel Number		1	Only one cdma2000 1X carrier
				frequency is used.
E-UTRA FDD PR	ACH configuration		4	As specified in table 5.7.1-2 in
				TS 36.211
E_UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random
				access procedure.
T1		S	30	
T2		s	30	

Table A.4.6.1.1.1-2: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Ce	II 1
		T1	T2
E-UTRA RF Channel number		1	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in A.3.2.1.2			
(OP.2 FDD)		OP.2	FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	(	)
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$N_{oc}$ Note 2	dBm/15 kHz	-9	8
RSRP Note 3	dBm/15 KHz	-89	-102
$\hat{E}_{s}/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
Treselection <sub>EUTRAN</sub>	S	(	)
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-14	40
Qrxlevminoffset	dB	(	)
Pcompensation	dB	(	)
S <sub>Serving</sub> Cell	dB	51	38
Thresh <sub>serving, low</sub>	dB	4	4
Propagation Condition		AW	GN
N. ( 4 00NO 1 III 1 1 III			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

**Parameter** Unit Cell 2 T1 **T2** cdma2000 1X RF Channel Number Pilot E<sub>c</sub> -7 dB  $I_{or}$ Sync E<sub>c</sub> dB -16  $I_{or}$ Paging E<sub>c</sub> (4.8 kbps) dB -12  $\hat{I}_{or}/I_{oc}$ dB 0 dBm/ 1.2288  $I_{oc}$ -55 MHz CDMA2000 1xRTT Pilot Strength dB -10 -10 AWGN **Propagation Condition** -20 SnonServingCell,x Treselection 0 s oneXRTT-CellReselectionPriority 0 Thresh<sub>x, low</sub> -28

Table A.4.6.1.1.1-3: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

# A.4.6.1.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluatecdma2000~1X} + T_{SI-cdma2000~1X}$ 

#### Where:

 $T_{evaluatcdma2000 \ 1X}$  See Table 4.2.2.5.5-1

 $T_{SI\text{-}cdma2000\ IX}$  Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

#### A.4.6.2 E-UTRAN TDD - cdma2000 1X

# A.4.6.2.1 E-UTRAN TDD –cdma2000 1X Cell Reselection: cdma2000 1X is of Lower Priority

#### A.4.6.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD- cdma2000 1X inter-RAT cell reselection requirements specified in clause 4.2.2.5.5 when the cdma2000 1X cell is of lower priority.

The test scenario comprises of one cdma2000 1X and one E-UTRAN TDD cells as given in tables A.4.6.2.1.1-1, A.4.6.2.1.1-2 and A.4.6.2.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN TDD cell 1 and cdma2000 1X cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.6.2.1.1-1: General Test Parameters for E-UTRAN TDD - lower priority cdma2000 1X Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting during T2
DRX cycle length		S	1.28	
E-UTRA TDD RF	Channel Number		1	Only one TDD carrier frequency is used.
E-UTRA TDD Cha	nnel Bandwidth (BW <sub>channel</sub> )	MHz	10	
cdma2000 1X RF	Channel Number		1	Only one cdma2000 1X carrier frequency is used.
E-UTRA TDD PRA	ACH configuration		53	As specified in table 5.7.1-3 in TS 36.211
Uplink-downlink co	onfiguration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe	configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
E_UTRA TDD Acc	ess Barring Information	-	Not Sent	No additional delays in random access procedure.
T1	·	S	30	
T2	·	S	30	

Table A.4.6.2.1.1-2: Cell Specific Test Parameters for E-UTRAN TDD (Cell # 1)

Parameter	Unit	Cel	l1	
		T1	T2	
E-UTRA RF Channel number		1		
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in A.3.2.2.2				
(OP.2 TDD)		OP.2	TDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB	_		
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$N_{oc}^{ m Note  2}$	dBm/15 kHz	-9	8	
RSRP Note 3	dBm/15 KHz	-89	-102	
$\hat{E}_{s}/I_{ot}$	dB	9	-4	
$\hat{E}_s/N_{oc}$	dB	9 -4		
Treselection <sub>EUTRAN</sub>	S	0		
Snonintrasearch	dB	Not sent		
cellReselectionPriority	-	1		
Qrxlevmin	dBm	-14	10	
Qrxlevminoffset	dB	0		
Pcompensation	dB	0		
SservingCell	dB	51	38	
Thresh <sub>serving, low</sub>	dB	44		
Propagation Condition		AWGN		

Note 1: CNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Iterference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: SRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Parameter Unit Cell 2 T1 **T2** cdma2000 1X RF Channel Number Pilot E<sub>c</sub> -7 dB  $I_{or}$ Sync E<sub>c</sub> dB -16 Paging E<sub>c</sub> (4.8 kbps) dB -12  $\hat{I}_{or}/I_{oc}$ dB 0 dBm/ 1.2288  $I_{oc}$ -55 MHz CDMA2000 1xRTT Pilot Strength dB -10 -10 AWGN **Propagation Condition** -20 SnonServingCell,x 0 Treselection s oneXRTT-CellReselectionPriority 0 Thresh<sub>x, low</sub> -28

Table A.4.6.2.1.1-3: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

#### A.4.6.2.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as:  $T_{evaluatecdma2000~1X} + T_{SI-cdma2000~1X}$ 

#### Where:

T<sub>evaluatcdma2000 1X</sub> See Table 4.2.2.5.5-1

 $T_{SI\text{-}cdma2000\ IX}$  Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

# A.5 E-UTRAN RRC CONNECTED Mode Mobility

# A.5.1 E-UTRAN Handover

# A.5.1.1 E-UTRAN FDD - FDD Intra frequency handover

# A.5.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency handover requirements specified in clause 5.1.2.1.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.1.1-1 and A.5.1.1.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.1.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Par	ameter	Unit	Value	Comment
PDSCH parameter	rs .		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chann	nel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidtl	h (BW <sub>channel</sub> )	MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
PRACH configurat	PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
Time offset between	en cells		3 ms	Asynchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.1.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	Т3
E-UTRA RF Channel			1		1		
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD
defined in A.3.2.1.1		FDD	FDD	FDD			
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			•	
PDCCH_RA	dB		0			0	
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}$ Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition					AWGN		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.1.2Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

### A.5.1.2 E-UTRAN TDD - TDD Intra frequency handover

### A.5.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency handover requirements specified in clause 5.2.2.4.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.5.1.2.1-1 and A.5.1.2.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.2.1-1: General test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Para	Parameter		Value	Comment
			DL Reference Measurement	
PDSCH parameters			Channel R.0 TDD	As specified in clause A.3.1.1.2
•			DL Reference Measurement	
PCFICH/PDCCHPI	HICH parameters		Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chann	el Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth	n (BW <sub>channel</sub> )	MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
Special subframe of	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink co	nfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset betwee	n cells		3 μs	Synchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.1.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3		
E-UTRA RF Channel			1		1				
Number									
BW <sub>channel</sub>	MHz		10			10			
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 TDD	OP.2 TDD	OP.1 TDD		
defined in A.3.2.2.1		TDD	TDD	TDD					
(OP.1 TDD) and in									
A.3.2.2.2 (OP.2 TDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_RB	dB		•			•			
PDCCH_RA	dB		0			0			
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
${ m \hat{E}}_{ m s}/{ m I}_{ m ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36		
$N_{oc}^{ m Note~2}$	dBm/15 KHz	-98							
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11		
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87		
Propagation Condition			•	-	AWGN	•	•		
	e used such that	both cells a	re fully alloca	ated and a c	onstant total tra	ansmitted powe	er spectral		

density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

RSRP levels have been derived from other parameters for information purposes. They are not settable Note 3: parameters themselves.

#### A.5.1.2.2 **Test Requirements**

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

### A.5.1.3 E-UTRAN FDD – FDD Inter frequency handover

#### A.5.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency handover requirements specified in clause 5.1.2.1.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.5.1.3.1-1 and A.5.1.3.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.3.1-1: General test parameters for E-UTRAN FDD-FDD Inter frequency handover test case

Para	ameter	Unit	Value	Comment
PDSCH parameter	S		DL Reference Measurement	As specified in clause A.3.1.1.1
			Channel R.0 FDD	
PCFICH/PDCCH/P	HICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1
			Channel R.6 FDD	
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF chann	el number		1, 2	Two FDD carriers are used
Channel Bandwidth	n (BW <sub>channel</sub> )	MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			DRX_L	As specified in clause A.3.3
PRACH configurati	on		4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Info	ormation	-	Not sent	No additional delays in random
				access procedure
Time offset betwee	n cells		3 ms	Asynchronous cells
Gap pattern config	uration Id		0	As specified in Table 8.1.2.1-1
				started before T2 starts
T1	·	S	5	
T2	·	S	≤5	
T3		S	1	

Table A.5.1.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Inter frequency handover test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		2			
number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2 FDD	OP.2	OP.2 FDD	OP.1 FDD	
defined in A.3.2.1.1		FDD	FDD		FDD			
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7	
$N_{oc}^{ m Note~2}$	dBm/15 kHz				-98			
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7	
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91	
Propagation Condition		AWGN						
Note 1: OCNG shall b	e used such that b	ooth cells a	re fully alloca	ated and a cons	stant total tra	insmitted powe	er spectral	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.3.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay  $+ T_{interrupt}$ , where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

### A.5.1.4 E-UTRAN TDD – TDD Inter frequency handover

### A.5.1.4.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter frequency handover requirements specified in clause 5.2.2.4.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables Table A.5.1.4.1-1 and Table A.5.1.4.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the

UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

Table A.5.1.4.1-1: General test parameters for E-UTRAN TDD-TDD Inter frequency handover test case

Para	meter	Unit	Value	Comment
			DL Reference Measurement	
PDSCH paramete	ers		Channel R.0 TDD	As specified in clause A.3.1.1.2
			DL Reference Measurement	
PCFICH/PDCCH/	PHICH PHICH		Channel R.6 TDD	As specified in clause A.3.1.2.2
parameters				
Gap Pattern Id			1	As specified in TS 36.133 clause 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
E-UTRA RF chan	nel number		1, 2	Two TDD carriers are used
Channel Bandwid	Ith (BW <sub>channel</sub> )	MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
DRX			DRX_L	As specified in clause A.3.3
CP length			Normal	
Access Barring In	formation	-	Not Sent	No additional delays in random access procedure.
Special subframe	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink o	onfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configura	PRACH configuration		53	As specified in table 5.7.1-3 in TS 36.211
Time offset between	en cells		3 μs	Synchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.1.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter frequency handover test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		2			
number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2 FDD	OP.2	OP.2 FDD	OP.1 FDD	
defined in A.3.2.1.1		FDD	FDD		FDD			
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		_			_		
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{oc}}$	dB	4	4	4	-Infinity	7	7	
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98						
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7	
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-infinity	-91	-91	
Propagation Condition		AWGN						
	e used such that b	oth cells a	e fully alloca	ted and a cons	stant total tra	insmitted powe	r spectral	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.4.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

# A.5.1.5 E-UTRAN FDD – FDD Inter frequency handover: unknown target cell

### A.5.1.5.1 Test Purpose and Environment

This test is to verify the FDD-FDD inter-frequency handover requirements for the case when the target cell is unknown as specified in clause 5.1.2.1.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.5.1.5.1-1 and A.5.1.5.1-2. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2.

A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.5.1-1: General test parameters for the E-UTRAN FDD-FDD Inter frequency handover test case when the target cell is unknown

Para	ameter	Unit	Value	Comment
PDSCH parameter	'S		DL Reference Measurement	As specified in clause A.3.1.1.1
			Channel R.0 FDD	
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1
			Channel R.6 FDD	
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF chann	el number		1, 2	Two FDD carriers are used
Channel Bandwidtl	h (BW <sub>channel</sub> )	MHz	10	
DRX			OFF	Non-DRX test
PRACH configuration	ion		4	As specified in table 5.7.1-2 in TS
				36.211
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between	en cells		3 ms	Asynchronous cells
T1		S	≤5	
T2		S	1	

Table A.5.1.5.1-2: Cell specific test parameters for the E-UTRAN FDD-FDD Inter frequency handover test case when the target cell is unknown

Parameter	Unit	Cell 1		Cell	2				
		T1	T2	T1 T2					
E-UTRA RF Channel		1		2					
number									
BW <sub>channel</sub>	MHz	10	1	10	1				
OCNG Patterns		OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD				
defined in A.3.2.1.1									
(OP.1 FDD) and in									
A.3.2.1.2 (OP.2 FDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB			_					
PHICH_RB	dB	0		0					
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7				
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-98					
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7				
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-91				
Propagation Condition		AWGN							
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over									

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.5.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 130 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms, which is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt}$  = 115 ms in the test. See clause 5.1.2.1.2

This gives a total of 130 ms.

# A.5.1.6 E-UTRAN TDD – TDD Inter frequency handover; unknown Target Cell

### A.5.1.6.1 Test Purpose and Environment

This test is to verify the TDD-TDD inter-frequency handover requirements for the case when the target cell is unknown as specified in clause 5.2.2.4.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.5.1.6.1-1 and A.5.1.6.1-2. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1, T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.6.1-1: General test parameters for the E-UTRAN TDD-TDD Inter-Frequency handover test case when the target cell is unknown

Pa	rameter	Unit	Value	Comment
PDSCH paramete	rs		DL Reference Measurement	As specified in clause A.3.1.1.2
-			Channel R.0 TDD	·
			DL Reference Measurement	As specified in clause A.3.1.2.2
PCFICH/PDCCH/I	PHICH parameters		Channel R.6 TDD	
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF chann	nel number		1, 2	Two TDD carriers
DRX			OFF	Non-DRX test
Access Barring Inf	formation	-	Not sent	No additional delays in random
				access procedure
Special subframe	configuration		6	As specified in table 4.2-1 in TS
				36.211
Uplink-downlink co	onfiguration		1	As specified in table 4.2-2 in TS
				36.211
PRACH configura	tion		53	As specified in table 5.7.1-3 in TS
				36.211
Time offset between	en cells		3 μs	Synchronous cells
Gap pattern config	guration		-	No gap pattern configured
T1		S	≤5	
T2		S	1	

Table A.5.1.6.1-2: Cell specific test parameters for the E-UTRAN TDD-TDD Inter frequency handover test case when the target cell is unknown

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Parameter	Unit	Ce	Cell 1		ell 2		
		T1	T2	T1	T2		
E-UTRA RF Channel					2		
Number							
BW <sub>channel</sub>	MHz	1	0	1	10		
OCNG Patterns		OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD		
defined in A.3.2.2.1							
(OP.1 TDD) and in							
A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB		,	0			
PHICH_RB	dB	] (	)				
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}^{$	dBm/15 kHz			-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	5		
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	5		
Propagation Condition			Α	WGN			
Propagation Condition AWGN							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.6.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 130 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms, which is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt}$  = 115 ms in the test. See clause 5.2.2.4.2

This gives a total of 130 ms.

### A.5.1.7 E-UTRAN FDD – TDD Inter frequency handover

#### A.5.1.7.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-TDD inter frequency handover requirements specified in clause 5.2.2.2.

The test scenario comprises of one E-UTRA FDD cell and one E-UTRA TDD cell as given in tables Table A.5.1.7.1-1, Table A.5.1.7.1-2 and Table A.5.1.7.1-3. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

Table A.5.1.7.1-1: General test parameters for E-UTRAN FDD-TDD Inter frequency handover test case

Parameter	Unit	Value	Comment
Cell 1 PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.1
-		Channel R.0 FDD	
Cell 1 PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
		DL Reference Measurement	
Cell 2 PDSCH parameters		Channel R.0 TDD	As specified in clause A.3.1.1.2
		DL Reference Measurement	
Cell 2 PCFICH/PDCCH/PHICH		Channel R.6 TDD	As specified in clause A.3.1.2.2
parameters			
Gap Pattern Id		0	As specified in TS 36.133
I see I lee I lee		0.11.4	clause 8.1.2.1.
Initial conditions Active cell		Cell 1	
Neighbour cell		Cell 2	
Final conditions		Cell 2	
Cell 1 E-UTRA RF channel number		1	One FDD carrier is used
Cell 2 E-UTRA RF channel number		2	One TDD carrier is used
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-4	
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
DRX		DRX_L	As specified in clause A.3.3
CP length		Normal	
E-UTRA TDD Access Barring	-	Not Sent	No additional delays in random
Information			access procedure.
Special subframe configuration		6	As specified in table 4.2-1 in TS
			36.211. Applicable to cell 2.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS
			36.211. Applicable to cell 2
E-UTRA TDD PRACH configuration		53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	s	≤5	
T3	S	1	

Table A.5.1.7.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) in E-UTRAN FDD-TDD Inter frequency handover test case

Parameter	Unit		Cell 1	
		T1	T2	T3
E-UTRA RF Channel number			1	
BW <sub>channel</sub>	MHz		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB		0	
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB	4	4	4
$N_{oc}^{ m Note  2}$	dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	4
RSRP Note 3	dBm/15 KHz	-94	-94	-94
Propagation Condition		AWG	SN	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

Table A.5.1.7.1-3: Cell specific test parameters for E-UTRAN TDD (cell #2) in E-UTRAN FDD-TDD Inter frequency handover test case

Parameter	Unit		Cell 2	
		T1	T2	T3
E-UTRA RF Channel number			2	
BW <sub>channel</sub>	MHz		10	
OCNG Patterns defined in		OP.2 TDD	OP.2 TDD	OP.1 TDD
A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB		_	
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB	-Infinity	7	7
$N_{oc}^{ m Note~2}$	dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-Infinity	-91	-91
Propagation Condition		AWG	N	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

### A.5.1.7.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

### A.5.1.8 E-UTRAN TDD - FDD Inter frequency handover

#### A.5.1.8.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-FDD inter-frequency handover requirements specified in clause 5.2.2.3.

The test scenario comprises of one E-UTRA TDD cell and one E-UTRA FDD cell as given in tables Table A.5.1.8.1-1, Table A.5.1.8.1-2 and Table A.5.1.8.1-3. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1,

T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.8.1-1: General test parameters for E-UTRAN TDD-FDD Inter frequency handover test case

Para	meter	Unit	Value	Comment		
Cell 1 PDSCH para	meters		Channel R.0 TDD	As specified in clause A.3.1.1.2		
Cell 1 PCFICH/PD0 parameters	CCH/PHICH		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2		
Cell 2 PDSCH para	meters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1		
Cell 2 PCFICH/PD0 parameters	CCH/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1		
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1		
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2		
Final condition	Active cell		Cell 2			
Cell 1 E-UTRA RF	channel number		1	One TDD carrier is used		
Cell 2 E-UTRA RF	channel number		2	One FDD carrier is used		
Channel Bandwidth	(BW <sub>channel</sub> )	MHz	10			
A3-Offset		dB	-4			
Hysteresis		dB	0			
TimeToTrigger		S	0			
Filter coefficient			0	L3 filtering is not used		
DRX			DRX_L	As specified in clause A.3.3		
E-UTRA FDD PRA	CH configuration		4	As specified in table 5.7.1-2 in TS 36.211		
E-UTRA FDD Acce Information	ss Barring	-	Not sent	No additional delays in random access procedure		
Time offset betwee	n cells		3 ms	Asynchronous cells		
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1 started before T2 starts		
T1		S	5			
T2		S	≤5			
T3		S	1			

Table A.5.1.8.1-2: Cell specific test parameters for E-UTRAN TDD (cell #1) in E-UTRAN TDD-FDD Inter frequency handover test case

Parameter	Unit		Cell 1	
		T1	T2	T3
E-UTRA RF Channel number			1	
BW <sub>channel</sub>	MHz		10	
OCNG Patterns defined in		OP.1 TDD	OP.1 TDD	OP.2 TDD
A.3.2.2.1 (OP.1 TDD) and in				
A.3.2.2.2 (OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB		_	
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB	4	4	4
$N_{oc}^{ m Note  2}$	dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	4
RSRP Note 3	dBm/15 KHz	-94	-94	-94
Propagation Condition		AWG	N	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

Table A.5.1.8.1-3: Cell specific test parameters for E-UTRAN FDD (cell #2) in E-UTRAN TDD-FDD Inter frequency handover test case

Parameter	Unit		Cell 2			
		T1	T2	T3		
E-UTRA RF Channel number		2				
BW <sub>channel</sub>	MHz		10			
OCNG Patterns defined in		OP.2 FDD	OP.2 FDD	OP.1 FDD		
A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		_			
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{E}_s/I_{ot}$	dB	-Infinity	7	7		
$N_{oc}^{ m Note~2}$	dBm/15 kHz		-98			
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	7		
RSRP Note 3	dBm/15 KHz	-Infinity	-91	-91		
Propagation Condition		AWG	N			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

### A.5.1.8.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

## A.5.1.9 E-UTRAN FDD - FDD Intra frequency handover for 5MHz bandwidth

### A.5.1.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.5.1.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.5.1.9.1-1 and A.5.1.9.1-2 will replace the values of corresponding parameters in Tables A.5.1.1.1-1 and A.5.1.1.1-2.

Table A.5.1.9.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case, 5MHz

Parameter U		Value	Comment			
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.1			
		Channel R.5 FDD				
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1			
·		Channel R.11 FDD				
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5				
Note 1: See Table A.5.1.1.1-1 for other general test parameters.						
Note 2: This test is performed according to the principle defined in section A.3.7.2						

Table A.5.1.9.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case, 5MHz

Parameter	Unit	Cell 1					
		T1	T2	T3	T1	T2	T3
BW <sub>channel</sub>	MHz		5			5	
OCNG Patterns		OP.15	OP.15	OP.16	OP.16 FDD	OP.16 FDD	OP.15 FDD
defined in A.3.2.1.15		FDD	FDD	FDD			
(OP.15 FDD) and in							
A.3.2.1.16 (OP.16							
FDD)							
Note 1: See Table A.5							

### A.5.1.9.2 Test Requirements

The requirements defined in section A.5.1.1.2 shall apply to this test case.

### A.5.1.10 E-UTRAN FDD - FDD Intra frequency handover for UE category 0

### A.5.1.10.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency handover requirements specified in clause 5.1.2.1. This test case is applicable to UE category 0 as defined in Section 3.1.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.10.1-1 and A.5.1.10.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.10.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Para	ameter	Unit	Value	Comment
PDSCH parameter	'S			As specified in clause A.3.1.1.3
			Channel R.13 FDD	
PCFICH/PDCCH/F	PHICH parameters			As specified in clause A.3.1.2.1
			Channel R.6 FDD	
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chanr	nel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidtl	h (BW <sub>channel</sub> )	MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Info	s Barring Information -		Not Sent	No additional delays in random
				access procedure.
PRACH configuration	ion		4	As specified in table 5.7.1-2 in TS
				36.211
Time offset between cells			3 ms	Asynchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.1.10.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit		Cell 1			Cell 2								
		T1	T2	Т3	T1	T2	T3							
E-UTRA RF Channel			1			1								
Number														
BW <sub>channel</sub>	MHz		10			10								
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD							
defined in A.3.2.1.1		FDD	FDD	FDD										
(OP.1 FDD) and in														
A.3.2.1.2 (OP.2 FDD)														
PBCH_RA	dB													
PBCH_RB	dB													
PSS_RA	dB													
SSS_RA	dB													
PCFICH_RB	dB													
PHICH_RA	dB													
PHICH_RB	dB		_			_								
PDCCH_RA	dB		0			0								
PDCCH_RB	dB													
PDSCH_RA	dB													
PDSCH_RB	dB													
OCNG_RA <sup>Note 1</sup>	dB													
OCNG_RB <sup>Note 1</sup>	dB													
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36							
$N_{oc}$ Note 2	dBm/15 KHz	-98					·							
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11							
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87							
Propagation Condition		AWGN												
	e used such that	both cells a	re fully alloca	ated and a c	onstant total tra	ansmitted power	hall be used such that both cells are fully allocated and a constant total transmitted power spectral							

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.10.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

# A.5.1.11 E-UTRAN HD - FDD Intra frequency handover for UE category 0

### A.5.1.11.1 Test Purpose and Environment

This test is to verify the requirement for the HD-FDD intra frequency handover requirements specified in clause 5.2.2.5. This test case is applicable to UE category 0 as defined in Section 3.1.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.11.1-1 and A.5.1.11.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.11.1-1: General test parameters for E-UTRAN HD-FDD intra frequency handover test case

Par	ameter	Unit	Value	Comment
PDSCH paramete	rs		DL Reference Measurement	As specified in clause A.3.1.1.4
			Channel R.1 HD-FDD	
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.3
			Channel R.3 HD-FDD	
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chan	nel Number		1	Only one FDD carrier frequency is used.
<b>Channel Bandwidt</b>	h (BW <sub>channel</sub> )	MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Inf	ormation	-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between	Time offset between cells		3 ms	Asynchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.1.11.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD	
defined in A.3.2.1.1		FDD	FDD	FDD				
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDCCH_RA	dB		0			0		
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RANote 1	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{E}_{s}/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36	
$N_{oc}^{ m Note  2}$	dBm/15 KHz	-98					·	
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11	
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87	
Propagation Condition		AWGN						
Note 1: OCNG shall b	e used such that	both cells a	re fully alloca	ated and a co	onstant total tra	ansmitted powe	er spectral	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.11.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.2.2.5.2.

This gives a total of 50 ms.

# A.5.1.12 E-UTRAN TDD - TDD Intra frequency handover for UE category 0

### A.5.1.12.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency handover requirements specified in clause 5.2.2.4. This test case is applicable to UE category 0 as defined in Section 3.1.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.5.1.12.1-1 and A.5.1.12.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.12.1-1: General test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Para	ameter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.12 TDD	As specified in clause A.3.1.1.5
PCFICH/PDCCHP	HICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chanr	nel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth	n (BW <sub>channel</sub> )	MHz	10	
A3-Offset	, , , , , ,	dB	0	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe of	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 μs	Synchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.1.12.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter	Unit		Cell 1		Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 TDD	OP.2 TDD	OP.1 TDD
defined in A.3.2.2.1		TDD	TDD	TDD			
(OP.1 TDD) and in							
A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		•				
PDCCH_RA	dB		0			0	
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_{s}/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}^{ m Note~2}$	dBm/15 KHz				-98	•	•
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition					AWGN	1	
Note 1: OCNG shall b	e used such that	both cells a	re fully alloc			ansmitted powe	er spectral

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.5.1.12.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

 $T_{interrupt} = 35$  ms in the test;  $T_{interrupt}$  is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

### A.5.2 E-UTRAN Handover to other RATs

### A.5.2.1 E-UTRAN FDD – UTRAN FDD Handover

### A.5.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements specified in clause 5.3.1.

The test parameters are given in Tables A.5.2.1.1-1, A.5.2.1.1-2 and A.5.2.1.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.1.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

	ameter	Unit	Value	Comment
PDSCH paramete	rs		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters				As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidt	h (BW <sub>channel</sub> )	MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD me	easurement quantity		RSRP	
Inter-RAT (UTRAN quantity	FDD) measurement		CPICH Ec/N0	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	Absolute UTRAN CPICH Ec/lo threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Inf	formation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Chan	nel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel (BWchannel)		MHz	10	
UTRA RF Channe	l Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA F	DD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period			False	
T1		S	5	
T2		S	≤5	
T3		S	1	
		_	T .	1

Table A.5.2.1.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	ameter Unit		Cell 1 (E-UTRA)				
		T1	T2	Т3			
E-UTRA RF Channel			1				
number							
BW <sub>channel</sub>	MHz		10				
OCNG Patterns		OP.1	OP.1	OP.2			
defined in A.3.2.1.1		FDD	FDD	FDD			
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB	]					
PHICH_RB	dB	0					
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_s/I_{ot}$	dB	0	0	0			
$N_{oc}$	dBm/15 kHz		-98				
$\hat{E}_s/N_{oc}$	dB	0	0	0			
RSRP Note 2	dBm/15 KHz	-98	-98	-98			
lo Note 2	dBm/9 MHz	-67.21	-67.21	-67.21			
Propagation Condition							
	e used such that b	ooth cells a	re fully alloca	ated and a			
constant total transmitted power spectral density is achieved for all							

OFDM symbols.

Note 2: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.1.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 2)

Parameter	Unit	Се	II 2 (UTR	A)
		T1	T2	Т3
CPICH_Ec/lor	dB		-10	
PCCPCH_Ec/lor	dB		-12	
SCH_Ec/lor	dB		-12	
PICH_Ec/lor	dB		-15	
DCH_Ec/lor	dB	N/A	N/A	Note 1
OCNS_Ec/lor	dB	-0.941	0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
$I_{oc}$	dBm/3,84 MHz	-70	-70	-70
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition			AWGN	

Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{\rm or}$ 

#### A.5.2.1.2 **Test Requirements**

The UE shall start to transmit the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.1.1.1.

 $T_{interrupt} = 140$  ms in the test;  $T_{interrupt}$  is defined in clause 5.3.1.1.2.

This gives a total of 190 ms.

### A.5.2.2 E-UTRAN TDD - UTRAN FDD Handover

### A.5.2.2.1 Test Purpose and Environment

This test is to verify the E-UTRAN TDD – UTRAN FDD handover requirements specified in clause 5.3.1.

The test scenario comprises of one E-UTRAN TDD cell and one UTRAN FDD cell as given in the tables A.5.2.2.1-1, A5.2.2.1-2 and A.5.2.2.1-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At start of time duration T1, the UE does not have any timing information of cell 2. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before the start of T2 to enable the monitoring of UTRAN FDD. A neighbouring cell list, including the UTRAN cell (cell2), shall be sent to the UE before T2 starts. During the time T2 cell 2 becomes detectable and the UE is expected to detect and send the measurement report. A RRC message implying handover shall be sent to the UE during T2, after the UE has reported event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.2.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD handover

Par	ameter	Unit	Value	Comment
PDSCH paramete	ers (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
	Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Final conditions	Active cell		Cell 2	
Special subframe			6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink c	onfiguration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1
	easurement quantity		RSRP	
quantity	FDD) measurement		CPICH Ec/Io	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	UTRAN FDD CPICH Ec/lo threshold for event B2
Hysteresis		dB	0	
DRX			OFF	No DRX configured.
Time to Trigger		ms	0	
	Filter coefficient		0	
CP length			Normal	Applicable to cell 1
Gap pattern confi	•		0	As specified in Table 8.1.2.1-1; to start before T2 starts
E-UTRA RF Char			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel (BW <sub>channel</sub> )	E-UTRA Channel Bandwidth		10	
	UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell list before T2.
Post-verification period			False	Post verification is not used.
T1		S	5	
T2		S	<b>≤</b> 5	
T3	· · · · · · · · · · · · · · · · · · ·	S	1	

Table A.5.2.2.1-2: Cell specific test parameters for E-UTRAN TDD (cell 1) for handover to UTRAN FDD (cell # 2)

Unit	Cell 1 (E-UTRAN)		
	T1	T2	T3
		1	
MHz		10	
	OP 1	חחד	OP.2 TDD
	01.1	100	01.2100
dB		0	
		1	T
dBm/15 kHz	-98	-98	-98
dB	0	0	0
dB	0	0	0
dBm/15 kHz		-98	
dBm/9 MHz	-67.21	-67.21	-67.21
		AWGN	
	MHz  MHz  dB  dB  dB  dB  dB  dB  dB  dB	MHz  OP.1  dB  dB  0  dBm/15 kHz  -98  dB  0  dB  0	T1         T2           1         10           MHz         10           OP.1 TDD         0           dBm/15 kHz         -98         -98           dB         0         0           dBm/15 kHz         -98         -98           dBm/15 kHz         -98         -98           dBm/15 kHz         -98         -67.21

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted

power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.2.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Се	II 1 (UTR	۸)
		T1	T2	Т3
CPICH_Ec/lor	dB		-10	
PCCPCH_Ec/lor	dB		-12	
SCH_Ec/lor	dB		-12	
PICH_Ec/lor	dB		-15	
DPCH_Ec/lor	dB	N/A	N/A	Note 1
OCNS	dB	-0.941	-0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
$I_{oc}$	dBm/3.84 MHz		-70	
CPICH_Ec/lo	dB	-infinity	-14	-14
Propagation Condition			AWGN	
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make				

the total power from the cell to be equal to  $I_{or}$ 

### A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 50 ms, which is specified in clause 5.1.1.1.1.

 $T_{interrupt} = 140$  ms in the test;  $T_{interrupt}$  is defined in clause 5.3.1.1.2.

This gives a total of 190 ms.

### A.5.2.3 E-UTRAN FDD- GSM Handover

### A.5.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to GSM cell handover delay specified in clause 5.3.3.

The test parameters are given in Table A.5.2.3.1 -1, A.5.2.3.1 -2 and A.5.2.3.1 -3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 shall be used. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event B1. The start of T3 is defined as the end of last E-UTRAN TTI containing the RRC message implying handover.

The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern should be sent for the parameters specified in Table A.5.2.3.1-1.

Table A.5.2.3.1 -1: General test parameters for E-UTRAN FDD-GSM handover

Parameter		Unit	Value	Comment
PDSCH paramete	PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH, parameters	PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Gap Pattern Id			1	As specified in TS 36.133 section8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Final conditions		Cell 2	
Inter-RAT measu	rement quantity		GSM Carrier RSSI	
Threshold other s	Threshold other system		-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient	Filter coefficient		0	L3 filtering is not used
DRX				OFF
T1		S	20	
T2		S	7	
T3		S	1	

Table A. A.5.2.3.1 - 2: Cell Specific Parameters for Handover from E- UTRAN FDD to GSM cell case (cell 1)

Parameter	Unit	Cell 1				
		T1, T2	Т3			
BW <sub>channel</sub>	MHz	1	0			
OCNG Patterns						
defined in A.3.2.1.1						
(OP.1 FDD) and in		OP.1 FDD OP.2 FDD				
A.3.2.1.2 (OP.2						
FDD)						
PBCH_RA	dB					
PBCH_ RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_ RB	dB					
PHICH_ RA	dB					
PHICH_ RB	dB	(	0			
PDCCH_ RA	dB					
PDCCH_ RB	dB					
PDSCH_ RA	dB					
PDSCH_ RB	dB					
OCNG_ RA Note1	dB					
OCNG_ RB Note1	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4				
$N_{oc}^{ m Note  2}$	dBm/15	-98 (AWGN)				
1 voc	kHz	55 (7W 5H)				
$\hat{E}_s/N_{oc}$	dB	4	4			
RSRP Note 3	dBm/15kH z	-6	94			
Propagation		010	AMAZONI			
Condition		AWGN				
		ch that cell 1 is fully allocate				
transmitted power spectral density is achieved for all OFDM symbols.						
Note 2: Interference from other cells and noise sources not specified in the test is						
assumed to be constant over subcarriers and time and shall be modelled as						
$N_{\rm max}$						
AWGN of appropriate power for $N_{oc}$ to be fulfilled.						
Note 3: RSRP levels have been derived from other parameters for information						
purposes. They are not settable parameters themselves.						

Table A.5.2.3.1 - 3: Cell Specific Parameters for Handover from E-UTRAN FDD to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)		
Farameter	Onit	T1	T2, T3	
Absolute RF Channel		۸р	FCN 1	
Number		AK	FCN I	
RXLEV	dBm	-85	-75	

### A.5.2.3.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{Handover delay} = 90 \text{ ms} \text{ (Table 5.3.3.2.1-1)} + T_{offset} + T_{UL}$ 

 $T_{\text{offset}}$ : Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

 $T_{UL}$ : Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

### A.5.2.4 E-UTRAN TDD - UTRAN TDD Handover

### A.5.2.4.1 Test Purpose and Environment

#### A.5.2.4.1.1 Void

#### A.5.2.4.1.2 1.28 Mcps TDD option

This test is to verify the requirement for E-UTRAN TDD to UTRAN TDD handover requirements specified in clause 5.3.2.

The test scenario comprises of 1 E-UTRA TDD cell and 1 UTRA TDD cell as given in tables Table A.5.2.4.1.2-1, Table A.5.2.4.1.2-2, and Table A.5.2.4.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively.

E-UTRAN shall send a RRC message implying handover to UE. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The end of the last TTI containing handover message is begin of T3 duration.

Table A.5.2.4.1.2-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) handover test case

Parai	meter	Unit	Value	Comment
PDSCH parame	PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCC	H/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters			Channel R.6 TDD	
Initial	Active cell		Cell 1	E-UTRA TDD cell
conditions	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			0	As specified in TS 36.133 clause 8.1.2.1.
of cell 1	Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subfram of cell 1	Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of ce	CP length of cell 1		Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring	Access Barring Information		Not Sent	No additional delays in random access procedure.
Assigned Sub-Channel			1	No additional delays in random
Number				access procedure due to ASC.
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Thresh1		dBm	-93	E-UTRA event B2 threshold
Thresh2		dBm	-80	UTRA event B2 threshold
T1		S	5	
T2		S	≤10	
T3		S	1	

Table A.5.2.4.1.2-2: Cell specific test parameters for E-UTRA TDD to UTRA TDD handover test case (cell 1)

Parameter	Unit	Cell 1					
		T1	T2	T3			
E-UTRA RF Channel		1					
Number							
BW <sub>channel</sub>	MHz		10				
OCNG Pattern defined in							
A.3.2.2.1 (OP.1 TDD)		OP.1 TDD		OP.2			
and in A.3.2.1.2 (OP.2		01.1100		TDD			
TDD)			1				
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB	0	0	0			
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	13	-3	-3			
$\hat{E}_s/N_{oc}$	dB	13	-3	-3			
$N_{oc}$	dBm/15kHz	-98					
RSRP Note 2	dBm/15kHz	-85	-101	-101			
SCH RP Note 2	dBm/15 kHz	-85	-101	-101			
lo Note 2	dBm/9MHz	-57.01	-68.45	-68.45			
Propagation Condition	AWGN						
Note 1: OCNG chall be a	used such that cal	Lie fully all	acatad and	a constant			

Note 2: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves

Table A.5.2.4.1.2-3: Cell specific test parameters for cell search E-UTRA to UTRA case (cell 2)

Parameter	Unit	Cell 2 (UTRA)							
Timeslot Number		0			DwPTS				
		T1	T2	T3	T1	T2	T3		
UTRA RF Channel Number Note 21		Channel 2							
PCCPCH_Ec/lor	dB	-3							
DwPCH_Ec/lor	dB			0					
OCNS_Ec/lor	dB	-3							
$\hat{I}_{or}/I_{oc}$	dB	-3	11	11	-3	11	11		
$I_{oc}$	dBm/1.28 MHz	-80							
PCCPCH RSCP Note 2	dBm	-86	-72	-72	n.a.				
lo Note 2	dBm/1.28 MHz	-78.24	-68.67	-68.67					
Propagation Condition		AWGN							

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: PCCPCH\_RSCP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.2.4.1.3 Void

### A.5.2.4.2 Test Requirements

A.5.2.4.2.1 Void

### A.5.2.4.2.2 1.28 Mcps TDD option

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 120 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.2.2.1.

 $T_{interrupt}$  is defined in clause 5.3.2.2.2.  $T_{interrupt} = 70$  ms in the test as following:

 $T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 \text{ ms}$ 

 $T_{offset} = 10 \text{ ms}$ ;  $T_{UL} = 10 \text{ ms}$ ; and  $F_{SFN} = 1 \text{ for UE decoding SFN}$ .

This gives a total of 120 ms.

A.5.2.4.2.3 Void

### A.5.2.5 E-UTRAN FDD – UTRAN TDD Handover

### A.5.2.5.1 Test Purpose and Environment

A.5.2.5.1.1 Void

A.5.2.5.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRAN FDD to UTRAN TDD handover requirements specified in clause 5.3.2.

The test scenario comprises of two cells, E-UTRA TDD cell1 and UTRA TDD cell2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring. The test parameters are given in Tables A.5.2.5.1-1, A.5.2.5.1-2 and A.5.2.5.1-3.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.5.1.2-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD option) handover test case

Parar	Parameter		Value	Comment
PDSCH paramet	PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH parameters	/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial	Active cell		Cell 1	E-UTRA FDD cell
conditions	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			1	As specified in TS 36.133 clause 8.1.2.1.
E-UTRAN FDD n			RSRP	
UTRAN TDD mea			RSCP	
CP length of cell	1		Normal	
Access Barring Ir	Access Barring Information		Not Sent	No additional delays in random access procedure.
Assigned Sub-Channel Number			1	No additional delays in random access procedure due to ASC.
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Thresh1		dBm	-93	Absolute E-UTRAN RSRP threshold for event B2
Thresh2		dBm	-80S	Absolute UTRAN RSCP threshold for event B2
T1		S	5	
T2		S	≤ 10	
T3		S	1	

Table A.5.2.5.1.2-2: Cell specific test parameters for E-UTRAN FDD to UTRAN (1.28 Mcps TDD option) handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)				
		T1	T2	T3		
E-UTRA RF Channel			1			
number						
BW <sub>channel</sub>	MHz		10			
OCNG Patterns		OP.1 FDD	OP.1 FDD	OP.2		
defined in A.3.2.1.1				FDD		
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{E}_s/N_{oc}$	dB	13	-3	-3		
$N_{oc}$	dBm/15 kHz		-98			
$\hat{E}_s/I_{ot}$	dB	13	-3	-3		
RSRP Note 2	dBm/15 KHz	-85	-101	-101		
lo Note 2	dBm/9MHz	-57.01	-68.45	-68.45		
Propagation Condition			AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves

Table A.5.2.5.1.2-3: Cell specific test parameters for E-UTRAN FDD to UTRAN (1.28 Mcps TDD option) handover test case (cell 2)

Parameter	Unit			Cell 2 (U	ΓRA)		
Timeslot Number			0		DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number Note 21				Channe	el 2		
PCCPCH_Ec/lor	dB		-3				
DwPCH_Ec/lor	dB					0	
OCNS_Ec/lor	dB		-3				
$\hat{I}_{or}/I_{oc}$	dB	-3	11	11	-3	11	11
$I_{oc}$	dBm/1.28 MHz			-80			
PCCPCH RSCP Note 2	dBm	-86	-72	-72		n.a.	
lo Note 2	dBm/1.28 MHz	-78.24	-68.67	-68.67			
Propagation Condition				AWGI	N		

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary

frequency's channel number.

Note 2: PCCPCH\_RSCP and lo levels have been derived from other parameters for information

purposes. They are not settable parameters themselves.

A.5.2.5.1.3 Void

#### A.5.2.5.2 Test Requirements

A.5.2.5.2.1 Void

## A.5.2.5.2.2 1.28 Mcps TDD option

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 120 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.2.2.1.

 $T_{interrupt}$  is defined in clause 5.3.2.2.2.  $T_{interrupt} = 70$  ms in the test as following:

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 \text{ ms}$$

 $T_{offset} = 10 \text{ ms}$ ;  $T_{UL} = 10 \text{ ms}$ ; and  $F_{SFN} = 1 \text{ for UE decoding SFN}$ .

This gives a total of 120 ms.

A.5.2.5.2.3 Void

#### A.5.2.6 E-UTRAN TDD - GSM Handover

#### A.5.2.6.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to GSM cell handover delay specified in clause 5.3.3.

The test parameters are given in Table A.5.2.6.1-1, A.5.2.6.1-2 and A.5.2.6.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 shall be used. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event B1. The start of T3 is defined as the end of last E-UTRAN TTI containing the RRC message implying handover.

The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern should be sent for the parameters specified in Table A.5.2.6.1-1.

Table A.5.2.6.1-1: General test parameters for E-UTRAN TDD toGSM neighbours handover test case in AWGN propagation condition

Pa	rameter	Unit	Value	Comment
PDSCH paramete	ers		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH	/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id			1	As specified in TS 36.133 clause 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Uplink-downlink o	configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe	configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell	1		Normal	
Inter-RAT measu	rement quantity		GSM Carrier RSSI	
E-UTRA RF Char	nnel Number		1	E-UTRA RF Channel Number
E-UTRA Channel (BW <sub>channel</sub> )	Bandwidth	MHz	10	E-UTRA Channel Bandwidth (BW <sub>channel</sub> )
Threshold other s	system	dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
T1	<u> </u>	S	20	
T2	<u> </u>	S	7	
T3	·	S	1	

Table A.5.2.6.1-2: Cell Specific Parameters for Handover E- UTRAN TDD to GSM handover test case

Parameter	Unit	Се	Cell 1		
		T1, T2	Т3		
E-UTRA RF Channel Number		1	1		
BW <sub>channel</sub>	MHz	1	0		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD		
PBCH_RA	dB				
PBCH_ RB	dB				
PSS_ RA	dB				
SSS_ RA	dB				
PCFICH_ RB	dB				
PHICH_ RA	dB	0			
PHICH_ RB	dB				
PDCCH_ RA	dB				
PDCCH_ RB	dB				
PDSCH_ RA	dB				
PDSCH_ RB	dB				
OCNG_ RA Note1	dB				
OCNG_ RB Note1	dB				
$\hat{E}_s/N_{oc}$	dB	4	1		
$N_{\it oc}$ Note 2	dBm/15 kHz	-98 (A	WGN)		
$\hat{E}_s/I_{ot}$	dB	2	1		
RSRP Note 3	dBm/15kHz	-9	)4		
Propagation Condition		AW	GN		

NOTE 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

NOTE 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.6.1-3: Cell Specific Parameters for Handover E-UTRAN to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)		
Farameter	Onit	T1	T2, T3	
Absolute RF Channel		ARFCN 1		
Number				
RXLEV	dBm	-85	-75	

#### A.5.2.6.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{\text{Handover delay}} = 90 \text{ ms} \text{ (Table 5.3.3.2.1-1)} + T_{\text{offset}} + T_{\text{UL}}$ 

T<sub>offset</sub>: Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

 $T_{UL}$ : Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

# A.5.2.7 E-UTRAN FDD – UTRAN FDD Handover; Unknown Target Cell

## A.5.2.7.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements for the case when the target cell is unknown as specified in clause 5.3.1.

The test parameters are given in Tables A.5.2.7.1-1, A.5.2.7.1-2 and A.5.2.7.1-3. The test consists of two successive time periods, with time durations of T1, T2. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.7.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Par	ameter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement	As specified in clause A.3.1.1.1
			Channel R.0 FDD	
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1
	·		Channel R.6 FDD	
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidt	h (BW <sub>channel</sub> )	MHz	10	
	easurement quantity		RSRP	
Inter-RAT (UTRAN quantity	I FDD) measurement		CPICH Ec/N0	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random
				access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier
				frequency is used.
E-UTRA Channel	Bandwidth	MHz	10	
(BWchannel)				
UTRA RF Channe	I Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel
D				1 provided in the cell before T2.
Post-verification po	eriod		False	
T1		S	≤5	
T2		S	1	

Table A.5.2.7.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (	E-UTRA)	
		T1	T2	
E-UTRA RF Channel			1	
number				
BW <sub>channel</sub>	MHz	,	10	
OCNG Patterns defined in		OP.1 FDD	OP.2 FDD	
A.3.2.1.1 (OP.1 FDD) and in				
A.3.2.1.2 (OP.2 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB	0	0	
$N_{oc}^{$	dBm/15 kHz	-!	98	
$\hat{E}_s/N_{oc}$	dB	0	0	
RSRP Note 3	dBm/15 KHz	-98	-98	
Propagation Condition			VGN	
Note 1: OCNG shall be use				
a constant total tra		spectral density	is achieved	
for all OFDM symb				
Note 2: Interference from o				
the test is assumed				
and shall be model	led as AWGN of	appropriate po	ower for $N_{oc}$	
to be fulfilled.				
Note 3: RSRP levels have				

Table A.5.2.7.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 2)

information purposes. They are not settable parameters

themselves.

Parameter	Unit	Cell 2 (UTRA)			
		T1	T2		
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-1	12		
SCH_Ec/lor	dB	-1	12		
PICH_Ec/lor	dB	-15			
DCH_Ec/lor	dB	Note 1			
OCNS_Ec/lor	dB	Note 2			
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8		
$I_{oc}$	dBm/3,84 MHz	-70	-70		
CPICH_Ec/lo	dB	-infinity	-14		
Propagation Condition	AWGN				

Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{\rm or.}$ 

## A.5.2.7.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 290 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

RRC procedure delay is 50ms. See clause 5.3.1.1.1.

 $T_{interrupt}$  is 240ms. See clause 5.3.1.1.2.

This gives a total of 290ms in the test case.

## A.5.2.8 E-UTRAN FDD - GSM Handover; Unknown Target Cell

## A.5.2.8.1 Test Purpose and Environment

This test is to verify the E-UTRAN FDD to GSM handover requirements for the case when the target GSM cell is unknown as specified in clause 5.3.3.

The test parameters are given in Table A.5.2.8.1-1, A.5.2.8.1-2 and A.5.2.8.1-3 below. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.8.1-1: General test parameters for E-UTRAN FDD to GSM handover test case; unknown target cell

Para	meter	Unit	Value	Comment
PDSCH paramete	ers		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH, parameters	/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
T1		S	7	
T2		S	1	

Table A.5.2.8.1 - 2: Cell specific parameters for cell # 1 in E-UTRAN FDD to GSM handover test case; unknown target cell

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Parameter	Unit	Cell 1			
		T1	T2		
BW <sub>channel</sub>	MHz		10		
OCNG Patterns					
defined in A.3.2.1.1					
(OP.1 FDD) and in		OP.1 FDD	OP.2 FDD		
A.3.2.1.2 (OP.2					
FDD)					
PBCH_RA	dB				
PBCH_ RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_ RB	dB				
PHICH_ RA	dB				
PHICH_ RB	dB		0		
PDCCH_ RA	dB				
PDCCH_ RB	dB				
PDSCH_ RA	dB				
PDSCH_ RB	dB				
OCNG_ RA Note1	dB				
OCNG_ RB Note1	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4			
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4			
RSRP Note 3	dBm/15 kHz		-94		
Propagation		AWGN			
Condition					
		hat cell 1 is fully allocate			
		density is achieved for al			
		s and noise sources not			
		er subcarriers and time a	nd shall be modelled as		
AMON -	annranriata na:	er for $N_{oc}$ to be fulfilled.			
Note 3: RSRP leve	appropriate powe	rived from other paramet	ors for information		
		rived from other paramet			
purposes. They are not settable parameters themselves.					

Table A.5.2.8.1-3: Cell specific parameters for cell # 2 in E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 2 (GSM)		
Farameter	Onit	T1	T2	
Absolute RF Channel		ARFCN 1		
Number				
RXLEV	dBm	-Infinity	-75	

## A.5.2.8.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{Handover delay}$  = 190 ms (Table 5.3.3.2.1-1) +  $T_{offset}$  +  $T_{UL}$ 

 $T_{\text{offset}}$ : Equal to 4.65 ms is the GSM timing uncertainty from the time when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T<sub>UL</sub>: Equal to 4.65 ms is the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 199.3 ms, allow 200 ms in the test case.

## A.5.2.9 E-UTRAN TDD - GSM Handover; Unknown Target Cell

#### A.5.2.9.1 Test Purpose and Environment

This test is to verify the E-UTRAN TDD to GSM handover requirements for the case when the target GSM cell is unknown as specified in clause 5.3.3.

The test parameters are given in Table A.5.2.9.1 -1, A.5.2.9.1 -2 and A.5.2.9.1 -3 below. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.9.1-1: General test parameters for E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter		Unit	Value	Comment
PDSCH paramete	PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.2
			Channel R.0 TDD	
PCFICH/PDCCH	/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters			Channel R.6 TDD	
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
Special subframe	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink o	configuration		1	As specified in table 4.2-2 in TS 36.211
T1		S	7	
T2		S	1	

Table A.5.2.9.1 - 2: Cell specific parameters for cell # 1 in E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter	Unit	(	Cell 1	
		T1	T2	
BW <sub>channel</sub>	MHz		10	
OCNG Patterns				
defined in A.3.2.2.1				
(OP.1 TDD) and in		OP.1 TDD	OP.2 TDD	
A.3.2.2.2 (OP.2				
TDD)				
PBCH_RA	dB			
PBCH_ RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_ RB	dB			
PHICH_ RA	dB			
PHICH_ RB dB		0		
PDCCH_ RA	dB			
PDCCH_ RB	dB			
PDSCH_RA	dB			
PDSCH_ RB	dB			
OCNG_ RA Note1	dB			
OCNG_ RB Note1	dB			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB		4	
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB		4	
RSRP Note 3	dBm/15 kHz		-94	
Propagation		AWGN		
Condition		-		
		hat cell 1 is fully allocate		
		density is achieved for al		
		s and noise sources not		
		er subcarriers and time a	nd shall be modelled as	
ANAICNI -4	anneneiata e	er for $N_{oc}$ to be fulfilled.		
Note 3: RSRP lev	appropriate powe	rived from other personat	are for information	
		rived from other paramet table parameters themse		
purposes.	THEY ALE HOLSELL	abie parameters memse	IVCO.	

Table A.5.2.9.1 - 3: Cell specific parameters for cell # 2 in E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 2 (GSM)		
Farameter	Onit	T1	T2	
Absolute RF Channel		۸р	FCN 1	
Number		AN	FON I	
RXLEV	dBm	-Infinity	-75	

## A.5.2.9.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{Handover delay}$  = 190 ms (Table 5.3.3.2.1-1) +  $T_{offset}$  +  $T_{UL}$ 

 $T_{\text{offset}}$ : Equal to 4.65 ms is the GSM timing uncertainty from the time when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T<sub>III</sub>: Equal to 4.65 ms is the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 199.3 ms, allow 200 ms in the test case.

## A.5.2.10 E-UTRAN TDD to UTRAN TDD handover: unknown target cell

#### A.5.2.10.1 Test Purpose and Environment

This test is to verify the requirement for E-UTRAN TDD to UTRAN TDD handover requirements specified in clause 5.3.2 when the target UTRAN TDD cell is unknown.

The test scenario comprises of 1 E-UTRAN TDD cell and 1 UTRAN TDD cell as given in tables A.5.2.10.1-1, A.5.2.10.1-2, and A.5.2.10.1-3. No gap pattern is configured in the test case.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, a RRC message implying handover to UTRA 1.28Mcps TDD cell shall be sent to the UE. The end of the last TTI containing handover message is the beginning of T2 duration.

Table A.5.2.10.1-1: General test parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case

Parar	meter	Unit	Value	Comment
PDSCH param	neters		DL Reference Measurement Channel	As specified in clause A.3.1.1.2
			R.0 TDD	
	PCFICH/PDCCH/PHICH		DL Reference	As specified in clause A.3.1.2.2
parameters			Measurement Channel	
			R.6 TDD	
Initial	Active cell		Cell 1	E-UTRAN TDD cell
conditions	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD cell
Final conditions	Active cell		Cell 2	UTRA 1.28Mcps TDD cell
CP length of ce	ell 1		Normal	
Uplink-downlin configuration of			1	As specified in table 4.2.2 in TS 36.211
Special subfraction of	me		6	As specified in table 4.2.1 in TS 36.211
Time offset bet			3 ms	Asynchronous cells
Access Barring	g Information		Not Sent	No additional delays in random access procedure.
Assigned Sub- Number	Channel		1	No additional delays in random access procedure due to ASC.
TimeToTrigger	r	S	0	
Filter coefficier	nt		0	L3 filtering is not used
DRX			OFF	
T1		S	5	During T1, cell 2 shall be powered off, and during the off time the physical layer cell identity shall be changed.
T2	·	S	1	

Table A.5.2.10.1-2: Cell specific test parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case (cell 1)

Parameter	Unit	Ce	ell 1
		T1	T2
E-UTRA RF Channel			1
Number			
BWchannel	MHz	1	0
OCNG Patterns defined in		OP.1 TDD	OP.2 TDD
TS36.133 A.3.2.2.1 (OP.1			
TDD) and in A.3.2.2.2			
(OP.2 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RANote 1	dB		
OCNG_RBNote 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	3
$\hat{E}_s/N_{oc}$	dB	3	3
$N_{oc}$	dBm/15kHz	-9	98
RSRP	dBm/15kHz	-95	-95
SCH_RP	dBm/15 kHz	-95	-95
Propagation Condition		AW	/GN
Note 1: OCNG shall be us	sed such that cell is	s fully allocated	and a

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable

parameters themselves.

Table A.5.2.10.1-3: Cell specific test parameters for E-UTRAN TDD to unknown UTRAN TDD cell test case (cell 2)

Parameter Unit		Cell 2 (UTRA)			
Timeslot Number	0		0 Dw		PTS
		T1	T2	T1	T2
UTRA RF Channel Number <sup>Note1</sup>			Char	nel 2	
PCCPCH_Ec/lor	dB	-:	3		
DwPCH_Ec/lor	dB			0	)
OCNS_Ec/lor	dB	-(	3		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	13	-infinity	13
$I_{oc}$	dBm/1.28 MHz		-8	30	
PCCPCH RSCP	dBm	-infinity	-70	n.a	a.
Propagation Condition			AW	GN	•

Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note2: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.5.2.10.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 280 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.2.2.1.

 $T_{interrupt}$  is defined in clause 5.3.2.2.2.  $T_{interrupt} = 230$  ms in the test as following:

 $T_{offset} = 10 \text{ ms}$ ;  $T_{UL} = 10 \text{ ms}$ ; and  $F_{SFN} = 1 \text{ for UE decoding SFN}$ .

This gives a total of 280 ms.

# A.5.2.10A E-UTRAN FDD – UTRAN FDD Multicarrier Handover with two target cells

### A.5.2.10A.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements specified in clause 5.3.1 in a 2 cell multicarrier configuration. It is applicable to UEs that support DC-HSDPA, DB-DC-HSDPA and which do not support 3C-HSDPA or 4C-HSDPA.

The test parameters are given in Tables A.5.2.10A.1-1, A.5.2.10A.1-2 and A.5.2.10A.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 and cell 3 become detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover to cell 2 and cell 3 shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target Primary Serving HS-DSCH cell and cell 3 as the target Secondary Serving HS-DSCH cell.

Table A.5.2.10A.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Para	meter	Unit	Value	Comment
PDSCH parameters	PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
	Active cell		Cell 2 and cell 3	UTRAN cell
Channel Bandwidth	(BW <sub>channel</sub> )	MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD mea	asurement quantity		RSRP	
quantity	FDD) measurement		CPICH Ec/lo	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTR	Α	dB	-18	Absolute UTRAN CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Info	rmation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channe	el Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel B (BWchannel)		MHz	10	
UTRA RF Channel	Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA FD			12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification per	riod		False	
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.2.10A.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel			1	
number				
BW <sub>channel</sub>	MHz		10	
OCNG Patterns		OP.1	OP.1	OP.2
defined in A.3.2.1.1		FDD	FDD	FDD
(OP.1 FDD) and in				
A.3.2.1.2 (OP.2 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB	0	0	0
$N_{oc}$	dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$	dB	0	0	0
RSRP Note 2	dBm/15 KHz	-98	-98	-98
lo Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition			AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.10A.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD multi carrier handover test case (cell 2 and cell 3)

			Cell 2	•		Cell 3	
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number			Channel 1			Channel 2	
Cell type		Primary Serving HS-DSCH Cell		Secondary Serving HS-DSCH Cell		S-DSCH	
CPICH_Ec/lor dB		-10			-10		
PCCPCH_Ec/lor	dB	-12		-12			
SCH_Ec/lor	dB		-12	-12			
PICH_Ec/lor	dB		-15		-15		
HS-SCCH_Ec/lor	dB		-13			-13	
HS_DPDCH_Ec/lor	dB		-10		-10		
DPCH_Ec/lor dB		Note 1			N/A		
OCNS		Note 2			-2.02		
$\hat{I}_{or}/I_{oc}$	dB	-Inf	-1.8	-1.8	-Inf	-1.8	-1.8
$I_{oc}$	dBm/3.8 MHz	34			-70		
Propagation Condition			AWGN	•		AWGN	•

Note 1: The DPCH level is controlled by the power control loop

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{\rm or}$  Note 3: The UE shall be scheduled continuously with HS-DSCH data during T3 using both cell 2 and cell 3

#### A.5.2.10A.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 210 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay  $+ T_{interrupt}$ , where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.1.1.1.

 $T_{interrupt} = 160$  ms in the test;  $T_{interrupt}$  is defined in clause 5.3.1.1.2.

This gives a total of 210 ms.

# A.5.2.10B E-UTRAN TDD – UTRAN FDD Multicarrier Handover with two target cells

#### A.5.2.10B.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to UTRAN FDD handover requirements specified in clause 5.3.1 in a 2 cell multicarrier configuration. It is applicable to UEs that support DC-HSDPA, DB-DC-HSDPA and which do not support 3C-HSDPA or 4C-HSDPA.

The test parameters are given in Tables A.5.2.10B.1-1, A.5.2.10B.1-2 and A.5.2.10B.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 and cell 3 become detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover to cell 2 and cell 3 shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target Primary Serving HS-DSCH cell and cell 3 as the target Secondary Serving HS-DSCH cell.

Table A.5.2.10B.1-1: General test parameters for E-UTRAN TDD to UTRAN FDD handover test case

Paran	neter	Unit	Value	Comment
PDSCH parameters	PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PH (E-UTRAN TDD)	HICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions A	Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
N	Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Final conditions A	Active cell		Cell 2 and cell 3	
Special subframe co	onfiguration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink con	ifiguration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1
E-UTRAN TDD mea			RSRP	
Inter-RAT (UTRA FI quantity	DD) measurement		CPICH Ec/Io	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTR	Α	dB	-18	UTRAN FDD CPICH Ec/lo threshold for event B2
Hysteresis		dB	0	
DRX			OFF	No DRX configured.
Time to Trigger		ms	0	
Filter coefficient			0	
CP length			Normal	Applicable to cell 1
Gap pattern configu	ration Id		0	As specified in Table 8.1.2.1-1; to start before T2 starts
E-UTRA RF Channe	el Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Ba (BW <sub>channel</sub> )		MHz	10	
UTRA RF Channel N	Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA FD	DD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list before T2.
Post-verification per	riod		False	Post verification is not used.
T1		S	5	
T2		S	≤5	
T3		S	1	

Table A.5.2.10B.1-2: Cell specific test parameters for E-UTRAN TDD to UTRAN FDD handover test case (cell 1)

Unit	Cell 1 (E-UTRAN)				
	T1	T2	T3		
		1			
MHz		10			
	OP 1	TDD	OP.2 TDD		
	01.1	100	01.2100		
1					
1					
1					
1					
dB		0			
1					
1					
1					
1					
1					
		T	T		
dBm/15 kHz	-98	-98	-98		
dB	0	0	0		
dB	0	0	0		
dBm/15 kHz		-98			
dBm/9 MHz	-67.21	-67.21	-67.21		
		AWGN			
	MHz  dB  dBm/15 kHz  dB  dB  dB	MHz  OP.1  dB  dB  dB  0  dB  0  dBm/15 kHz	T1         T2           1         10           MHz         10           OP.1 TDD         0           dBm/15 kHz         -98         -98           dB         0         0           dBm/15 kHz         -98         -98           dBm/15 kHz         -98         -98           dBm/9 MHz         -67.21         -67.21		

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.10B.1-3: Cell specific test parameters for E-UTRAN TDD to UTRAN FDD multi carrier handover test case (cell 2 and cell 3)

T1   T2   T3   T1   T2	
Cell type         Primary Serving HS-DSCH Cell         Secondary Serving Cell           CPICH_Ec/lor         dB         -10         -10           PCCPCH_Ec/lor         dB         -12         -12           SCH_Ec/lor         dB         -12         -12           PICH_Ec/lor         dB         -15         -15           HS-SCCH_Ec/lor         dB         -13         -13           HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	
Cell type         Cell         Cell           CPICH_Ec/lor         dB         -10         -10           PCCPCH_Ec/lor         dB         -12         -12           SCH_Ec/lor         dB         -12         -12           PICH_Ec/lor         dB         -15         -15           HS-SCCH_Ec/lor         dB         -13         -13           HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	g HS-DSCF
PCCPCH_Ec/lor         dB         -12         -12           SCH_Ec/lor         dB         -12         -12           PICH_Ec/lor         dB         -15         -15           HS-SCCH_Ec/lor         dB         -13         -13           HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	
SCH_Ec/lor         dB         -12         -12           PICH_Ec/lor         dB         -15         -15           HS-SCCH_Ec/lor         dB         -13         -13           HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	
PICH_Ec/lor         dB         -15         -15           HS-SCCH_Ec/lor         dB         -13         -13           HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	
HS-SCCH_Ec/lor         dB         -13         -13           HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	
HS_DPDCH_Ec/lor         dB         -10         -10           DPCH_Ec/lor         dB         Note 1         N/A	
DPCH_Ec/lor         dB         Note 1         N/A	
0010	
OCNS Note 2 -2.02	
$\hat{I}_{or}/I_{oc}$ dB -Inf -1.8 -1.8 -Inf -1.8	-1.8
I <sub>oc</sub> dBm/3.84 -70	•
Propagation Condition AWGN AWG	J

Note 1: The DPCH level is controlled by the power control loop

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{\rm or}$  Note 3: The UE shall be scheduled continuously with HS-DSCH data during T3 using both cell 2 and cell 3

#### A.5.2.10B.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 210 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay  $+ T_{interrupt}$ , where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.1.1.1.

 $T_{interrupt} = 160$  ms in the test;  $T_{interrupt}$  is defined in clause 5.3.1.1.2.

This gives a total of 210 ms.

#### A.5.2.11 E-UTRAN FDD – UTRAN FDD Handover for 5MHz Bandwidth

#### A.5.2.11.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.5.2.1.1.

The parameters of this test are the same as defined in Subclause A.5.2.1.1 except that the values of the parameters in the Table A.5.2.11.1-1 will replace the values of the corresponding parameters in A.5.2.1.1-1, and the values of the parameters in the Table A.5.2.1.1-2 will replace the values of the corresponding parameters in A.5.2.1.1-2.

Table A.5.2.11.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case for 5MHz bandwidth

Parameter	Unit	Value	Comment	
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.1	
		Channel R.5 FDD		
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1	
		Channel R.11 FDD		
E-UTRA Channel Bandwidth	MHz	5		
(BWchannel)				
Note 1: See Table A.5.2.1.1-1 for other general test parameters.				
Note 2: This test is according to the pr	inciple d	efined in section A.3.7.2.		

Table A.5.2.11.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Pai	rameter	Unit		Cell 1 (E-UTRA)				
			T1 T2		T3			
BW <sub>channel</sub>		MHz		5				
OCNG Pa	atterns		OP.15	OP.15	OP.16			
defined in	n A.3.2.1.15		FDD	FDD	FDD			
(OP.15 F	DD) and in							
A.3.2.1.10	6 (OP.16							
FDD)								
lo Note 2		dBm/4.5 MHz	-70.22	-70.22	-70.22			
Note 1:	OCNG shall b	e used such that b	ooth cells a	re fully alloc	ated and a			
	constant total	transmitted power	spectral d	ensity is ach	ieved for all			
	OFDM symbo	nbols.						
Note 2:	RSRP and lo	I lo levels have been derived from other parameters for						
	information pu	purposes. They are not settable parameters themselves.						
Note 3:	See Table A.5	5.2.1.1-2 for other	cell specifi	c test param	eters.			

## A.5.2.11.2 Test Requirements

The test requirements defined in section A.5.2.1.2 shall apply to this test case.

#### A.5.3 E-UTRAN Handover to Non-3GPP RATs

#### A.5.3.1 E-UTRAN FDD – HRPD Handover

#### A.5.3.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to HRPD handover requirements specified in clause 5.4.1.

The test parameters are given in Tables A.5.3.1.1-1, A.5.3.1.1-2 and A.5.3.1.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.1.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
	tive cell		Cell 1	E-UTRAN FDD cell
Ne	ighbouring cell		Cell 2	HRPD cell
	tive cell		Cell 2	HRPD cell
Channel Bandwidth (B'	W <sub>channel</sub> )	MHz	10	
Gap Pattern Id	·		0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measu	rement quantity		RSRP	
Inter-RAT (HRPD) mea			CDMA2000 HRPD Pilot	
quantity			Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Informa	ation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel N	lumber		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Band (BWchannel)	dwidth	MHz	10	,
HRPD RF Channel Nu	mber		1	One HRPD carrier frequency is used.
HRPD neighbour cell list size			8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWind	dowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	5	
T2		S	≤10	
T3		S	1	

Table A.5.3.1.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRA) T1 T2 T3		<b>A)</b>	
				T3	
E-UTRA RF Channel		1			
number					
BW <sub>channel</sub>	MHz		10		
OCNG Patterns defined in		OP.1	FDD	OP.2	
A.3.2.1.1 (OP.1 FDD) and				FDD	
in A.3.2.1.2 (OP.2 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	1			
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}^{ m Note~2}$	dBm/15		-98		
	kHz				
RSRP Note 3	dBm/15	-98	-98	-98	
	KHz				
$\hat{E}_s/N_{oc}$	dB	0	0	0	
$\hat{E}_s/I_{ot}$	dB	0	0	0	
Propagation Condition			AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.3.1.1-3: Cell specific test parameters for HRPD (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit		Cell 2 (HRPD)	
		T1	T2	Т3
$\frac{\text{Control}  \text{E}_{\text{b}}}{\text{N}_{\text{t}}}  \text{(38.4 kbps)}$	dB 21			
$\frac{\text{Control}  \text{E}_{\text{b}}}{\text{N}_{\text{t}}} \text{ (76.8 kbps)}$	dB		18	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
$I_{oc}$	dBm/1.2288 MHz		-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3
Propagation Condition			AWGN	

#### A.5.3.1.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 50 ms, which is specified in clause 5.4.1.1.1.

 $T_{interrupt} = 76.66$  ms in the test;  $T_{interrupt}$  is defined in clause 5.4.1.1.2.

This gives a total of 126.66 ms, allow 127 ms in the test.

#### A.5.3.2 E-UTRAN FDD – cdma2000 1X Handover

## A.5.3.2.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to cdma2000 1X handover requirements specified in clause 5.4.2.

The test parameters are given in Tables A.5.3.2.1-1, A.5.3.2.1-2 and A.5.3.2.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.2.1-1: General test parameters for E-UTRAN FDD to cdma2000 1X handover test case

Parameter		Jnit	Value	Comment
PDSCH parameters			Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions			Cell 1	E-UTRAN FDD cell
Neighb	ouring cell		Cell 2	cdma2000 1X cell
Final condition Active			Cell 2	cdma2000 1X cell
Channel Bandwidth (BW <sub>cha</sub>	annel) IV	1Hz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurem	ent quantity		RSRP	
Inter-RAT (cdma2000 1X)			CDMA2000 1xRTT Pilot	
quantity			Strength	
b2-Threshold1	d	Bm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information	1	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Num	ber		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwid (BWchannel)	th N	ИHz	10	
cdma2000 1X RF Channel	Number		1	One HRPD carrier frequency is used.
cdma2000 1X neighbour co	ell list size		8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindow	Size		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	5	
T2		S	≤10	
T3		3	≥10	

Table A.5.3.2.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to cdma2000 1X cell #2

Parameter	Unit	C	Cell 1 (E-UTRA)		
		T1	T2	T3	
E-UTRA RF Channel			1		
number					
BW <sub>channel</sub>	MHz		10		
OCNG Patterns defined in		OP.1	FDD	OP.2	
A.3.2.1.1 (OP.1 FDD) and				FDD	
in A.3.2.1.2 (OP.2 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
N <sub>oc</sub> Note 2	dBm/15	-98			
	kHz		T	1	
RSRP Note 3	dBm/15	-98	-98	-98	
	KHz	_	_	_	
$\hat{E}_s/N_{oc}$	dB	0	0	0	
$\hat{E}_s/I_{ot}$	dB	0	0	0	
Propagation Condition	AWGN				
Note 1: OCNG shall be us	sed such that	both cells are	fully allocate	ed and a	
constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the					
test is assumed to be constant over subcarriers and time and shall					

be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 3:

Table A.5.3.2.1-3: Cell specific test parameters for cdma2000 1X (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Unit Cell 2 (cdma2000 1		
		T1	T2	Т3
Pilot E <sub>c</sub> I <sub>or</sub>	dB	-7		
$\begin{array}{c c} Sync & E_c \\ \hline I_{or} \end{array}$	dB	-16		
$\frac{\text{Paging}  \text{E}_{\text{c}}}{\text{I}_{\text{or}}}  \text{(4.8 kbps)}$	dB	-12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
$I_{oc}$	dBm/1.2288 MHz	-55		
CDMA2000 1xRTT Pilot Strength	dB	dB -infinity -10		-10
Propagation Condition			AWGN	

#### A.5.3.2.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 300 ms from the beginning of time period T3.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 130 ms, which is specified in clause 5.4.2.1.1.

 $T_{interrupt} = 170$  ms in the test;  $T_{interrupt}$  is defined in clause 5.4.2.1.2.

This gives a total of 300 ms.

# A.5.3.3 E-UTRAN FDD – HRPD Handover; Unknown Target Cell

## A.5.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to HRPD handover requirements for the case when the target HRPD cell is unknown as specified in clause 5.4.1.

The test parameters are given in Tables A.5.3.3.1-1, A.5.3.3.1-2 and A.5.3.3.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. During time period T1, message containing Information Element *systemTimeInfo* as defined in clause 6.3.1 of TS 36.331 [2] shall be sent by the System Simulator (SS). No gap patterns are configured in the test case. No HRPD neighbour cell list shall be provided to the UE.

A RRC message implying handover to the unknown HRPD cell shall be sent to the UE towards the end of the time period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.3.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case; unknown target HRPD cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/P	HICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidth	n (BW <sub>channel</sub> )	MHz	10	
DRX			OFF	Non-DRX test
Access Barring Info	Access Barring Information		Not sent	No additional delays in random access procedure
E-UTRA RF Chann	el Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel B (BWchannel)	Bandwidth	MHz	10	
HRPD RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	≤5	
T2		S	1	

Table A.5.3.3.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to unknown HRPD cell # 2

Parameter	Unit	Cell 1 (E-U	TRAN FDD)	
		T1	T2	
E-UTRA RF Channel			1	
number				
BW <sub>channel</sub>	MHz	1	0	
OCNG Patterns defined in		OP.1	FDD	
A.3.2.1.1 (OP.1 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	(	)	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-9	98	
RSRP Note 3	dBm/15 kHz	-98	-98	
$\hat{E}_s/N_{oc}$	dB	0 0		
$\hat{E}_s/I_{ot}$	dB	0	0	
Propagation Condition		AW	'GN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.5.3.3.1-3: Cell specific test parameters for unknown HRPD (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)		
		T1	T2	
$\frac{\text{Control}  E_b}{N_t}  (38.4)$	dB	2	1	
kbps)				
Control $E_b$ (76.8		1	8	
$N_{t}$	dB			
kbps)				
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	
$I_{oc}$	dBm/1.22 88 MHz	-5	55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	
Propagation Condition		AW	GN	

## A.5.3.3.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

T<sub>interrupt</sub> also includes time to detect HRPD cell; see clause 5.4.1.1.2

This gives a total of 126.66 ms, allow 127 ms in the test case.

## A.5.3.4 E-UTRAN FDD – cdma2000 1X Handover; Unknown Target cell

#### A.5.3.4.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to cdma2000 1X handover requirements for the case when the target cdma2000 1X cell is unknown as specified in clause 5.4.2.

The test parameters are given in Tables A.5.3.4.1-1, A.5.3.4.1-2 and A.5.3.4.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. During time period T1, message containing Information Element *systemTimeInfo* as defined in clause 6.3.1 of TS 36.331 [2] shall be sent by the System Simulator (SS). No gap patterns are configured in the test case. No cdma2000 1X neighbour cell list shall be provided to the UE.

A RRC message implying handover to the unknown cdma2000 1X cell shall be sent to the UE towards the end of the time period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.2.1-1: General test parameters for E-UTRAN FDD to cdma2000 1X handover test case; unknown target cdma2000 1X cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement	As specified in clause A.3.1.1.1
			Channel R.0 FDD	
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1
			Channel R.6 FDD	
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidt	h (BW <sub>channel</sub> )	MHz	10	
DRX			OFF	Non-DRX test
Access Barring Inf	Access Barring Information		Not sent	No additional delays in random
				access procedure
E-UTRA RF Chan	nel Number		1	One E-UTRA FDD carrier
				frequency is used.
E-UTRA Channel	Bandwidth	MHz	10	
(BWchannel)				
cdma2000 1X RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	≤5	
T2		S	1	

Table A.5.3.2.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to unknown cdma2000 1X cell # 2

Parameter	Unit	Cell 1 (E-UTRAN FDD)			
	Ī	T1	T2		
E-UTRA RF Channel number			1		
BW <sub>channel</sub>	MHz	1	0		
OCNG Patterns defined in		OP.1	FDD		
A.3.2.1.1 (OP.1 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$N_{oc}^{ m Note  2}$	dBm/15 kHz	-9	98		
RSRP Note 3	SRP Note 3 dBm/15 kHz		-98		
$\hat{E}_s/N_{oc}$	dB	0	0		
$\hat{E}_s/I_{ot}$	dB	0	0		
Propagation Condition		AW	GN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.3.2.1-3: Cell specific test parameters for unknown cdma2000 1X (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (cdma2000 1X)		
		T1	T2	
Pilot E <sub>c</sub> I <sub>or</sub>	dB	-7		
Sync E <sub>c</sub>	dB	-16		
$\frac{\text{Paging}  \text{E}_{\text{c}}}{\text{I}_{\text{or}}}  \text{(4.8 kbps)}$	dB	-12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	
$I_{oc}$	dBm/1.22 88 MHz	-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10	
Propagation Condition		AWGN		

#### A.5.3.4.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 300 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

T<sub>interrupt</sub> also includes time to detect cdma2000 1X cell; see clause 5.4.2.1.2

This gives a total of 300 ms.

## A.5.3.5 E-UTRAN TDD - HRPD Handover

#### A.5.3.5.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to HRPD handover requirements specified in clause 5.4.1.

The test parameters are given in Tables A.5.3.5.1-1, A.5.3.5.1-2 and A.5.3.5.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.5.1-1: General test parameters for E-UTRAN TDD to HRPD handover test case

Paran	neter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PH	ICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
	Active cell		Cell 1	E-UTRAN TDD cell
1	leighbouring cell		Cell 2	HRPD cell
	ctive cell		Cell 2	HRPD cell
Channel Bandwidth (	BW <sub>channel</sub> )	MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN TDD meas	surement quantity		RSRP	
Inter-RAT (HRPD) m	easurement		CDMA2000 HRPD Pilot	
quantity			Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDM	A2000	dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Inform	mation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channe	Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Ba (BWchannel)	ndwidth	MHz	10	
Uplink-downlink conf	iguration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe con	nfiguration of cell 1		6	As specified in table 4.2.1 in TS 36.211
HRPD RF Channel N	lumber		1	One HRPD carrier frequency is used.
HRPD neighbour cel			8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchW	indowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	5	
T2		S	≤10	
T3		S	1	

Table A.5.3.5.1-2: Cell specific test parameters for E-UTRAN TDD cell#1 for handover to HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRA)			
		T1	T2	T3	
E-UTRA RF Channel		1			
number					
BW <sub>channel</sub>	MHz		10		
OCNG Patterns defined in		OP.1 TDD OP.		OP.2	
TS36.133 A.3.2.2.1 (OP.1				TDD	
TDD) and in A.3.2.2.2					
(OP.2 TDD)					
PBCH_RA	dB	-			
PBCH_RB	dB	-			
PSS_RA	dB	<u> </u>			
SSS_RA	dB	-			
PCFICH_RB	dB	-			
PHICH_RA	dB	-			
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RANote 1	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}^{ m Note~2}$	dBm/15	-98			
	kHz		1		
RSRP Note 3	dBm/15	-98	-98	-98	
	KHz	_	_		
$\hat{E}_s/N_{oc}$	dB	0	0	0	
$\hat{E}_s/I_{ot}$	dB	0	0	0	
Propagation Condition	Propagation Condition AWGN				
constant total tran					
OFDM symbols.					
test is assumed to	be constant	over subcarri	ers and time	and shall	
be modelled as A	be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.				
Note 3: RSRP levels have	RSRP levels have been derived from other parameters for				
information purpos					

Table A.5.3.5.1-3: Cell specific test parameters for HRPD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)		
		T1	T2	T3
$\frac{\text{Control}  \text{E}_{\text{b}}}{\text{N}_{\text{t}}}  \text{(38.4 kbps)}$	dB		21	
$\frac{\text{Control}  \text{E}_{\text{b}}}{\text{N}_{\text{t}}} \text{ (76.8 kbps)}$	dB		18	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
$I_{oc}$	dBm/1.2288 MHz		-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3
Propagation Condition			AWGN	

# A.5.3.5.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 50 ms, which is specified in clause 5.4.1.1.1.

 $T_{interrupt} = 76.66$  ms in the test;  $T_{interrupt}$  is defined in clause 5.4.1.1.2.

This gives a total of 126.66 ms, allow 127 ms in the test.

#### A.5.3.6 E-UTRAN TDD – cdma2000 1X Handover

#### A.5.3.6.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to cdma2000 1X handover requirements specified in clause 5.4.2.

The test parameters are given in Tables A.5.3.6.1-1, A.5.3.6.1-2 and A.5.3.6.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.6.1-1: General test parameters for E-UTRAN TDD to cdma2000 1X handover test case

Para	meter	Unit	Value	Comment
PDSCH parameters			Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth	(BW <sub>channel</sub> )	MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN TDD mea	asurement quantity		RSRP	
Inter-RAT (cdma20 quantity	00 1X) measurement		CDMA2000 1xRTT Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Info	ormation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Chann	el Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel B (BWchannel)		MHz	10	,
cdma2000 1X RF Channel Number			1	One cdma2000 1X carrier frequency is used.
cdma2000 1X neighbour cell list size			8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchV	VindowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	5	
T2		S	≤10	
T3		S	1	

Table A.5.3.6.1-2: Cell specific test parameters for E-UTRAN TDD cell#1 for handover to cdma2000 1X cell # 2

Parameter	Unit	C	ell 1 (E-UTR	A)			
		T1	T2	Т3			
E-UTRA RF Channel			1				
number							
BW <sub>channel</sub>	MHz		10				
OCNG Patterns defined in		OP.1	TDD	OP.2			
A.3.2.2.1 (OP.1 TDD) and				TDD			
in A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0				
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
Noc Note 2	dBm/15		-98				
	kHz						
RSRP Note 3	dBm/15	-98 -98		-98			
	KHz						
$\hat{E}_s/N_{oc}$	dB	0	0	0			
$\hat{E}_s/I_{ot}$	dB	0	0	0			
Propagation Condition			AWGN				
Note 1: OCNG shall be us	ed such that	both cells are	fully allocate	ed and a			
	constant total transmitted power spectral density is achieved for all						
Note 2: Interference from							
test is assumed to	be constant	over subcarri	ers and time	and shall			
			. <i>N</i>				
be modelled as A\	NGN of appro	opriate power	for $10^{\circ}$ to b	oe fulfilled.			
Note 3: RSRP levels have							
information purpos	information purposes. They are not settable parameters themselves.						

Table A.5.3.6.1-3: Cell specific test parameters for cdma2000 1X (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell	2 (cdma2000 1	X)	
		T1	T2	T3	
$\frac{\text{Pilot}  \text{E}_{\text{c}}}{\text{I}_{\text{or}}}$	dB	-7			
$\frac{\mathrm{Sync} \ \mathrm{E}_{\mathrm{c}}}{\mathrm{I}_{\mathrm{or}}}$	dB		-16		
$\frac{\text{Paging}  \text{E}_{c}}{\text{I}_{\text{or}}}  \text{(4.8 kbps)}$	dB		-12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity 0 0			
$I_{oc}$	dBm/1.2288 MHz		-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity -10 -10			
Propagation Condition	AWGN				

#### A.5.3.6.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 300 ms from the beginning of time period T3.

NOTE: The handover delay can be expressed as: RRC procedure delay + T<sub>interrupt</sub>, where:

RRC procedure delay = 130 ms, which is specified in clause 5.4.2.1.1.

 $T_{interrupt} = 170$  ms in the test;  $T_{interrupt}$  is defined in clause 5.4.2.1.2.

This gives a total of 300 ms.

### A.6 RRC Connection Control

#### A.6.1 RRC Re-establishment

#### A.6.1.1 E-UTRAN FDD Intra-frequency RRC Re-establishment

#### A.6.1.1.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.1.1-1 and table A.6.1.1.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.1.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Para	Parameter		Value	Comment
PDSCH parameter	'S		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chann			1	Only one FDD carrier frequency is used.
Channel Bandwidtl	h (BW <sub>channel</sub> )	MHz	10	
N310			1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		S	5	
T2	<u> </u>	ms	200	
T3		S	3	

Table A.6.1.1.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD	
defined in A.3.2.1.1		FDD	FDD	FDD				
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		•					
PDCCH_RA	dB		0			0		
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{E}_{s}/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4	
$N_{oc}$ Note 2	dBm/15 KHz				-98	·	·	
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4	
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94	
Propagation Condition					AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.6.1.1.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish delay} = T_{UL grant} + T_{UE re-establish delay}$$

Where:

 $T_{UL\_grant} = It$  is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-establish\_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{freq} = 1$$

$$T_{\text{search}} = 100 \text{ ms}$$

 $T_{SI}$  = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

 $T_{PRACH}$  = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

#### A.6.1.2 E-UTRAN FDD Inter-frequency RRC Re-establishment

#### A.6.1.2.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD inter-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.1.2-1 and table A.6.1.1.2-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of radio link failure. At the start of time period T3, cell 2, which is the neighbour cell, is activated.

Table A.6.1.2.1-1: General test parameters for E-UTRAN FDD inter-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters	5		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/P	HICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chann	el Number (cell 1)		1	
E-UTRA RF Chann	el Number (cell 2)		2	
E-UTRA FDD inter-	frequency carrier list		1	2 E-UTRA FDD carrier
size				frequencies in total: 1 intra-
				frequency and 1 inter-frequency
Channel Bandwidth	(BW <sub>channel</sub> )	MHz	10	
N310	,	-	1	Maximum consecutive out-of-sync
				indications from lower layers
N311		-	1	Minimum consecutive in-sync
				indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		S	5	
T2		ms	200	
T3		S	5	

Table A.6.1.2.1-2: Cell specific test parameters for E-UTRAN FDD inter-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			2		
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD	
defined in A.3.2.1.1		FDD	FDD	FDD				
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		•			•		
PDCCH_RA	dB		0			0		
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{E}_{s}/I_{ot}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7	
$N_{oc}$ Note 2	dBm/15 KHz				-98			
$\hat{E}_s/N_{oc}$	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7	
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91	
Propagation Condition					AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.6.1.2.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA FDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish delay} = T_{UL grant} + T_{UE re-establish delay}$$

Where:

 $T_{UL\_grant} = It$  is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-establish\_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{\text{freq}} = 2$$

$$T_{\text{search}} = 800 \text{ ms}$$

 $T_{SI}$  = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

 $T_{PRACH}$  = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, allow 3 s in the test case.

#### A.6.1.3 E-UTRAN TDD Intra-frequency RRC Re-establishment

### A.6.1.3.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.3.1-1 and table A.6.1.3.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.3.1-1: General test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameter	'S		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chanr	nel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidtl	h (BW <sub>channel</sub> )	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
Special subframe of	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink co	nfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between	en cells	μs	3	Synchronous cells
T1		S	5	-
T2		ms	200	
T3		S	3	

Table A.6.1.3.1-2: Cell specific test parameters for E-UTRAN TDD intra-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3		
E-UTRA RF Channel			1		1				
Number									
BW <sub>channel</sub>	MHz		10			10			
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 TDD	OP.2 TDD	OP.1 TDD		
defined in A.3.2.2.1		TDD	TDD	TDD					
(OP.1 TDD) and in									
A.3.2.2.2 (OP.2 TDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_RB	dB					•			
PDCCH_RA	dB		0			0			
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$\hat{E}_{s}/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4		
N <sub>oc</sub> Note 2	dBm/15 KHz		·		-98	·			
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4		
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94		
Propagation Condition					AWGN				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.6.1.3.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to a known E-UTRA TDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish delay} = T_{UL grant} + T_{UE re-establish delay}$$

Where:

 $T_{UL\_grant} = It$  is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-establish\_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{freq} = 1$$

$$T_{\text{search}} = 100 \text{ ms}$$

 $T_{SI}$  = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN TDD cell.

 $T_{PRACH}$  = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

#### A.6.1.4 E-UTRAN TDD Inter-frequency RRC Re-establishment

#### A.6.1.4.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD inter-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.4.1-1 and table A.6.1.4.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of radio link failure. At the start of time period T3, cell 2, which is the neighbour cell, is activated.

Table A.6.1.4.1-1: General test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement	As specified in clause A.3.1.1.2
			Channel R.0 TDD	
PCFICH/PDCCH/PI	HICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.2
	'		Channel R.6 TDD	•
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
	Active cell		Cell 2	
E-UTRA RF Channe			1	
E-UTRA RF Channe	` /			
	frequency carrier list		2	2 E-UTRA TDD carrier
size				frequencies in total: 1 intra-
0.20				frequency and 1 inter-frequency
Channel Bandwidth	(BW <sub>channel</sub> )	MHz	10	inequency and i interinequency
N310	(DVV channel)	-	1	Maximum consecutive out-of-sync
14310				indications from lower layers
N311			1	Minimum consecutive in-sync
14011			'	indications from lower layers
T310		ms	0	Radio link failure timer; T310 is
1310		1113	o o	disabled
T311		ms	5000	RRC re-establishment timer
DRX		1113	OFF	TATO TE-ESTABIISTITIETT TITLET
CP length			Normal	
Access Barring Info	rmation		Not Sent	No additional delays in random
			Not Sent	access procedure.
Special subframe co	onfiguration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink cor	nfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between	n cells	μs	3	Synchronous cells
T1		β S	5	- ,
T2		ms	200	
T3		S	5	

Table A.6.1.4.1-2: Cell specific test parameters for E-UTRAN TDD inter-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		2			
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 TDD	OP.2 TDD	OP.1 TDD	
defined in A.3.2.2.1		TDD	TDD	TDD				
(OP.1 TDD) and in								
A.3.2.2.2 (OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDCCH_RA	dB		0			0		
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7	
$N_{oc}$ Note 2	dBm/15 KHz		·		-98			
$\hat{E}_s/N_{oc}$	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7	
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91	
Propagation Condition					AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.6.1.4.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA TDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish delay} = T_{UL grant} + T_{UE re-establish delay}$$

Where:

 $T_{UL\_grant} = It$  is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-establish\_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{\text{freq}} = 2$$

$$T_{\text{search}} = 800 \text{ ms}$$

 $T_{SI}$  = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN TDD cell.

 $T_{PRACH} = 15$  ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, allow 3 s in the test case.

### A.6.1.5 E-UTRAN FDD Intra-frequency RRC Re-establishment for 5MHz bandwidth

#### A.6.1.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.6.1.1.1.

The parameters of this test are the same as defined in Subclause A.6.1.1.1 except that the values of the parameters in the Table A.6.1.5.1-1 will replace the values of the corresponding parameters in A.6.1.1.1-1, and the values of the parameters in the Table A.6.1.5.1-2 will replace the values of the corresponding parameters in A.6.1.1.1-2.

Table A.6.1.5.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case for 5MHz bandwidth

Parameter Ur		Value	Comment		
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1		
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5			
Note 1: See Table A.6.1.1.1-1 for the other parameters.					
Note 2: This test is according to the principle defined in section A.3.7.2.					

Table A.6.1.5.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Reestablishment test case for 5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	T3
BW <sub>channel</sub>	MHz		5			5	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)		OP.15 FDD	OP.15 FDD	OP.16 FDD	OP.16 FDD	OP.16 FDD	OP.15 FDD
	e used such that		re fully alloca	ated and a c	onstant total tra	ansmitted powe	er spectral

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: See Table A.6.1.5.1-2 for the other parameters.

#### A.6.1.5.2 Test Requirements

The test requirements defined in section A.6.1.1.2 shall apply to this test case.

# A.6.1.6 E-UTRAN FD-FDD Intra-frequency RRC Re-establishment for UE category 0

#### A.6.1.6.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. This test case is applicable to UE category 0 as defined in Section 3.1. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.6.1-1 and table A.6.1.6.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.6.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH paramete	ers		DL Reference Measurement Channel R.13 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/	PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chan	inel Number		1	Only one FDD carrier frequency is used.
Channel Bandwid	th (BW <sub>channel</sub> )	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1			5	
T2		ms	200	
T3	T3		3	

Table A.6.1.6.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Reestablishment test case

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T3	T1	T2	Т3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD
defined in A.3.2.1.1		FDD	FDD	FDD			
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB					_	
PDCCH_RA	dB		0		0		
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
$N_{oc}^{ m Note~2}$	dBm/15 KHz				-98	•	•
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					

density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

RSRP levels have been derived from other parameters for information purposes. They are not settable Note 3: parameters themselves.

#### A.6.1.6.2 **Test Requirements**

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

The RRC re-establishment delay in the test is derived from the following expression:

Where:

T<sub>UL\_grant</sub> = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-establish\_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{freq} = 1$$

$$T_{\text{search}} = 100 \text{ ms}$$

 $T_{SI}$  = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

 $T_{PRACH}$  = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

# A.6.1.7 E-UTRAN HD-FDD Intra-frequency RRC Re-establishment for UE category 0

#### A.6.1.7.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. This test case is applicable to UE category 0 as defined in Section 3.1. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.7.1-1 and table A.6.1.7.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.7.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency RRC Reestablishment test case

Pa	rameter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement	As specified in clause A.3.1.1.4
			Channel R.1 HD-FDD	
PCFICH/PDCCH/	PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.3
	·		Channel R.3 HD-FDD	
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Char	nnel Number		1	Only one FDD carrier frequency is used.
Channel Bandwid	th (BW <sub>channel</sub> )	MHz	10	
N310	,	-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring In	formation	-	Not Sent	No additional delays in random access procedure.
PRACH configura	tion index		4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		S	5	
T2		ms	200	
T3		S	3	

Table A.6.1.7.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1		Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD
defined in A.3.2.1.1		FDD	FDD	FDD			
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB		0		0		
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_{s}/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
$N_{oc}^{ m Note  2}$	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition			•		AWGN	•	,
Note 1: OCNG shall b	e used such that	both cells a	re fully alloca	ated and a co	onstant total tra	ansmitted powe	r spectral

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.6.1.7.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

Where:

 $T_{UL\_grant}$  = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-establish\_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{freq} = 1$$

$$T_{\text{search}} = 100 \text{ ms}$$

 $T_{SI}$  = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

 $T_{PRACH} = 15$  ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

# A.6.1.8 E-UTRAN TDD Intra-frequency RRC Re-establishment for UE category 0

#### A.6.1.8.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD intra-frequency RRC re-establishment delay is within the specified limits. This test case is applicable to UE category 0 as defined in Section 3.1. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.8.1-1 and table A.6.1.8.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.8.1-1: General test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Para	ameter	Unit	Value	Comment
PDSCH parameter	PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.5
			Channel R.12 TDD	-
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.2
	·		Channel R.6 TDD	
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chanr	nel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidtl	h (BW <sub>channel</sub> )	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
Special subframe of	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink co	nfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configuration	ion index		53	As specified in table 5.7.1-3 in TS 36.211
Time offset between	en cells	μs	3	Synchronous cells
T1		s	5	
T2		ms	200	
T3		S	3	

Table A.6.1.8.1-2: Cell specific test parameters for E-UTRAN TDD intra-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 TDD	OP.2 TDD	OP.1 TDD	
defined in A.3.2.2.1		TDD	TDD	TDD				
(OP.1 TDD) and in								
A.3.2.2.2 (OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		_		0			
PDCCH_RA	dB		0					
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{E}_{s}/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4	
$N_{oc}^{$	dBm/15 KHz				-98			
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4	
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94	
Propagation Condition		AWGN						
Note 1: OCNG shall b	e used such that	both cells a	re fully alloca	ated and a c	onstant total tra	ansmitted power	er spectral	
density is achieved for all OFDM symbols								

density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

RSRP levels have been derived from other parameters for information purposes. They are not settable Note 3: parameters themselves.

#### A.6.1.8.2 **Test Requirements**

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to a known E-UTRA TDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

The RRC re-establishment delay in the test is derived from the following expression:

Where:

T<sub>UL\_grant</sub> = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence  $T_{UL\_grant}$  is not used.

$$T_{UE\_re\text{-}establish\_delay} = 50 \ ms + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{freq} = 1$$

$$T_{\text{search}} = 100 \text{ ms}$$

 $T_{SI} = 1280$  ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN TDD cell.

 $T_{PRACH}$  = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

### A.6.2 Random Access

#### A.6.2.1 E-UTRAN FDD – Contention Based Random Access Test

#### A.6.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.1.1-1 and A.6.2.1.1-2.

Table A.6.2.1.1-1: General test parameters for FDD contention based random access test

Parameter	Unit	Value	Comments		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern Note 1		OP.1/2 FDD Note 1	As defined in A.3.2.1.1/2.		
PDSCH parameters Note 4		DL Reference Measurement	As defined in A.3.1.1.1.		
·		Channel R.0 FDD Note 4			
PCFICH/PDCCH/PHICH		DL Reference Measurement	As defined in A.3.1.2.1.		
parameters		Channel R.6 FDD			
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_{s}/I_{ot}$	dB	3			
$N_{oc}$	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	3			
lo Note 2	dBm/9 MHz	-65.5			
RSRP Note 3	dBm/15 KHz	-95			
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.		
Configured UE transmitted	dBm	23	As defined in clause 6.2.5		
power ( $P_{ m CMAX}$ )			in TS 36.101.		
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in TS 36.211.		
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.		
Propagation Condition	-	AWGN			
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test					

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Table A.6.2.1.1-2: RACH-Configuration parameters for FDD contention based random access test

Field	Value	Comment	
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
preambleTransMax	n6		
ra-ResponseWindowSize	sf10	10 sub-frames	
mac-ContentionResolutionTimer	sf48	48 sub-frames	
maxHARQ-Msg3Tx	4		
Note: For further information see Clause 6.3.2 in TS 36.331.			

#### A.6.2.1.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

#### A.6.2.1.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.1.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.1.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.1.2.3 Receiving a NACK on msg3

To test the UE behavior specified in subclause 6.2.2.1.3 the System Simulator shall NACK *all* UE msg3 following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ re-transmissions is reached.

#### A.6.2.1.2.4 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

#### A.6.2.1.2.5 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

#### A.6.2.1.2.6 Contention Resolution Timer expiry

To test the UE behavior specified in Subclause 6.2.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

#### A.6.2.2 E-UTRAN FDD – Non-Contention Based Random Access Test

#### A.6.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.2.1-1 and A.6.2.2.1-2.

Table A.6.2.2.1-1: General test parameters for FDD non-contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
BW <sub>channel</sub>	MHz	10	
OCNG Pattern		OP.1 FDD	As defined in A.3.2.1.1.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH		DL Reference Measurement	As defined in A.3.1.2.1.
parameters		Channel R.6 FDD	
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB	_	
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_{s}/I_{ot}$	dB	3	
$N_{oc}$	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
lo <sup>Note 2</sup>	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power ( $P_{\mathrm{CMAX}}$ )	dBm	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Table A.6.2.2.1-2: RACH-Configuration parameters for FDD non-contention based random access test

Field	Value	Comment	
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
preambleTransMax	n6		
ra-ResponseWindowSize	sf10	10 sub-frames	
Note: For further information see Clause 6.3.2 in TS 36.331.			

#### A.6.2.2.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

#### A.6.2.2.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.2.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.3 E-UTRAN TDD – Contention Based Random Access Test

#### A.6.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.3.1-1 and A.6.2.3.1-2.

Table A.6.2.3.1-1: General test parameters for TDD contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number	-	1	
BW <sub>channel</sub>	MHz	10	
OCNG Pattern Note 1	-	OP.1/2 TDD Note 1	As defined in A.3.2.2.1/2.
PDSCH parameters Note 4	-	DL Reference Measurement	As defined in A.3.1.1.2.
·		Channel R.0 TDD Note 4	
PCFICH/PDCCH/PHICH	-	DL Reference Measurement	As defined in A.3.1.2.2.
parameters		Channel R.6 TDD	
Special subframe	-	6	As specified in table 4.2-1
configuration			in TS 36.211.
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in TS 36.211.
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	3	
$N_{oc}$	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
lo Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted	dBm	23	As defined in clause 6.2.5
power ( $P_{ m CMAX}$ )			in TS 36.101.
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	
	I	L	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Table A.6.2.3.1-2: RACH-Configuration parameters for TDD contention based random access test

Field	Value	Comment	
numberOfRA-Preambles	n52		
sizeOfRA-PreamblesGroupA	n52	No group B.	
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
preambleTransMax	n6		
ra-ResponseWindowSize	sf10	10 sub-frames	
mac-ContentionResolutionTimer	sf48	48 sub-frames	
maxHARQ-Msg3Tx	4		
Note: For further information see Clause 6.3.2 in TS 36.331.			

#### A.6.2.3.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

#### A.6.2.3.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.1.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.3.2.2 No Random Access Response reception

To test the UE behavior specified in Subclause 6.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.3.2.3 Receiving a NACK on msg3

To test the UE behavior specified in Subclause 6.2.2.1.3 the System Simulator shall NACK *all* UE msg3 following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ re-transmissions is reached.

#### A.6.2.3.2.4 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

#### A.6.2.3.2.5 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

#### A.6.2.3.2.6 Contention Resolution Timer expiry

To test the UE behavior specified in Subclause 6.2.2.1.6 the System Simulator shall not send a response to a msg3.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

#### A.6.2.4 E-UTRAN TDD - Non-Contention Based Random Access Test

#### A.6.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.4.1-1 and A.6.2.4.1-2.

Table A.6.2.4.1-1: General test parameters for TDD non-contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number	-	1	
BW <sub>channel</sub>	MHz	10	
OCNG Pattern	-	OP.1 TDD	As defined in A.3.2.2.1.
PDSCH parameters	-	DL Reference Measurement	As defined in A.3.1.1.2.
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH	-	DL Reference Measurement	As defined in A.3.1.2.2.
parameters		Channel R.6 TDD	
Special subframe	-	6	As specified in table 4.2-1
configuration			in TS 36.211.
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in TS 36.211.
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	3	
$N_{oc}$	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
lo Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted	dBm	23	As defined in clause 6.2.5
power ( $P_{ m CMAX}$ )			in TS 36.101.
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	
11 1 1 00110 1 111			

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Table A.6.2.4.1-2: RACH-Configuration parameters for TDD non-contention based random access test

Field	Value	Comment		
powerRampingStep	dB2			
preambleInitialReceivedTargetPower	dBm-120			
preambleTransMax	n6			
ra-ResponseWindowSize	sf10	10 sub-frames		
Note: For further information see Clause 6.3.2 in TS 36.331.				

#### A.6.2.4.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

#### A.6.2.4.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.4.2.2 No Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

### A.6.2.5 E-UTRAN FDD – Contention Based Random Access Test for 5MHz bandwidth

#### A.6.2.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.6.2.1.1.

The parameters of this test are the same as defined in Subclause A.6.2.1.1 except that the values of the parameters in the Table A.6.2.5.1-1 will replace the values of the corresponding parameters in A.6.2.1.1-1

Table A.6.2.5.1-1: General test parameters for FDD contention based random access test for 5MHz bandwidth

	Parameter	Unit	Value	Comments		
BW <sub>channel</sub>		MHz	5			
OCNG Pa	attern <sup>Note 1</sup>		OP.15/16 FDD Note 1	As defined in		
				A.3.2.1.15/16.		
PDSCH p	parameters Note 2		DL Reference Measurement Channel R.5 FDD Note 2	As defined in A.3.1.1.1.		
PCFICH/	PDCCH/PHICH		DL Reference Measurement	As defined in A.3.1.2.1.		
paramete	ers		Channel R.11 FDD			
lo Note 2		dBm/4.5	-68.5			
10		MHz				
Note 1:	Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power					
			FDM symbols. The OCNG patte	rn is chosen during the test		
	according to the presence of a DL reference measurement channel.					
Note 2:	The DL PDSCH reference measurement channel is used in the test only when a downlink					
	transmission dedicated to the UE under test is required.					
Note 3:	See Table A.6.2.1.1-1 for the other parameters.					
Note 4:	This test is according to the principle defined in section A.3.7.2.					

#### A.6.2.5.2 Test Requirements

The test requirements defined in section A.6.2.1.2 shall apply to this test case.

## A.6.2.6 E-UTRAN FDD – Non-contention Based Random Access Test for 5MHz bandwidth

#### A.6.2.6.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.6.2.2.1.

The parameters of this test are the same as defined in Subclause A.6.2.2.1except that the values of the parameters in the Table A.6.2.6.1-1will replace the values of the corresponding parameters in A.6.2.2.1-1

Table A.6.2.6.1-1: General test parameters for FDD non-contention based random access test for 5MHz bandwidth

Parameter	Unit	Value	Comments			
BW <sub>channel</sub>	MHz	5				
OCNG Pattern Note 1		OP.15 FDD Note 1	As defined in A.3.2.1.15.			
PDSCH parameters Note 2		DL Reference Measurement Channel R.5 FDD Note 2	As defined in A.3.1.1.1.			
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As defined in A.3.1.2.1.			
lo Note 2	dBm/4.5 MHz	-68.5				
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.						
Note 2: Io level has been de parameter	lo level has been derived from other parameters for information purpose. It is not a settable parameter					
Note 3: See Table A.6.2.2.1	See Table A.6.2.2.1-1 for the other parameters.					
Note 4: This test is according	g to the principle	defined in section A.3.7.2.				

#### A.6.2.6.2 Test Requirements

The test requirements defined in section A.6.2.2.2 shall apply to this test case.

## A.6.2.7 E-UTRAN FDD – Non-Contention Based Random Access Test For SCell

#### A.6.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure, for the SCell, is according to the requirements and that the PRACH power settings and timing, for the SCell, are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell and SCell are different timing advance group. Cell 1 is in the primary Timing Advance Group (pTAG) and Cell 2 is in the secondary Timing Advance Group (sTAG). The purpose of the PCell is to allow the SCell to be configured and to handle the Random Access Response which takes place on PCell. The test parameters are given in tables A.6.2.7.1-1 and A.6.2.7.1-2.

Table A.6.2.7.1-1: General test parameters for FDD non-contention based random access test

Parameter	Unit	Cell 1	Cell 2	Comments
E-UTRA RF Channel Number		1	2	
BW <sub>channel</sub>	MHz	10	10	
Active PCell		Cell 1		Primary cell of RF
				channel number 1.
Active SCell			Cell 2	Secondary cell of RF
				channel number 2.
TAG configuration		pTAG	sTAG	pTAG+sTAG
-				configures Cell 1 and
				Cell 2 to separate
				TAGs
OCNG Pattern		OP.1 FDD	OP.1 FDD	As defined in
				A.3.2.1.11.
PDSCH parameters		DL Reference	DL Reference	As defined in A.3.1.1.1.
·		Measurement Channel	Measurement	
		R.0 FDD	Channel R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference	DL Reference	As defined in A.3.1.2.1.
parameters		Measurement Channel	Measurement	
		R.6 FDD	Channel R.6 FDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
	dB	3	3	
$\hat{E}_{s}/I_{ot}$		_		
$N_{oc}$	dBm/15 KHz	-98	-98	
	I.D.			
$\hat{E}_s/N_{oc}$	dB	3	3	
lo Note 2	dBm/9 MHz	-65.5	-65.5	
RSRP Note 3	dBm/15 KHz	-95	-65.5 -95	+
KOKF	dBm/15 KHz	- <del>9</del> 5 -5	-93 -5	As defined in clause
referenceSignalPower	UDIII/13 KHZ	-5	-5	6.3.2 in TS 36.331.
Configured UE transmitted	dPm	22	22	
	dBm	23	23	As defined in clause 6.2.5 in TS 36.101.
power ( $P_{ m CMAX,c}$ )				0.2.5 11 13 30.101.
PRACH Configuration Index	_	4	4	As defined in table
1 103011 Configuration index	_	<b> </b>	7	5.7.1-2 in TS 36.211.
Backoff Parameter Index	-	2	2	As defined in table 7.2-
Dackon i alametel muex	_		۷	1 in TS 36.321.
Propagation Condition	_	AWGN	AWGN	1 111 10 00.021.
Note to CONO de all le aveced		AVVGIN	AVVGIN	<u> </u>

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Io level has been derived from other parameters for information purpose. It is not a settable parameter.

RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Note 2:

Note 3:

Table A.6.2.7.1-2: RACH-Configuration parameters for FDD non-contention based random access test

Field	Value	Comment		
powerRampingStep	dB2			
preambleInitialReceivedTargetPower	dBm-120			
preambleTransMax	n6			
ra-ResponseWindowSize	sf10	10 sub-frames		
Note: For further information see Clause 6.3.2 in TS 36.331.				

#### A.6.2.7.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

#### A.6.2.7.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator, on Cell 2. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.7.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.2.2 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator on Cell 2. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

### A.6.2.7.2.3 Stop Preamble transmission if maximum number of preamble transmission counter has been reached

To test the UE behavior specified in Subclause 6.2.2 the System Simulator shall transmit, in response to the first 6 preambles, a Random Access Response *not* corresponding to the transmitted Random Access Preamble on Cell 1, the PCell. The UE shall stop transmitting preambles after 6 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

## A.6.2.8 E-UTRAN TDD – Non-Contention Based Random Access Test For SCell

#### A.6.2.8.1 Test Purpose and Environment

This test is applicable for UE supporting the optional capability of Multiple Timing Advance.

The purpose of this test is to verify that the behavior of the random access procedure, for the SCell, is according to the requirements and that the PRACH power settings and timing, for the SCell, are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell and SCell are different timing advance group. Cell 1 is in the primary Timing Advance Group (pTAG) and Cell 2 is in the secondary Timing Advance Group (sTAG). The purpose of the PCell is to allow the SCell to be configured and to handle the Random Access Response which takes place on PCell. The test parameters are given in tables A.6.2.8.1-1 and A.6.2.8.1-2.

Table A.6.2.8.1-1: General test parameters for TDD non-contention based random access test

Parameter	Unit	Cell 1	Cell 2	Comments
E-UTRA RF Channel Number	-	1	1	
BW <sub>channel</sub>	MHz	10	10	
Active PCell				Primary cell of RF
		Cell 1		channel number 1.
Active SCell				Secondary cell of RF
7.6			Cell 2	channel number 2.
TAG configuration		pTAG	sTAG	pTAG+sTAG
17 to comigaration		p1710	317.6	configures Cell 1 and
				Cell 2 to separate
				TAGs
OCNG Pattern	-	OP.1 TDD	OP.1 TDD	As defined in
		022	0	A.3.2.2.1.
PDSCH parameters	-	DL Reference	DL Reference	As defined in
		Measurement	Measurement	A.3.1.1.2.
		Channel R.0 TDD	Channel R.0 TDD	
PCFICH/PDCCH/PHICH	-	DL Reference	DL Reference	As defined in
parameters		Measurement	Measurement	A.3.1.2.2.
p and an		Channel R.6 TDD	Channel R.6 TDD	
Special subframe	-	6	6	As specified in table
configuration		-	•	4.2-1 in TS 36.211.
Uplink-downlink configuration	-	1	1	As specified in table
Chunk agui munk agui augu		·	·	4.2-2 in TS 36.211.
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
	dB	3	3	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	иь	S	3	
$N_{oc}$	dBm/15 KHz	-98	-98	
	dB	3	3	
$\hat{E}_s/N_{oc}$	uБ	S	3	
lo Note 2	dBm/9 MHz	-65.5	-65.5	
RSRP Note 3	dBm/15 KHz	-95	-95	
	dBm/15 KHz	-5	-5	As defined in clause
referenceSignalPower		-	-	6.3.2 in TS 36.331.
Configured UE transmitted	dBm	23	23	As defined in clause
power ( $P_{\text{CMAX.c}}$ )				6.2.5 in TS 36.101.
PRACH Configuration Index	-	53	53	As defined in table
				5.7.1-3 in TS 36.211.
Backoff Parameter Index	-	2	2	As defined in table
				7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	AWGN	
Note 1: OCNC shall be used		ملموم لمملمه مالمييالينا والبالا		al an accordance and a second

OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral Note 1: density is achieved for all OFDM symbols.

Io level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 2:

RSRP level has been derived from other parameters for information purposes. It is not a settable parameter. Note 3:

Table A.6.2.8.1-2: RACH-Configuration parameters for TDD non-contention based random access test

Field	Value	Comment			
powerRampingStep	dB2				
preambleInitialReceivedTargetPower	dBm-120				
preambleTransMax	n6				
ra-ResponseWindowSize	sf10	10 sub-frames			
Note: For further information see Clause 6.3.2 in TS 36.331.					

#### A.6.2.8.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

#### A.6.2.8.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator, on Cell 2. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.2.8.2.2 No Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.2 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator, on Cell 2. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

### A.6.2.8.2.3 Stop Preamble transmission if maximum number of preamble transmission counter has been reached

To test the UE behavior specified in Subclause 6.2.2 the System Simulator shall transmit, in response to the first 6 preambles, a Random Access Response *not* corresponding to the transmitted Random Access Preamble on Cell 1, the PCell. The UE shall stop transmitting preambles after 6 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

#### A.6.3 RRC Connection Release with Redirection

#### A.6.3.1 Redirection from E-UTRAN FDD to UTRAN FDD

#### A.6.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in clause 6.3.2.1.

The test parameters are given in Tables A.6.3.1.1-1, A.6.3.1.1-2 and A.6.3.1.1-3 below. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.6.3.1.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN FDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the " <i>RRCConnectionRelease</i> " message from the E-UTRAN
T1	S	≤5	
T2	S	1	

Table A.6.3.1.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell	1		
		T1 T2			
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1 F	DD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4		
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWG	N		

spectral density is achieved for all OFDM symbols.

The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2:

Interference from other cells and noise sources not specified in the test is assumed to be constant Note 3: over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{
m oc}$  to be

RSRP levels have been derived from other parameters for information purposes. They are not Note 4: settable parameters themselves.

Table A.6.3.1.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1	T1		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15	-15		
DPCH_Ec/lor	dB	N/A			
OCNS		-0.94	1		
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞ -13			
Propagation Condition		AWGN			

Note 1: The DPCH level is controlled by the power control loop.

The power of the OCNS channel that is added shall make the total power from the cell to be equal Note 2: to Ior.

This gives an SCH Ec/lo of -15dB Note 3:

### A.6.3.1.2 Test Requirements

The UE shall start to transmit random access to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

NOTE: The Re-establishment delay in this case can be expressed as

$$T_{connection\_release\_redirect\_UTRA\;FDD} = T_{RRC\_procedure\_delay} + T_{identify\_UTRA\;FDD} + T_{SI\_UTRA\;FDD} + T_{RA}$$

where

 $T_{RRC\_procedure\_delay} = 110 \text{ ms}$ 

 $T_{identify-UTRA\ FDD} = 500\ ms$ 

 $T_{SI-UTRA\ FDD}$  = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 0 ms is assumed in this test case.

 $T_{RA}$  = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 650 ms.

### A.6.3.2 Redirection from E-UTRAN TDD to UTRAN FDD

### A.6.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in clause 6.3.2.1.

The test parameters are given in Tables A.6.3.2.1-1, A.6.3.2.1-2 and A.6.3.2.1-3 below. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2,

Table A.6.3.2.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN TDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the " <i>RRCConnectionRelease</i> " message from the E-UTRAN
T1	S	≤5	
T2	S	1	

Table A.6.3.2.1-2: Cell specific test parameters for cell #1 E-UTRAN TDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.2.1 (OP.1 TDD)		OP.1 <sup>-</sup>	TDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB	0			
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4		
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98	3		
$\hat{E}_s/N_{oc}$	dB	4	4		
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWGN			
Note 1: OCNG shall be used		l is fully allocated and a constant	t total transmitted power		

spectral density is achieved for all OFDM symbols.

The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2:

Interference from other cells and noise sources not specified in the test is assumed to be constant Note 3: over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{
m oc}$  to be

RSRP levels have been derived from other parameters for information purposes. They are not Note 4: settable parameters themselves.

Table A.6.3.2.1-3: Cell specific test parameters for cell #2 E-UTRAN TDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	- 00	0.02		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞	-13		
Propagation Condition		AWGN			

Note 1: The DPCH level is controlled by the power control loop.

The power of the OCNS channel that is added shall make the total power from the cell to be equal Note 2: to Ior.

This gives an SCH Ec/lo of -15dB Note 3:

### A.6.3.2.2 Test Requirements

The UE shall start to transmit random access to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA FDD observed during repeated tests shall be at least 90%.

NOTE: The Re-establishment delay in this case can be expressed as

$$T_{connection\_release\_redirect\_UTRA\;FDD} = T_{RRC\_procedure\_delay} + T_{identify\_UTRA\;FDD} + T_{SI\_UTRA\;FDD} + T_{RA}$$

where

 $T_{RRC\_procedure\_delay} = 110 \text{ ms}$ 

 $T_{identify-UTRA\ FDD} = 500\ ms$ 

 $T_{SI-UTRA\ FDD}$  = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 0 ms is assumed in this test case.

 $T_{RA}$  = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 650 ms.

## A.6.3.3 Redirection from E-UTRAN FDD to GERAN when System Information is provided

### A.6.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target GERAN cell within  $T_{connection\_release\_redirect\_GERAN}$ . This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.3.1-1, A.6.3.3.1-2 and A.6.3.3.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of cell 2.

Table A.6.3.3.1-1: General test parameters for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	GSM cells are provided in the "RRCConnectionRelease" message.
T1	S	5	
T2	S	2	

Table A.6.3.3.1-2: Cell specific test parameters for E-UTRA FDD cell (cell #1) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BWchannel	MHz	10			
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1 F	DD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB	0			
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RANote 1	dB				
OCNG_RBNote 1	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$\hat{E}_s/N_{oc}$	dB	4	4		
$N_{oc}$	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWG	SN .		
spectral density is ac	hieved for all OF	I is fully allocated and a constant DM symbols.	•		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.3.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		ARFNC 1		
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

### A.6.3.3.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 1120 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{connection\_release\_redirect\_GERAN} = T_{RRC\_procedure\_delay} + T_{identify\_GERAN} + T_{SI\_GERAN} + T_{RA}$ 

 $T_{RRC\_procedure\_delay} = 110$  ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify\text{-}GERAN} = 1000 \text{ ms}$ , which is the time for identifying the target GERAN cell.

 $T_{SI\text{-}GERAN} = 0$ ; UE does not have to read the system information of the GERAN cell since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA}$  = 10 ms, which is about 2 GSM frames (2\*4.65 ms) to account for the GSM timing uncertainty.

# A.6.3.4 Redirection from E-UTRAN TDD to GERAN when System Information is provided

### A.6.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target GERAN cell within  $T_{connection\_release\_redirect\_GERAN}$ . This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.4.1-1, A.6.3.4.1-2 and A.6.3.4.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of cell 2.

Table A.6.3.4.1-1: General test parameters for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement	As specified in clause A.3.1.1.2.
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.2.
(E-UTRAN TDD)		Channel R.6 TDD	
Active		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1
			(GSM cell)
CP length		Normal	Applicable to cell 1
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The
		6	same configuration applies to all cells.
Uplink-downlink configuration		1	
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including	GSM cells provided in the
		ARFCN 1	"RRCConnectionRelease" message.
T1	S	5	
T2	S	2	

Table A.6.3.4.1-2: Cell specific test parameters for E-UTRA TDD cell (cell #1) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number			1		
BW <sub>channel</sub>	MHz		10		
OCNG Pattern defined in					
A.3.2.2.1 (OP.1 TDD)		OP.	1 TDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB		_		
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>NOTE 1</sup>	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4		
$\hat{E}_s/N_{oc}$	dB	4	4		
$N_{oc}$	dBm/15 kHz	-	98		
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AV	VĠN		
spectral density is ac	chieved for all OFD	is fully allocated and a consta DM symbols. sources not specified in the to			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.4.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		ARFNC 1		
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

### A.6.3.4.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 1120 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{connection\_release\_redirect\_GERAN} = T_{RRC\_procedure\_delay} + T_{identify\_GERAN} + T_{SI\_GERAN} + T_{RA}$ 

 $T_{RRC\_procedure\_delay} = 110$  ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify\text{-}GERAN} = 1000 \text{ ms}$ , which is the time for identifying the target GERAN cell.

### A.6.3.5 E-UTRA TDD RRC connection release redirection to UTRA TDD

### A.6.3.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target UTRA TDD cell within  $T_{connection\_release\_redirect\_UTRA\ TDD}$ . This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.5.1-1, table A.6.3.5.1-2, and table A.6.3.5.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of Cell 2.

Table A.6.3.5.1-1: General test parameters for E-UTRA TDD RRC connection release redirection to UTRA TDD

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN		DL Reference Measurement	As specified in clause A.3.1.1.2.
TDD)		Channel R.0 TDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2.
parameters (E-UTRAN TDD)		Channel R.6 TDD	
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number
			1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is
			used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
CP length		Normal	Applicable to cell 1
Special subframe configuration of		6	As specified in table 4.2.1 in TS 36.211
cell 1			
Uplink-downlink configuration of		1	As specified in table 4.2-2 in TS 36.211
cell 1			
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is
			used.
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is
			used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		16	UTRA cells on UTRA RF channel 1
			provided in the "RRCConnectionRelease"
			message from the E-UTRAN
T1	S	5	
T2	S	1	

Table A.6.3.5.1-2: Cell specific test parameters for cell 1 in E-UTRA TDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.2.1 (OP.1 TDD)		OP.1 T	DD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	0			
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$N_{oc}^{ m Note 3}$	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4 4			
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWG	N		

- OCNG shall be used such that the cell is fully allocated and a constant total transmitted power Note 1: spectral density is achieved for all OFDM symbols.

  The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 2:
- Interference from other cells and noise sources not specified in the test is assumed to be constant Note 3: over subcarriers and time and shall be modelled as AWGN of appropriate power for  $\,N_{oc}\,$  to be
- RSRP levels have been derived from other parameters for information purposes. They are not Note 4: settable parameters themselves.

Table A.6.3.5.1-3: Cell specific test parameters for cell 2 in E-UTRA TDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 2 (UTRA TDD)				
Timeslot Number		(	)	Dwl	DwPTS	
		T1	T2	T1	T2	
UTRA RF Channel Number Note1			Chan	inel 1		
PCCPCH_Ec/lor	dB	-4.77	-4.77			
DwPCH_Ec/lor	dB			0	0	
OCNS_Ec/lor <sup>Note2</sup>	dB	-1.76	-1.76			
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8	
$I_{oc}$	dBm/1.28 MHz	-80				
PCCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.	
PCCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.	
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64	
Propagation Condition		AWGN				

- Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
- Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .
- Note 3: P-CCPCH RSRP, PCCPCH\_Ec/lo and DwPCH\_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.6.3.5.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as:  $T_{RRC\_procedure\_delay} + T_{identify\_UTRA\ TDD} + T_{SI\_UTRA\ TDD} + T_{RA}$ , where:

 $T_{RRC\_procedure\_delay} = 110$  ms, which is specified in clause 6.3.2.3.

 $T_{identify-UTRA\ TDD} = 500$  ms; which is defined in clause 6.3.2.3.

 $T_{SI\text{-}UTRA\ TDD} = 0$  ms, UE does not have to read the system information of the UTRAN TDD since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA} = 40 \text{ms}$ . This is the additional delay caused by the random access procedure

It gives a total delay of 650 ms.

### A.6.3.6 E-UTRA FDD RRC connection release redirection to UTRA TDD

### A.6.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target UTRA TDD cell within  $T_{connection\_release\_redirect\_UTRA\ TDD}$ . This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.6.1-1, table A.6.3.6.1-2, and table A.6.3.6.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of Cell 2.

Table A.6.3.6.1-1: General test parameters for E-UTRA FDD RRC connection release redirection to UTRA TDD

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "RRCConnectionRelease" message from the E-UTRAN
T1	S	5	
T2	S	1	

Table A.6.3.6.1-2: Cell specific test parameters for cell 1 in E-UTRA FDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Patterns defined in		OP.1 F	-DD		
A.3.2.1.1 (OP.1 FDD)		OP.11	-00		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	_			
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$N_{oc}^{ m Note 3}$	dBm/15 kHz	-98	3		
$\hat{E}_s/N_{oc}$	dB	4	4		
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWGN			

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be

ulfilled

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.6.1-3: Cell specific test parameters for cell 2 in E-UTRA FDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		(	0	Dwl	PTS
		T1	T2	T1	T2
UTRA RF Channel Number Note1			Chan	nel 1	
PCCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/lor <sup>Note2</sup>	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
$I_{oc}$	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition			AWGN		

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .

Note 3: P-CCPCH RSRP, PCCPCH\_Ec/lo and DwPCH\_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A. 6.3.6.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as:  $T_{RRC\ procedure\ delay} + T_{identify-UTRA\ TDD} + T_{SI-UTRA\ TDD} + T_{RA}$ , where:

 $T_{RRC\_procedure\_delay} = 110$  ms, which is specified in clause 6.3.2.3.

 $T_{identify-UTRA\ TDD} = 500$  ms; which is defined in clause 6.3.2.3.

 $T_{SI\text{-}UTRA\ TDD} = 0$  ms, UE does not have to read the system information of the UTRAN TDD since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA} = 40 \text{ms}$ . This is the additional delay caused by the random access procedure.

This gives a total delay of 650 ms.

# A.6.3.7 E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided

### A.6.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target UTRA TDD cell within  $T_{connection\_release\_redirect\_UTRA\ TDD}$ . This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.7.1-1, table A.6.3.7.1-2, and table A.6.3.7.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message not containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from Cell 1.

Table A.6.3.7.1-1: General test parameters for E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	Applicable to cell 1
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		none	No explicit neighbour list is provided to the UE
T1	S	5	
T2	S	2	

Table A.6.3.7.1-2: Cell specific test parameters for cell 1 in E-UTRA TDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 1				
		T1	T2			
E-UTRA RF Channel Number		1				
BW <sub>channel</sub>	MHz	10				
OCNG Pattern defined in						
A.3.2.2.1 (OP.1 TDD)		OP.1 TDE				
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	0				
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{ extsf{E}}_{ extsf{s}}/ extsf{I}_{ ext{ot}}$	dB	4	4			
$N_{oc}^{ m Note  3}$	dBm/15 kHz	-98				
$\hat{E}_s/N_{oc}$	dB	4	4			
RSRP Note 4	dBm/15 kHz	-94	-94			
SCH_RP	dBm/15 kHz	-94	-94			
Propagation Condition		AWGN				

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled
- Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.7.1-3: Cell specific test parameters for cell 2 in E-UTRA TDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		(	0		PTS
		T1	T2	T1	T2
UTRA RF Channel Number Note1			Chan	nel 1	
PCCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/lor <sup>Note2</sup>	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
$I_{oc}$	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			

- Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
- Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .
- Note 3: P-CCPCH RSRP, PCCPCH\_Ec/lo and DwPCH\_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.6.3.7.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as:  $T_{RRC\ procedure\ delay} + T_{identify-UTRA\ TDD} + T_{SI-UTRA\ TDD} + T_{RA}$ , where:

 $T_{RRC\_procedure\_delay} = 110$  ms, which is specified in clause 6.3.2.3.

 $T_{identify\text{-}UTRA\ TDD} = 500$  ms; which is defined in clause 6.3.2.3.

T<sub>SI-UTRA TDD</sub>: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRA TDD cell. 1280 ms is assumed in this test case.

 $T_{RA} = 40$ ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

# A.6.3.8 E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided

### A.6.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target UTRA TDD cell within  $T_{connection\_release\_redirect\_UTRA\ TDD}$ . This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.8.1-1, table A.6.3.8.1-2, and table A.6.3.8.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message not containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from Cell 1.

Table A.6.3.8.1-1: General test parameters for E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	Applicable to cell 1
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		none	No explicit neighbour list is provided to the UE
T1	S	5	
T2	S	2	

Table A.6.3.8.1-2: Cell specific test parameters for cell 1 in E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Patterns defined in		OP.1 F	DD		
A.3.2.1.1 (OP.1 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	4	4		
$N_{oc}^{ m Note 3}$	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4		
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWG			

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled
- Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.8.1-3: Cell specific test parameters for cell 2 in E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		(	0	Dwl	PTS
		T1	T2	T1	T2
UTRA RF Channel Number Note1			Chan	nel 1	
PCCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/lor <sup>Note2</sup>	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
$I_{oc}$	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition			AWGN		

- Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
- Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .
- Note 3: P-CCPCH RSRP, PCCPCH\_Ec/lo and DwPCH\_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.6.3.8.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as:  $T_{RRC\ procedure\ delay} + T_{identify-UTRA\ TDD} + T_{SI-UTRA\ TDD} + T_{RA}$ , where:

 $T_{RRC\_procedure\_delay} = 110$  ms, which is specified in clause 6.3.2.3.

 $T_{identify\text{-}UTRA\ TDD} = 500$  ms; which is defined in clause 6.3.2.3.

T<sub>SI-UTRA TDD</sub>: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRA TDD cell. 1280 ms is assumed in this test case.

 $T_{RA} = 40$ ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

## A.6.3.9 Redirection from E-UTRAN FDD to UTRAN FDD without System Information

### A.6.3.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in clause 6.3.2.1.

The test parameters are given in Tables A.6.3.9.1-1, A.6.3.9.1-2 and A.6.3.9.1-3 below. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "RRCConnectionRelease" message not containing any system information of Cell 2 shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.6.3.9.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN FDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/lo	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	S	≤5	
T2	S	2	

Table A.6.3.9.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1 F	DD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	_			
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4		
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWGN			
N 4 4 00NO 1 III	1 41 441 1				

- Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.9.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2		
		T1	T1	
UTRA RF Channel Number		1		
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB	-15		
DPCH_Ec/lor	dB	N/A		
OCNS		-0.94	1	
$\hat{I}_{or}/I_{oc}$	dB	- 80	0.02	
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞	-13	
Propagation Condition		AWGN		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

Note 3: This gives an SCH Ec/lo of -15dB

### A.6.3.9.2 Test Requirements

The UE shall start to send random access to the target UTRA FDD cell (Cell 2) less than 1930 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to UTRAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this case can be expressed as

$$T_{connection\_release\_redirect\_UTRA\;FDD} = T_{RRC\_procedure\_delay} + T_{identify\_UTRA\;FDD} + T_{SI\_UTRA\;FDD} + T_{RA}$$

where

 $T_{RRC procedure delay} = 110 \text{ ms}$ 

 $T_{identify-UTRA\ FDD} = 500\ ms$ 

 $T_{SI-UTRA\ FDD}$  = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. Since no SI is provided, 1280 ms is assumed in this test case.

 $T_{RA}$  = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 1930 ms.

# A.6.3.10 Redirection from E-UTRAN FDD to GERAN when System Information is not provided

#### A.6.3.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target GERAN cell within  $T_{connection\_release\_redirect\_GERAN}$ . This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.10.1-1, A.6.3.10.1-2 and A.6.3.10.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI

containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall not contain any system information of cell 2.

Table A.6.3.10.1-1: General test parameters for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement	As specified in clause A.3.1.1.1.
		Channel R.0 FDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1.
(E-UTRAN FDD)		Channel R.6 FDD	
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1
			(GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including	Only the list of GERAN carrier frequencies is
		ARFCN 1	provided in the "RRCConnectionRelease"
			message.
T1	S	≤5	
T2	S	4	

Table A.6.3.10.1-2: Cell specific test parameters for E-UTRA FDD cell (cell #1) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1 FDD			
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	_			
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4 4			
$\hat{E}_s/N_{oc}$	dB	4 4			
$N_{oc}$	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94 -94			
SCH_RP	dBm/15 kHz	-94 -94			
Propagation Condition		AWGN			

- Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.10.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		AF	RFNC 1	
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

### A.6.3.10.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 3020 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{connection\_release\_redirect\_\ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$ 

 $T_{RRC\_procedure\_delay} = 110$  ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify-GERAN} = 1000$  ms, which is the time for identifying the target GERAN cell.

T<sub>SI-GERAN</sub> = 1900 ms, which is the maximum time allowed to read BCCH data from the target GERAN cell.

 $T_{RA} = 10$  ms, which is about 2 GSM frames (2\*4.65 ms) to account for the GSM timing uncertainty.

# A.6.3.11 Redirection from E-UTRAN TDD to GERAN when System Information is not provided

### A.6.3.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target GERAN cell within  $T_{connection\_release\_redirect\_GERAN}$ . This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.11.1-1, A.6.3.11.1-2 and A.6.3.11.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall not contain any system information of cell 2.

Table A.6.3.11.1-1: General test parameters for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement	As specified in clause A.3.1.1.2.
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.2.
(E-UTRAN TDD)		Channel R.6 TDD	
Active		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1
			(GSM cell)
CP length		Normal	Applicable to cell 1
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The
		0	same configuration applies to all cells.
Uplink-downlink configuration		1	
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including	Only the list of GERAN carrier frequencies is
		ARFCN 1	provided in the "RRCConnectionRelease"
			message.
T1	S	≤5	
T2	S	4	

Table A.6.3.11.1-2: Cell specific test parameters for E-UTRA TDD cell (cell #1) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell	1		
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.2.1 (OP.1 TDD)		OP.1 7	ΓDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$\hat{E}_s/N_{oc}$	dB	4	4		
$N_{oc}$	dBm/15 kHz	-98	3		
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94 -94			
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.11.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		AF	RFNC 1	
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

### A.6.3.11.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 3020 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

 $T_{connection\_release\_redirect\_\ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$ 

 $T_{RRC\_procedure\_delay} = 110$  ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify-GERAN} = 1000$  ms, which is the time for identifying the target GERAN cell.

T<sub>SI-GERAN</sub> = 1900 ms, which is the maximum time allowed to read BCCH data from the target GERAN cell.

 $T_{RA} = 10$  ms, which is about 2 GSM frames (2\*4.65 ms) to account for the GSM timing uncertainty.

## A.6.3.12 E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided

### A.6.3.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRAN TDD to the target UTRAN FDD cell within  $T_{connection\_release\_redirect\_UTRAN\ FDD}$ . This test will partly verify the RRC connection release with redirection to UTRAN FDD requirements in clause 6.3.2.1.

The test parameters are given in table A.6.3.12.1-1, table A.6.3.12.1-2, and table A.6.3.12.1-3. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message not containing any system information of Cell 2 shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from Cell 1.

Table A.6.3.12.1-1: General test parameters for E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN		DL Reference Measurement	As specified in clause A.3.1.1.2.
TDD)		Channel R.0 TDD	·
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2.
parameters (E-UTRAN TDD)		Channel R.6 TDD	
Active cell		Cell 1	Cell 1 is on E-UTRAN RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRAN RF channel number 1.
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
E-UTRAN Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length		Normal	Applicable to cell 1
UTRAN RF Channel Number		1	One UTRAN TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRAN FDD cell list		None	No explicit neighbour list is provided to
size			the UE
T1	S	≤5	
T2	S	2	

Table A.6.3.12.1-2: Cell specific test parameters for cell 1 in E-UTRAN TDD RRC connection release redirection to UTRAN FDD test without SI provided

Parameter	Unit	Се	Cell 1		
		T1	T2		
E-UTRAN RF Channel			1		
Number					
BW <sub>channel</sub>	MHz	1	0		
OCNG Pattern defined in		OP 1	TDD		
A.3.2.2.1 (OP.1 TDD)		OF.1	TDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	•	0		
PDCCH_RA	dB				
PDCCH_RB	dB	1			
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4		
$N_{oc}^{ m Note 3}$	dBm/15 kHz	-(	98		
$\hat{E}_s/N_{oc}$	dB	4	4		
RSRP Note 4	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AW	/ĠN		

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.12.1-3: Cell specific test parameters for cell 2 in E-UTRAN TDD RRC connection release redirection to UTRAN FDD test without SI provided

Parameter	Unit	Cell 2			
		T1	T1		
UTRAN RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.94	1		
$\hat{I}_{or}/I_{oc}$	dB		0.02		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞	-13		
Propagation Condition		AWGN			

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .

Note 3: This gives an SCH Ec/lo of -15dB

### A.6.3.12.2 Test Requirements

The UE shall start to send random access to the target UTRAN FDD cell (Cell 2) less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as:  $T_{RRC\_procedure\_delay} + T_{identify\_UTRAN\ FDD} + T_{SI\_UTRAN\ FDD} + T_{RA}$ , where:

 $T_{RRC\ procedure\ delay} = 110$  ms, which is specified in clause 6.3.2.1.

 $T_{identify-UTRAN FDD} = 500 \text{ ms}$ ; which is defined in clause 6.3.2.1.

 $T_{SI\text{-}UTRAN\ FDD}$ : Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRAN FDD cell. 1280 ms is assumed in this test case.

 $T_{RA} = 40$ ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

#### **A.7** Timing and Signalling Characteristics

#### A.7.1**UE Transmit Timing**

#### A.7.1.1 E-UTRAN FDD – UE Transmit Timing Accuracy Tests

#### A.7.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test a single cell is used. Table A.7.1.1.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.1.1-2.

Table A.7.1.1.1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Barrandar	11	Value			
Parameter	Unit	Test 1	Test 2	Test 3	Test 4
E-UTRA RF Channel Number		1	1	1	1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	10	1.4	10
DRX cycle	ms	N/A	80 <sup>Note5</sup>	N/A	640 <sup>Note5</sup>
PDCCH/PCFICH/PHICH					
Reference measurement channel Nates		R.6 FDD	R.6 FDD	R.8 FDD	R.6 FDD
OCNG Pattern <sup>Note2</sup>		OP.2 FDD	OP.2 FDD	OP.4 FDD	OP.2 FDD
PBCH_RA					
PBCH_RB			0	0	0
PSS_RA					
SSS_RA		dB 0			
PCFICH_RB					
PHICH_RA	dB				
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA <sup>Note3</sup>					
OCNG_RB <sup>Note3</sup>					
$N_{oc}$	dBm/15 kHz	-98	-98	-98	-98
$\hat{\mathtt{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3
Io <sup>Note4</sup>	dBm/9 MHz	-65.5	-65.5	N/A	-65.5
10	dBm/1.08 MHz	N/A	N/A	-74.7	N/A
Propagation condition	-	AWGN	AWGN	AWGN	AWGN

Note 1: For the reference measurement channels, see clause A.3.1.

For the OCNG pattern, see clause A.3.2. Note 2:

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: lo level has been derived from other parameters for information purpose. It is not a settable

DRX related parameters are defined in Table A.7.1.1.3. Note 5:

Table A.7.1.1.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Field	Value				Comment
Fleid	Test 1	Test 2	Test 3	Test 4	Comment
srsBandwidthConfiguration	bw5	bw5	bw7	bw5	
srsSubframeConfiguration	sc1	sc3	sc1	sc3	
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	N/A	N/A	N/A	N/A	Not applicable for FDD
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	0	77	0	317	SRS periodicity of 2ms, 80 ms and 320ms for Test 1, 2 and 4, respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
SRS-AntennaPort  Note: For further information see clause 6	an1 Number of antenna ports used for SRS transmission				

Table A.7.1.1.1-3: drx-Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 4 for E-UTRAN FDD

Field	Va	lue	Comment		
rieid	Test 2	Test 4			
onDurationTimer	psf1	psf1			
drx-InactivityTimer	psf1	psf1			
drx-RetransmissionTimer	psf1	psf1			
longDRX-CycleStartOffset	sf80	sf640			
shortDRX	disable	disable			
Note: For further information see clause 6.3.2 in TS 36.331.					

### A.7.1.1.2 Test Requirements

For parameters specified in Tables A.7.1.1.1-1 and A.7.1.1.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 10MHz channel bandwidth, the test sequence shall be carried out in RRC\_CONNECTED for both non-DRX (for Test1) and DRX with a cycle length of 80 ms or a cycle length of 640 ms (Tests 2 and 4, respectively):

- a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+64 \times T_S$  (for Test 1 and Test 2) or  $+32 \times T_S$  (for Test 4) compared to that in (a).
- c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. Skip this step for Test 2 and Test 4.

d) The test system shall verify that the UE transmit timing offset stays within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. For test 2 and test 4 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

For the 1.4MHz channel bandwidth, the test sequence shall be carried out in RRC\_CONNECTED for non-DRX (Test 3):

- a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within  $N_{TA} \times T_S \pm 24 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+128 \times T_S$  (approximately  $+4\mu s$ ) compared to that in (a).
- c) The test system shall verify that the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within  $N_{TA} \times T_S \pm 24 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- d) The test system shall verify that the UE transmit timing offset stays within  $N_{TA} \times T_S \pm 24 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

### A.7.1.2 E-UTRAN TDD - UE Transmit Timing Accuracy Tests

### A.7.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test a single cell is used. Table A.7.1.2.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.2.1-2.

Table A.7.1.2.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Downwater	11	Value					
Parameter	Unit	Test 1	Test 2	Test 3	Test 4		
E-UTRA RF Channel Number		1	1	1	1		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	10	1.4	10		
Special subframe		6	6	6	6		
configuration Note1							
Uplink-downlink configuration <sup>Note2</sup>		1	1	1	1		
DRX cycle	ms	N/A	80 <sup>Note7</sup>	N/A	640 <sup>Note7</sup>		
PDCCH/PCFICH/PHICH							
Reference measurement		R.6 TDD	R.6 TDD	R.8 TDD	R.6 TDD		
channel <sup>Note3</sup>							
OCNG Pattern <sup>Note4</sup>		OP.2 TDD	OP.2 TDD	OP.4 TDD	OP.2 TDD		
PBCH_RA	dB	0	0	0	0		
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA		0	0	0	0		
PHICH_RB		U	U	0	0		
PDCCH_RA							
PDCCH_RB							
OCNG_RA <sup>Note5</sup>							
OCNG_RB <sup>Note5</sup>							
$N_{oc}$	dBm/15 kHz	-98	-98	-98	-98		
$\hat{E}_{s}/I_{ot}$	dB	3	3	3	3		
$\hat{E}_s/N_{oc}$	dB	3	3	3	3		
lo <sup>Note6</sup>	dBm/9 MHz	-65.5	-65.5	N/A	-65.5		
IU	dBm/1. 08 MHz	N/A	N/A	-74.7	N/A		
Propagation condition	-	AWGN	AWGN	AWGN	AWGN		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.

Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

Note 3: For the reference measurement channels, see clause A.3.1.

Note 4: For the OCNG pattern, see clause A.3.2.

Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted

power spectral density is achieved for all OFDM symbols.

Note 6: lo level has been derived from other parameters for information purpose. It is not a

settable parameter.

Note 7: DRX related parameters are defined in Table A.7.1.2.1-3.

Table A.7.1.2.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field		Va	Comment				
rieia	Test 1	Test 2	Test 3	Test 4	Comment		
srsBandwidthConfiguration	bw5	bw5	bw7	bw5			
srsSubframeConfiguration	sc3	sc3	sc3	sc3	Once every 5 subframes		
ackNackSrsSimultaneousTr ansmission	FALSE	FALSE	FALSE	FALSE			
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE			
srsBandwidth	0	0	0	0	No hopping		
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0			
frequencyDomainPosition	0	0	0	0			
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration		
Srs-ConfigurationIndex	15	85	15	325	SRS periodicity of 10, 80, 10 and 320 ms for Test 1, 2, 3 and 4 respectively.		
transmissionComb	0	0	0	0			
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift		
SRS-AntennaPort		aı	Number of antenna ports used for SRS transmission				
Note: For further information see clause 6.3.2 in TS 36.331.							

Table A.7.1.2.1-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 4 for E-UTRAN TDD

Field	Va	lue	Comment
rieid	Test 2	Test 4	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	Sf640	
shortDRX	disable	disable	
Note: For further information se	ee clause 6.3.2 in	TS 36.331.	

### A.7.1.2.2 Test Requirements

For parameters specified in Tables A.7.1.2.1-1 and A.7.1.2.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 10MHz channel bandwidth, the test sequence shall be carried out in RRC\_CONNECTED for both non-DRX (for Test1) and DRX with a cycle length of 80 ms or a cycle length of 640 ms (Tests 2 and 4, respectively):

- a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within  $(N_{TA} + 624) \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+64 \times T_S$  (for Test 1 and Test 2) or  $+32 \times T_S$  (for Test 4) compared to that in (a).
- c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within  $(N_{TA} + 624) \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. Skip this step for test 2 and test 4.
- d) The test system shall verify that the UE transmit timing offset stays within  $(N_{TA} + 624) \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. For test 2 and test 4 the UE

transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

For the 1.4MHz channel bandwidth, the test sequence shall be carried out in RRC\_CONNECTED for non-DRX (Test 3):

- a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within  $(N_{TA} + 624) \times T_S \pm 24 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+128 \times T_S$  (approximately  $+4\mu s$ ) compared to that in (a).
- c) The test system shall verify that the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within  $(N_{TA}+624)\times T_S\pm 24\times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- d) The test system shall verify that the UE transmit timing offset stays within  $(N_{TA} + 624) \times T_S \pm 24 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

### A.7.1.3 E-UTRAN FDD – UE Transmit Timing Accuracy Tests for SCell

### A.7.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. Both PCell and SCell are in the primary Timing Advance Group (pTAG). Table A.7.1.3.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.3.1-2.

Table A.7.1.3.1-1: General test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Paramatan	l lade		Cell 1		Cell 2			
Parameter	Unit	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	
E-UTRA RF Channel Number		1	1	1	2	2	2	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	20	20	20	20	20	
Active PCell		Cell 1	Cell 1	Cell 1				
Active SCell					Cell 2	Cell 2	Cell 2	
TAG configuration		pTAG	pTAG	pTAG	pTAG	pTAG	pTAG	
DRX cycle	ms	N/A	80 <sup>Note5</sup>	640 <sup>Note5</sup>	N/A	80 <sup>Note5</sup>	640 <sup>Note5</sup>	
PDCCH/PCFICH/PHICH Reference measurement channel <sup>Note1</sup>		R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD	
OCNG Pattern <sup>Note2</sup>		OP.12 FDD	OP.12 FDD	OP.12 FDD	OP.12 FDD	OP.12 FDD	OP.12 FDD	
PBCH_RA								
PBCH_RB	1							
PSS_RA	1							
SSS_RA	1							
PCFICH_RB	1							
PHICH_RA	dB	0	0	0	0	0	0	
PHICH_RB	1 - I	,			-		-	
PDCCH_RA	1							
PDCCH RB	1							
OCNG RA <sup>Note3</sup>	1							
OCNG_RB <sup>Note3</sup>	1							
$N_{oc}$	dBm/15 kHz	-98	-98	-98	-98	-98	-98	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	3	3	3	3	3	3	
$\hat{E}_s/N_{oc}$	dB	3	3	3	3	3	3	
Io <sup>Note4</sup>	dBm/18 MHz	-62.5	-62.5	-62.5	-62.5	-62.5	-62.5	
Propagation condition	-	AWGN	AWGN	AWGN	AWGN	AWGN	AWGN	

Note 1: For the reference measurement channels, see clause A.3.1.

Note 2: For the OCNG pattern, see clause A.3.2.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 5: DRX related parameters are defined in Table A.7.1.3.1-3.

Table A.7.1.3.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Field	Cell 1				Cell 2	C		
Field	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	Comment	
srsBandwidthConfiguratio n	bw5	bw5	bw5	bw5	bw5	bw5		
srsSubframeConfiguration	sc1	sc3	sc3	sc1	sc3	sc3		
ackNackSrsSimultaneous Transmission	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		
srsMaxUpPTS	N/A	N/A	N/A	N/A	N/A	N/A	Not applicable for FDD	
srsBandwidth	0	0	0	0	0	0	No hopping	
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	hbw0	hbw0		
frequencyDomainPosition	0	0	0	0	0	0		
duration	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Indefinite duration	
Srs-ConfigurationIndex	0	77	317	0	77	317	SRS periodicity of 2ms, 80 ms and 320ms for Test 1, 2 and 3, respectively.	
transmissionComb	0	0	0	0	0	0		
cyclicShift	cs0	cs0	cs0	cs0	cs0	cs0	No cyclic shift	
srsAntennaPort	an1	an1	an1	an1	an1	an1	Number of SRS antenna ports	
NOTE: For further information see clause 6.3.2 in TS 36.331.								

Table A.7.1.3.1-3: drx-Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 3 for E-UTRAN FDD

Field	Test 2		Test 3		Comment			
	Cell 1	Cell 2	Cell 1	Cell 2				
onDurationTimer	psf1	psf1	psf1	psf1				
drx-InactivityTimer	psf1	psf1	psf1	psf1				
drx-RetransmissionTimer	psf1	psf1	psf1	psf1				
longDRX-CycleStartOffset	sf80	sf80	Sf640	Sf640				
shortDRX	disable	disable	disable	Disable				
NOTE: For further information see clause 6.3.2 in TS 36.331.								

### A.7.1.3.2 Test Requirements

For parameters specified in Tables A.7.1.3.1-1, and A.7.1.3.1-2 the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

The test sequence shall be carried out in RRC\_CONNECTED for both non-DRX (for Test 1) and DRX with a cycle length of 80 ms or a cycle length of 640 mss(Test 2 and 3, respectively):

- a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets of both PCell and SCell are within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1).
- b) The test system adjusts the downlink transmit timing for the PCell (Cell 1) by  $+64\times T_S$  (for Test 1 and Test 2) or  $+32\times T_S$  (for Test 3) compared to that in (a).
- c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of both PCell and SCell are within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). Skip this step for Test 2 and Test 3.

d) The test system shall verify that the UE transmit timing offsets of both PCell and SCell stay within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). For test 2 and test 3 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

### A.7.1.4 E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell

### A.7.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. Both PCell and SCell are in the primary Timing Advance Group (pTAG). Table A.7.1.4.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.4.1-2.

Table A.7.1.4.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Boromotor	I Imit		Cell 1		Cell 2			
Parameter	Unit	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	
E-UTRA RF Channel Number		1	1	1	2	2	2	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	20	20	20	20	20	
E-UTRA RF Channel Number		1	1	1	2	2	2	
Active PCell		Cell 1	Cell 1	Cell 1				
Active SCell					Cell 2	Cell 2	Cell 2	
TAG configuration		pTAG	pTAG	pTAG	pTAG	pTAG	pTAG	
Special subframe		6	6	6	6	6	6	
configuration Note1								
Uplink-downlink configuration Note2		1	1	1	1	1	1	
DRX cycle	ms	OFF	80 <sup>Note7</sup>	640 <sup>Note</sup> /	OFF	80 <sup>Note7</sup>	640 <sup>Note</sup>	
PDCCH/PCFICH/PHICH		R.10	R.10	R.10	R.10	R.10	R.10	
Reference measurement		TDD	TDD	TDD	TDD	TDD	TDD	
channel <sup>Note3</sup>								
OCNG Pattern <sup>Note4</sup>		OP.8	OP.8	OP.8	OP.8	OP.8	OP.8	
		TDD	TDD	TDD	TDD	TDD	TDD	
PBCH_RA	dB	0	0	0	0	0	0	
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA		0	0	0		0	0	
PHICH_RB		U	U	U		U		
PDCCH_RA								
PDCCH_RB								
OCNG_RA <sup>Note5</sup>								
OCNG_RB <sup>Note5</sup>								
$N_{oc}$	dBm/15	-98	-98	-98	-98	-98	-98	
1 voc	kHz	-90	-90	-90	-90	-90	-90	
$\hat{E}_{s}/I_{ot}$	dB	3	3	3	3	3	3	
$\hat{E}_s/N_{oc}$	dB	3	3	3	3	3	3	
Io <sup>Note6</sup>	dBm/18 MHz	-62.5	-62.5	-62.5	-62.5	-62.5	-62.5	
Propagation condition	-	AWGN	AWGN	AWGN	AWGN	AWGN	AWGN	
Note 1: For the special subframe	configuratio	n coo tabla	121 in TC 2	E 211				

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.

Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

Note 3: For the reference measurement channels, see clause A.3.1.

Note 4: For the OCNG pattern, see clause A.3.2.

Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 6: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 7: DRX related parameters are defined in Table A.7.1.4.1-3.

Table A.7.1.4.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field		Cell 1			Cell 2		Comment	
Field Test 1	T <b>ēs</b> t <b>1</b> 1	Test 2	Test 3	Test 1	Test 2	Test 3	Tset	3 Tset3
srsBandwidthConfiguration	bw5	bw5	bw5	bw5	bw5	bw5		
srsSubframeConfiguration	sc3	sc3	sc3	sc3	sc3	sc3	Once every 5 subframes	
ackNackSrsSimultaneous Transmission	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		
srsBandwidth	0	0	0	0	0	0	No hopping	
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	hbw0	hbw0		
frequencyDomainPosition	0	0	0	0	0	0		
duration	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Indefinite duration	
Srs-ConfigurationIndex	15	85	325	15	85	325	SRS periodicity of 10, 80 ms and 320ms for Test 1, 2 and 3, respectively.	
transmissionComb	0	0	0	0	0	0		
cyclicShift	cs0	cs0	cs0	cs0	cs0	cs0	No cyclic shift	
srsAntennaPort	an1	an1	an1	an1	an1	an1	Number of SRS antenna ports	
Note: For further inform	ation see o	lause 6.3.2	2 in TS 36.3	331.				

Table A.7.1.4.1-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 3 for E-UTRAN TDD

Field	Tes	st 2	Tes	Comment			
rieia	Cell 1	Cell 2	Cell 1	Cell 2			
onDurationTimer	psf1	psf1	psf1	psf1			
drx-InactivityTimer	psf1	psf1	psf1	psf1			
drx-RetransmissionTimer	psf1	psf1	psf1	psf1			
longDRX-CycleStartOffset	sf80	sf80	Sf640	Sf640			
shortDRX	disable	disable	disable	disable			
Note: For further information see clause 6.3.2 in TS 36.331.							

#### A.7.1.4.2 Test Requirements

For parameters specified in Tables A.7.1.4.1-1 and A.7.1.4.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

The test sequence shall be carried out in RRC\_CONNECTED for both non-DRX (for Test 1) and DRX with a cycle length of 80 ms or a cycle length of 640 ms (Test 2 and 3, respectively):

- a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets of both PCell and SCell are within  $(N_{TA}+624)\times T_S\pm 12\times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1).
- b) The test system adjusts the downlink transmit timing for the PCell (Cell 1) by  $+64\times T_S$  (for Test 1 and Test 2) or  $+32\times T_S$  (for Test 3) compared to that in (a).
- c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of both PCell and SCell are within  $(N_{TA} + 624) \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). Skip this step for test 2 and test 3.

d) The test system shall verify that the UE transmit timing offsets of both PCell and SCell stay within ( $N_{TA}$  + 624)× $T_S$  ± 12× $T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). For test 2 and test 3 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

# A.7.1.4A E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell for 20 MHz + 10 MHz

#### A.7.1.4A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.4.1.

The parameters of this test are the same as defined in Subclause A.7.1.4.1 except that the values of the parameters in the Table A.7.1.4A.1-1 will replace the values of the corresponding parameters in A.7.1.4.1-1. Parameters used for the sounding reference symbol configuration and DRX configuration are unchanged from table A.7.1.4.1-2 and table A.7.1.4.1-3.

Table A.7.1.4A.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD for 20 MHz +10 MHz

Parameter	Unit		Cell 1		Cell 2		
Parameter	Offic	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	20	20	10	10	10
PDCCH/PCFICH/PHICH Reference measurement channel <sup>Note3</sup>		R.10 TDD	R.10 TDD	R.10 TDD	R.6 TDD	R.6 TDD	R.6 TDD
OCNG Pattern <sup>Note4</sup>		OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
lo <sup>Note6</sup>	dBm/18 MHz	-62.5	-62.5	-62.5	N/A	N/A	N/A
	dBm/9 MHz	N/A	N/A	N/A	-65.5	-65.5	-65.5

#### A.7.1.4A.2 Test Requirements

The test requirements defined in section A.7.1.4.2 shall apply to this test case.

# A.7.1.5 E-UTRAN FDD – UE Transmit Timing Accuracy Tests for 5MHz Bandwidth

#### A.7.1.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.1.1.

The parameters of this test are the same as defined in Subclause A.7.1.1.1 except that the values of the parameters in Test 1 in the Table A.7.1.5.1-1 will replace the values of the corresponding parameters in A.7.1.1.1-1. Only Test 1 is defined for the 5MHz bandwidth.

Table A.7.1.5.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD for 5MHz bandwidth

Parameter	Unit	Value
Farameter	Onit	Test 1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5
PDCCH/PCFICH/PHICH		
Reference measurement channel <sup>Note1</sup>		R.11 FDD
OCNG Pattern <sup>Note2</sup>		OP.16 FDD
Io <sup>Note4</sup>	dBm/4.5 MHz	-68.5

Note 1: For the reference measurement channels, see clause A.3.1.

Note 2: For the OCNG pattern, see clause A.3.2.

Note 3: See Table A.7.1.1.1-1 for the other parameters.

Note 4: This test is according to the principle defined in section A.3.7.2.

#### A.7.1.5.2 Test Requirements

The test requirements defined in section A.7.1.1.2 shall apply to this test case.

## A.7.1.6 E-UTRAN FDD – UE Transmit Timing Accuracy Tests for SCell in sTAG

#### A.7.1.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits for SCell in sTAG. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the Primary Timing Advance Group (pTAG) and Scell is in the secondary Timing Advance Group (sTAG). Table A.7.1.6.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing for Scell in sTAG is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.6.1-2.

Table A.7.1.6.1-1: General test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN FDD

Parameter	Unit	Ce	II 1	Cel	II 2
Parameter	Unit	Test 1	Test 2	Test 1	Test 2
E-UTRA RF Channel		1	1	2	2
Number		Į.	,	2	2
Channel Bandwidth	MHz	10	10	10	10
(BW <sub>channel</sub> )	IVII IZ			10	10
Active PCell		Cell 1	Cell 1		
Active SCell				Cell 2	Cell 2
TAG configuration		pTAG	pTAG	sTAG	sTAG
DRX cycle	ms	OFF	80 <sup>Note5</sup>	OFF	80 <sup>Note5</sup>
PDCCH/PCFICH/PHICH					
Reference measurement		R.6 FDD	R.6 FDD	R.6 FDD	R.6 FDD
channel <sup>Note1</sup>					
OCNG Pattern <sup>Note2</sup>		OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA	dB	0	0	0	0
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA <sup>Note3</sup>					
OCNG_RB <sup>Note3</sup>					
	dBm/15	-98	-98	-98	-98
$N_{oc}$	kHz	-90	-90	-90	-90
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3
Io <sup>Note4</sup>	dBm/9 MHz	-65.5	-65.5	-65.5	-65.5
Propagation condition	-	AWGN	AWGN	AWGN	AWGN

Note 1: For the reference measurement channels, see clause A.3.1.

Note 2: For the OCNG pattern, see clause A.3.2.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 5: DRX related parameters are defined in Table A.7.1.6.1-3.

Table A.7.1.6.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN FDD

Field	Ce	Cell 1 Cell 2			Comment
Field	Test 1	Test 2	Test 1	Test 2	
srsBandwidthConfiguratio n	bw5	bw5	bw5	bw5	
srsSubframeConfiguration	sc3	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneous Transmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	15	85	SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
srsAntennaPort	an1	an1	an1	an1	Number of SRS antenna ports
Note: For further inform	nation see cla	ause 6.3.2 in	TS 36.331		

Table A.7.1.6.1-3: drx-Configuration to be used in Test 2 of UE Transmit Timing Accuracy for SCell in sTAG for E-UTRAN FDD

Field	Cell 1	Cell 2	Comment			
onDurationTimer	psf1	psf1				
drx-InactivityTimer	psf1	psf1				
drx-RetransmissionTimer	psf1	psf1				
longDRX-CycleStartOffset	sf80	sf80				
shortDRX	disable	disable				
Note: For further information see clause 6.3.2 in TS 36.331.						

#### A.7.1.6.2 Test Requirements

For parameters specified in Tables A.7.1.6.1-1, and A.7.1.6.1-2 the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate for Scell in sTAG shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For Test1 and Test2, the test sequence shall be carried out in RRC\_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms:

- a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets for SCell in sTAG are within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of the activated Scell.
- b) The test system adjusts the downlink transmit timing for the activated Scell (Cell 2) by  $+64 \times T_S$  (approximately  $+2\mu s$ ) compared to that in (a).
- c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate for Scell in sTAG shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of SCell within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell (Cell 2). Skip this step for Test 2.
- d) The test system shall verify that the UE transmit timing offsets of the SCell in sTAG stay within  $N_{TA} \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell (Cell 2).

# A.7.1.7 E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG

#### A.7.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits for SCell in sTAG. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the Primary Timing Advance Group (pTAG) and Scell is in the secondary Timing Advance Group (sTAG). Table A.7.1.7.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing for Scell in sTAG is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.7.1-2.

Table A.7.1.7.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD

E-UTRA RF Channel Number	
Channel Bandwidth (BW <sub>channel</sub> )         MHz         10         10         10           E-UTRA RF Channel Number         1         1         1         2           Active PCell         Cell 1         Cell 1         Cell 2         Cell 2           Active SCell         Cell 2         Cell 3         Cell 3         Cell 4         Cell 5         Cell 2         Cell 3         Cell 4         Cell 4         Cell 5         Cell 2         Cell 4         Cell 5         Cell 2         Cell 4         Cell 5         Ce	st 2
E-UTRA RF Channel Number	2
Active PCell	0
Active SCell	2
TAG configuration	
Special subframe configuration   Special subframe   Special subframe	ll 2
Configuration   Note1	AG
Uplink-downlink configuration   Note   Note	3
Uplink-downlink configuration   Notes   DRX cycle   ms	
DRX cycle	1
Reference measurement channel	lote7
channel         Note3         OP.2 TDD         OP.2 TDD <th< td=""><td></td></th<>	
OCNG Pattern Note4         OP.2 TDD         OP.2 TDD <td>TDD</td>	TDD
OCNG Pattern Note4         OP.2 TDD         OP.2 TDD <td></td>	
PBCH_RB           PSS_RA           SSS_RA           PCFICH_RB           PHICH_RA           PHICH_RB           PDCCH_RA           PDCCH_RB           OCNG_RANote5           OCNG_RBNote5           Noc         dBm/15 kHz           -98         -98           -98	TDD
PSS_RA           SSS_RA           PCFICH_RB           PHICH_RA           PHICH_RB           PDCCH_RA           PDCCH_RB           OCNG_RANote5           OCNG_RBNote5           Noc           dBm/15 kHz           -98           -98           -98	)
SSS_RA	
PCFICH_RB           PHICH_RA           PHICH_RB           PDCCH_RA           PDCCH_RB           OCNG_RANOte5           OCNG_RBNote5           Noc         dBm/15 kHz           -98         -98           -98	
PHICH_RA         0         0           PHICH_RB         0         0           PDCCH_RA         0         0           PDCCH_RB         0         0           OCNG_RA         OCNG_RA         0           OCNG_RB         0         0           OCNG_RB         0         0           Ac         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0           C         0         0	
PHICH_RB         0         0           PDCCH_RA         0         0           PDCCH_RB         0         0           OCNG_RA         OCNG_RA         0           OCNG_RA         0         0           OCNG_RB         0         0<	
PRICH_RB	0
PDCCH_RB	J
OCNG_RA <sup>Note5</sup> OCNG_RB <sup>Note5</sup> OCNG_RB <sup>Note5</sup> dBm/15 kHz         -98         -98         -	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$N_{oc}$ dBm/15 kHz -98 -98 -98 -98	
<u> </u>	98
$\hat{\mathbf{E}}_{_{\mathrm{s}}}/\mathbf{I}_{_{\mathrm{ot}}}$ dB 3 3	3
$\hat{E}_s/N_{oc}$ dB 3 3	3
Io <sup>Note6</sup> dBm/965.565.565.56	5.5
Propagation condition - AWGN AWGN AWGN AV	'GN

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.

Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

Note 3: For the reference measurement channels, see clause A.3.1.

Note 4: For the OCNG pattern, see clause A.3.2.

Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 6: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 7: DRX related parameters are defined in Table A.7.1.7.1-3.

Table A.7.1.7.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD

Field	Cell 1 Cell 2		Cell 1		Comment
rieiu	Test 1	Test 2	Test 1	Test 2	
srsBandwidthConfiguratio n	bw5	bw5	bw5	bw5	
srsSubframeConfiguration	sc3	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneous Transmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	15	85	SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
srsAntennaPort	an1	an1	an1	an1	Number of SRS antenna ports
Note: For further inform	nation see claus	e 6.3.2 in TS	36.331.		

Table A.7.1.7.1-3: DRX Configuration to be used in Test 2 of UE Transmit Timing Accuracy for SCell in sTAG for E-UTRAN TDD

Field	Cell 1	Cell 2	Comment			
onDurationTimer	psf1 psf1					
drx-InactivityTimer	psf1	psf1				
drx-RetransmissionTimer	psf1	psf1				
longDRX-CycleStartOffset	sf80	sf80				
shortDRX	disable	disable				
Note: For further information see clause 6.3.2 in TS 36.331.						

#### A.7.1.7.2 Test Requirements

For parameters specified in Tables A.7.1.7.1-1 and A.7.1.7.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate for Scell in sTAG shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For Test 1 and Test 2, the test sequence shall be carried out in RRC\_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms:

- a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets for Scell in sTAG are within  $(N_{TA} + 624) \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell (Cell 2).
- b) The test system adjusts the downlink transmit timing for the activated Scell (Cell 2) by  $+64 \times T_S$  (approximately  $+2\mu s$ ) compared to that in (a).
- c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate for Scell in sTAG shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of SCell are within  $(N_{TA}+624)\times T_S\pm 12\times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell(Cell 2). Skip this step for test 2.

d) The test system shall verify that the UE transmit timing offsets of the SCell in sTAG stay within  $(N_{TA} + 624) \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of the activated Scell (Cell 2).

## A.7.1.7A E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG for 20MHz +20MHz

#### A.7.1.7A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.7. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.1.7A.1.1-1 will replace the values of corresponding parameters in Tables A.7.1.7.1-1.

Table A.7.1.7A.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD with 20MHz +20MHz bandwidth

Parameter	Unit	С	ell 1	Cell 2			
	Onit	Test 1	Test 2	Test 1	Test 2		
E-UTRA RF Channel Number		1	1	2	2		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	20	20	20		
PDCCH/PCFICH/PHICH							
Reference measurement channel		R.7 TDD	R.7 TDD	R.7 TDD	R.7 TDD		
defined in A.3.1.2.2							
OCNG Pattern defined in A.3.2.2		OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.8 TDD		
Io <sup>Note1</sup>	dBm/18 MHz	-62.5	-62.5	-62.5	-62.5		
Note 1: lo level has been derived	****						

#### A.7.1.7A.2 Test Requirements

The test requirements defined in section A.7.1.7.2 shall apply to these test cases.

# A.7.1.7B E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG for 20MHz +10MHz

#### A.7.1.7B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.7. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.1.7B.1-1 will replace the values of corresponding parameters in Tables A.7.1.7.1-1.

Table A.7.1.7B.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD with 20MHz +10MHz bandwidth

Parameter	Unit	Cell 1		Cell 2	
Parameter	Unit	Test 1	Test 2	Test 1	Test 2
E-UTRA RF Channel Number		1	1	2	2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	20	10	10
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.7 TDD	R.7 TDD	R.6 TDD	R.6 TDD
OCNG Pattern defined in A.3.2.2		OP.8 TDD	OP.8 TDD	OP.2 TDD	OP.2 TDD
Io <sup>Note1</sup>	dBm/18 MHz	-62.5	-62.5	•	-
IO .	dBm/9 MHz	-	-	-65.5	-65.5
Note 1: lo level has been derived	from other	parameters for in	formation purpose. I	t is not a settable	e parameter.

#### A.7.1.7B.2 Test Requirements

The test requirements defined in section A.7.1.7.2 shall apply to these test cases.

### A.7.2 UE Timing Advance

#### A.7.2.1 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test

#### A.7.2.1.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN FDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.1.1-1, A.7.2.1.1-2, and A.7.2.1.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.1.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.7.2.1.1-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.1.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Timing Advance Command $(T_A)$ value during T1		31	N <sub>TA</sub> = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T <sub>A</sub> ) value during T2		39	N <sub>TA</sub> = 128
DRX		OFF	
T1	S	5	
T2	S	5	

Table A.7.2.1.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test

Parameter	Unit		Value	
		T1		T2
E-UTRA RF Channel Number			1	
BW <sub>channel</sub>	MHz		10	
OCNG Patterns defined in A.3.2.1.1			OP.1 FDD	
(OP.1 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB		0	
PDCCH_RA	dB		0	
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note1</sup>	dB			
OCNG_RB <sup>Note1</sup>	dB			
Timing Advance Command (T <sub>A</sub> )		31		39
$\hat{E}_{s}/I_{ot}$	dB		3	
$N_{oc}$	dBm/15 KHz	-98		
$\hat{E}_s/N_{oc}$	dB	3		
lo <sup>Note2</sup>	dBm/9 MHz		-65.5	
Propagation Condition			AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Table A.7.2.1.1-3: Sounding Reference Symbol Configuration for E-UTRAN FDD Transmit Timing Accuracy Test

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	Not applicable for E-UTRAN FDD
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	7	SRS periodicity of 10.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6	6.3.2 in TS 36.3	31.

#### A.7.2.1.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

#### A.7.2.2 E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test

#### A.7.2.2.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.2.1-1, A.7.2.2.1-2, and A.7.2.2.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.2.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.7.2.1.1-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.2.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Timing Advance Command (T <sub>A</sub> ) value during T1		31	$N_{TA}$ = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command ( <i>T<sub>A</sub></i> ) value during T2		39	N <sub>TA</sub> = 128
DRX		OFF	
T1	S	5	
T2	S	5	

Table A.7.2.2.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit		Value
		T1	T2
E-UTRA RF Channel Number			1
BW <sub>channel</sub>	MHz		10
Special subframe configuration Note1			6
Uplink-downlink configuration Note2			1
OCNG Patterns defined in A.3.2.2.1			OP.1 TDD
(OP.1 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		0
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note3</sup>	dB		
OCNG_RB <sup>Note3</sup>	dB		
Timing Advance Command (T <sub>A</sub> )		31	39
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB		3
$N_{oc}$	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB		3
Io <sup>Note4</sup>	dBm/9 MHz		-65.5
Propagation Condition			AWGN

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.

Note 4: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Table A.7.2.2.1-3: Sounding Reference Symbol Configuration for E-UTRAN TDD Transmit Timing Accuracy Test

Field	Value	Comment				
srsBandwidthConfiguration	bw5					
srsSubframeConfiguration	sc3	Once every 5 subframes				
ackNackSrsSimultaneousTransmission	FALSE					
srsMaxUpPTS	N/A					
srsBandwidth	bw0	No hopping				
srsHoppingBandwidth	hbw0					
frequencyDomainPosition	0					
Duration	TRUE	Indefinite duration				
Srs-ConfigurationIndex	15	SRS periodicity of 10ms.				
transmissionComb	0					
cyclicShift	cs0	No cyclic shift				
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission				
Note: For further information see clause 6.3.2 in TS 36.331.						

Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

#### A.7.2.2.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

### A.7.2.3 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test for 5MHz

#### A.7.2.3.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.2.1.1.

The parameters of this test are the same as defined in Subclause A.7.2.1.1 except that the values of the parameters in the Table A.7.2.3.1-1 will replace the values of the corresponding parameters in A.7.2.1.1-1, table A.7.2.3.1-2 will replace the values of the corresponding parameters in A.7.2.1.1-2. Parameters used for the sounding reference symbol configuration are unchanged from table A.7.2.1.1-3.

Table A.7.2.3.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for 5MHz bandwidth

	Parameter Ui		Value	Comment	
PDS	SCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1	
PCFIC	H/PDCCH/PHICH		DL Reference Measurement Channel	As specified in clause A.3.1.2.1	
	parameters		R.11 FDD		
Note 1:	e 1: For the reference measurement channels, see clause A.3.1.				
Note 2:	Note 2: See Table A.7.2.1.1-1 for the other parameters.				
Note 3:	This test is according	g to the	principle defined in section A.3.7.2		

Table A.7.2.3.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for 5MHz bandwidth

Parameter	Unit		Value
		T1	T2
BW <sub>channel</sub>	MHz		5
OCNG Patterns defined in			OP.15 FDD
A.3.2.1.15 (OP.15 FDD)			
Io <sup>Note2</sup>	dBm/4.5		-68.5
10	MHz		
Note 1: For the reference mea	surement channels, see	e clause A.3.2.	
Note 2: See Table A 7 2 1 1-2	for the other parameter	s	

#### A.7.2.3.2 Test Requirements

The test requirements defined in section A.7.2.1.2 shall apply to this test case.

# A.7.2.4 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test for SCell in sTAG

#### A.7.2.4.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN FDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.4.1-1, A.7.2.4.1-2, and A.7.2.4.1-3. For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the primary Timing Advance Group (pTAG) and SCell is in the secondary

Timing Advance Group (sTAG). The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands for sTAG are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.4.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured for SCell in sTAG.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element for sTAG, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance for sTAG used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements for sTAG, with Timing Advance Command value specified in table A.7.2.4.1-2. This value shall result in changes of the timing advance for sTAG used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.4.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Timing Advance Command (T <sub>A</sub> ) value during T1		31	N <sub>TA</sub> = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T <sub>A</sub> ) value during T2		39	$N_{TA} = 128$
DRX		OFF	
T1	S	5	
T2	S	5	

Table A.7.2.4.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value					
		Cell1				ell2	
		T1	T	2	T1	T2	
E-UTRA RF Channel			1			2	
Number							
BW <sub>channel</sub>	MHz		10			10	
Active PCell		Cell1	Ce	ell1			
Active SCell					Cell2	Cell2	
TAG configuration		pTAG	pT/	AG	sTAG	sTAG	
OCNG Patterns defined		(	OP.1 FDD		OP.	1 FDD	
in A.3.2.1.1 (OP.1 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB				0		
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		•				
PDCCH_RA	dB		0				
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note1</sup>	dB						
OCNG_RB <sup>Note1</sup>	dB						
Timing Advance		/	/		31	39	
Command $(T_A)$							
$\hat{E}_s/I_{ot}$	dB	3				3	
$N_{oc}$	dBm/15	-98			-	98	
	KHz					_	
$\hat{E}_s/N_{oc}$	dB	3				3	
Io <sup>Note2</sup>	dBm/9 MHz	-65.5			55.5		
Propagation Condition	IVII IZ		AWGN		AWGN		
i ropagation condition		AVVGN				V O I V	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Table A.7.2.4.1-3: Sounding Reference Symbol Configuration for E-UTRAN FDD Transmit Timing Accuracy Test for SCell in sTAG

Field	Value	Comment			
srsBandwidthConfiguration	bw5				
srsSubframeConfiguration	sc3	Once every 5 subframes			
ackNackSrsSimultaneousTransmission	FALSE				
srsMaxUpPTS	N/A	Not applicable for E-UTRAN FDD			
srsBandwidth	0	No hopping			
srsHoppingBandwidth	hbw0				
frequencyDomainPosition	0				
Duration	TRUE	Indefinite duration			
Srs-ConfigurationIndex	7	SRS periodicity of 10.			
transmissionComb	0				
cyclicShift	cs0	No cyclic shift			
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission			
Note: For further information see clause 6.3.2 in TS 36.331.					

#### A.7.2.4.2 Test Requirements

The UE shall apply the signalled Timing Advance value for SCell in sTAG to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy for SCell in STAG shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

## A.7.2.5 E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG

#### A.7.2.5.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.5.1-1, A.7.2.5.1-2, and A.7.2.5.1-3. For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the primary Timing Advance Group (pTAG) and SCell is in the secondary Timing Advance Group (sTAG). The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands for sTAG are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.5.1-3, are sent from the UE and received by the test equipment, but only for SCell. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured for SCell in sTAG.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element for sTAG, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements for sTAG, with Timing Advance Command value specified in table A.7.2.5.1-2. This value shall result in changes of the timing advance on SCell used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.5.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Timing Advance Command (T <sub>A</sub> ) value during T1		31	N <sub>TA</sub> = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command $(T_A)$ value during T2		39	N <sub>TA</sub> = 128
DRX		OFF	
T1	S	5	
T2	S	5	

Table A.7.2.5.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Va	alue	
		Cell 1	Cell 2	
		T1 T2	T1 T2	
E-UTRA RF Channel Number		1	2	
BW <sub>channel</sub>	MHz	10	10	
Active PCell		Cell1		
Active SCell			Cell2	
TAG configuration		pTAG	sTAG	
Special subframe configuration Note1		6	6	
Uplink-downlink configuration Note2		1	1	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	OP.1 TDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note3</sup>	dB			
OCNG_RB <sup>Note3</sup>	dB			
Timing Advance Command $(T_A)$			31 39	
${ m \hat{E}}_{ m s}/{ m I}_{ m ot}$	dB	3	3	
$N_{oc}$	dBm/15 KHz	-98	-98	
$\hat{E}_s/N_{oc}$	dB	3	3	
Io <sup>Note4</sup>	dBm/9 MHz	-65.5	-65.5	
Propagation Condition		AWGN	AWGN	

Note 1:

Note 2:

parameter.

For the special subframe configuration see table 4.2-1 in TS 36.211.
For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

OCNG shall be used such that both cells are fully allocated and a constant total transmitted power Note 3: spectral density is achieved for all OFDM symbols. Note 4: lo level has been derived from other parameters for information purpose. It is not a settable

Table A.7.2.5.1-3: Sounding Reference Symbol Configuration for E-UTRAN TDD Transmit Timing Accuracy Test for SCell in sTAG

Field	Value	Comment					
srsBandwidthConfiguration	bw5						
srsSubframeConfiguration	sc3	Once every 5 subframes					
ackNackSrsSimultaneousTransmission	FALSE						
srsMaxUpPTS	N/A						
srsBandwidth	bw0	No hopping					
srsHoppingBandwidth	hbw0						
frequencyDomainPosition	0						
Duration	TRUE	Indefinite duration					
Srs-ConfigurationIndex	15	SRS periodicity of 10ms.					
transmissionComb	0						
cyclicShift	cs0	No cyclic shift					
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission					
Note: For further information see clause 6.3.2 in TS 36.331.							

#### A.7.2.5.2 Test Requirements

The UE shall apply the signalled Timing Advance value for SCell in sTAG to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy for SCell in sTAG shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

## A.7.2.5A E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG for 20 MHz +20 MHz

#### A.7.2.5A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.2.5.1.

The parameters of this test are the same as defined in Subclause A.7.2.5.1 except that the values of the parameters in the Table A.7.2.5A.1-1 will replace the values of the corresponding parameters in A.7.2.5.1-1, table A.7.2.5A.1-2 will replace the values of the corresponding parameters in A.7.2.5.1-2. Parameters used for the sounding reference symbol configuration are unchanged from table A.7.2.5.1-3.

Table A.7.2.5A.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +20 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters		Channel R.10 TDD	

Table A.7.2.5A.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +20 MHz

Parameter	Unit	Value			
		Cell 1		Cell 2	
		T1	T2	T1	T2
BW <sub>channel</sub>	MHz	20		20	
OCNG Patterns defined in A.3.2.2		OP.7 TDD		OP.7 TDD	
lo <sup>Note4</sup>	dBm/18 MHz	-62.5		-62.5 -62.5	

#### A.7.2.5A.2 Test Requirements

The test requirements defined in section A.7.2.5.2 shall apply to this test case.

## A.7.2.5B E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG for 20 MHz +10 MHz

#### A.7.2.5B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.2.5.1.

The parameters of this test are the same as defined in Subclause A.7.2.5.1 except that the values of the parameters in the Table A.7.2.5B.1-1 will replace the values of the corresponding parameters in A.7.2.5.1-1, table A.7.2.5B.1-2 will replace the values of the corresponding parameters in A.7.2.5.1-2. Parameters used for the sounding reference symbol configuration are unchanged from table A.7.2.5.1-3.

Table A.7.2.5B.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +10 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		For Cell 1: DL Reference	As specified in clause A.3.1.1.2
		Measurement Channel R.3 TDD	
		For Cell 2: DL Reference	
		Measurement Channel R.0 TDD	
PCFICH/PDCCH/PHICH		For Cell 1: DL Reference	As specified in clause A.3.1.2.2
parameters		Measurement Channel R.10 TDD	
		For Cell 2: DL Reference	
		Measurement Channel R.6 TDD	

Table A.7.2.5B.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +10 MHz

Parameter	Unit	Va		ue		
		Cell 1		1 Cell 2		
		T1	T2	T1	T2	
BW <sub>channel</sub>	MHz	20		1	10	
OCNG Patterns defined in A.3.2.2		OP.7 TDD		OP.1 TDD		
lo <sup>Note4</sup>	dBm/18 MHz	-62.5		N/A		
10	dBm/9 MHz	N/A	A	-65	5.5	

#### A.7.2.5B.2 Test Requirements

The test requirements defined in section A.7.2.5.2 shall apply to this test case.

### A.7.3 Radio Link Monitoring

In the following section, any uplink signal transmitted by the UE is used for detecting the In-/Out-of-Sync state of the UE. In terms of measurement, the uplink signal is verified on the basis of the UE output power:

For intra-band contiguous carrier aggregation, transmit OFF power is measured as the mean power per component carrier.

For UE with multiple transmit antennas, transmit OFF power is measured as the mean power at each transmit connector.

- UE output power higher than Transmit OFF power -50 dBm (as defined in TS 36.101 [5]) means uplink signal
- UE output power equal to or less than Transmit OFF power -50 dBm (as defined in TS 36.101 [5]) means no uplink signal.

#### A.7.3.1 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

#### A.7.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.1.1-1, A.7.3.1.1-2 and A.7.3.1.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.1.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.1.1-1: General test parameters for E-UTRAN FDD out-of-sync testing

Pai	Parameter			Va	lue		Comment	
			Test 1	Test 2	Test 3	Test 4		
PCFICH/PDC parameters	CH/PHICH		R.6 FDD	R.7 FDD	R.6 FDD	R.7 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test	
OCNG param	eters		OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	As specified in section A.3.2.1.2.	
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length			Normal	Normal	Normal	Normal		
E-UTRA RF C	channel Number		1	1	1	1	One E-UTRA FDD carrier frequency is used.	
E-UTRA Char (BW <sub>channel</sub> )	nnel Bandwidth	MHz	10	10	10	10		
	atrix and Antenna		1x2	2x2	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2	
Out of sync	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212	
transmission parameters (Note 1)	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Qout and the corresponding	
	Aggregation level	CCE	8	8	8	8	hypothetical PDCCH/PCFICH	
	ρ <sub>A</sub> , ρ <sub>B</sub>		0	-3	0	-3	transmission	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	parameters are as specified in section	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	7.6.1 and Table 7.6.1-1 respectively.	
DRX			OFF	OFF	OFF	OFF		
Layer 3 filterin	ıg		Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	0	0	0	0	T310 is disabled	
T311 timer		ms	1000	1000	1000	1000	T311 is enabled	
	reporting mode		PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting	periodicity	ms	2	2	2	2	Minimum CQI reporting periodicity	
Propagation c	hannel		AWGN	AWGN	ETU 70 Hz	ETU 70 Hz		
T1		S	1	1	1	1		
T2		S	0.4	0.4	0.4	0.4		
T3		S	0.5	0.5	0.5	0.5		
Note 4: DD	COLUDOFICIA SAMA				_!		a for all colors of the Alexander	

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1			Test 2			
		T1	T2	Т3	T1	T2	Т3	
E-UTRA RF Channel			1		1			
Number								
BW <sub>channel</sub>	MHz		10			10		
Antenna			1x2			2x2		
Configuration								
OCNG Pattern								
defined in A.3.2.1			OP.2 FDD			OP.2 FDD		
(FDD)								
$\rho_{A},\rho_{B}$			0			-3		
PCFICH_RB	dB		4		1			
PDCCH_RA	dB		4		1			
PDCCH_RB	dB		4		1			
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB		0		-3			
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB	1						
OCNG RB <sup>Note 1</sup>	dB	1						
SNR Note 6	dB	-4.7	-9.5	-13.5	-4.7	-9.5	-13.5	
$N_{oc}$	dBm/15		-98			-98	•	
¹ 'oc	kHz							
Propagation condition		AWGN AWGN						

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal
- Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.1.1-1.

Table A.7.3.1.1-3: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit	Test 3			Test 4			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		1			
Number								
BW <sub>channel</sub>	MHz		10			10		
Correlation Matrix			1x2 Low			2x2 Low		
and Antenna								
Configuration								
OCNG Pattern								
defined in A.3.2.1			OP.2 FDD			OP.2 FDD		
(FDD)								
ρ <sub>A</sub> , ρ <sub>B</sub>			0			-3		
PCFICH_RB	dB		4		1			
PDCCH_RA	dB		4		1			
PDCCH_RB	dB		4		1			
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB		0			-3		
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG RB <sup>Note 1</sup>	dB							
SNR Note 6	dB	-1.4	-5.5	-11.5	-2.3	-6.2	-12.2	
$N_{oc}$	dBm/15		-98		-98			
1 oc	kHz							
Propagation condition		ETU 70 Hz ETU 70 Hz						

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal
- Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.1.1-1.

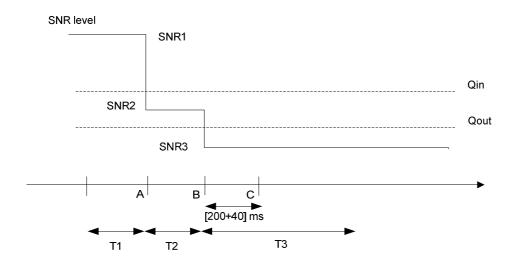


Figure A.7.3.1.1-1 SNR variation for out-of-sync testing

#### A.7.3.1.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

### A.7.3.2 E-UTRAN FDD Radio Link Monitoring Test for In-sync

#### A.7.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.2.1-1 and A.7.3.2.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.2.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.2.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	it Value		Comment	
			Test 1	Test 2		
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test	
OCNG parame	eters		OP.2 FDD	OP.2 FDD	As specified in clause A.3.2.1.2.	
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length			Normal	Normal		
E-UTRA RF	Channel Number		1	1	One E-UTRA FDD carrier frequency is used.	
	nannel Bandwidth W <sub>channel</sub> )	MHz	10	10		
	Matrix and Antenna figuration		1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2	
In sync transmissio	DCI format		1C	1C	As defined in clause 5.3.3.1.4 in TS 36.212	
n parameters (Note 1)	Number of Control OFDM symbols		2	2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical	
(11010-1)	Aggregation level	CCE	4	4	PDCCH/PCFICH transmission parameters	
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		0	-3	are as specified in clause and Table 7.6.1-2 respectively.	
	Ratio of PDCCH to RS EPRE		0	-3		
	Ratio of PCFICH to RS EPRE		4	1		
Out of sync transmissio	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212	
n parameters (Note 1)	Number of Control OFDM symbols		2	2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical	
(1000)	Aggregation level	CCE	8	8	PDCCH/PCFICH transmission parameters	
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		0	-3	are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.	
	Ratio of PDCCH to RS EPRE	dB	4	1	·	
	Ratio of PCFICH to RS EPRE	dB	4	1		
	DRX		OFF	OFF		
Layer 3 filtering	)	m	Enabled	Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	2000	2000	T310 is enabled	

T311 timer	ms	1000	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	2	2	Minimum CQI reporting periodicity
Propagation channel		ETU 70 Hz	ETU 70 Hz	
T1	S	0.5	0.5	
T2	S	0.4	0.4	
ТЗ	S	1.46	1.46	
T4	S	0.4	0.4	
T5	S	1	1	

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1						Test 2				
		T1	T2	T3 T	4	T5	T1 T2 T3 T4 T5					5
E-UTRA RF Channel				1			1					
Number												
BW <sub>channel</sub>	MHz			10			10					
Correlation Matrix				1x2 Low	1				2x2 Lo	w		
and Antenna												
Configuration												
OCNG Pattern												
defined in A.3.2.1			(	OP.2 FD	D				OP.2 F	DD		
(FDD)												
ρα, ρΒ				0					-3			
PCFICH_RB	dB			4			1					
PDCCH_RA	dB			0			-3					
PDCCH_RB	dB			0			-3					
PBCH_RA	dB			`								
PBCH_RB	dB											
PSS_RA	dB											
SSS_RA	dB											
PHICH_RA	dB			0					-3			
PHICH_RB	dB											ļ
PDSCH_RA	dB											ļ
PDSCH_RB	dB											ļ
OCNG_RA <sup>Note 1</sup>	dB											ļ
OCNG_RB <sup>Note 1</sup>	dB											
SNR Note 6	dB	-1.4	-5.5	-2.3	-6.2	-12.2	-7.3		-2.3			
$N_{oc}$	dBm/15	-98	•		•	•	-98		•	•		
1 oc	kHz											
Propagation condition		ETU 70 Hz					ETU 70 Hz					

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.

Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.2.1-1.

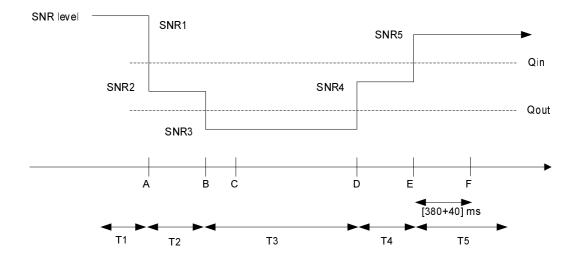


Figure A.7.3.2.1-1 SNR variation for in-sync testing

#### A.7.3.2.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

### A.7.3.3 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

#### A.7.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.3.1-1, A.7.3.3.1-2 and A.7.3.3.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.3.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.3.1-1: General test parameters for E-UTRAN TDD out-of-sync testing

Pa	rameter	Unit		Va	lue		Comment
			Test 1	Test 2	Test 3	Test 4	1
PCFICH/PDC parameters	CCH/PHICH		R.6 TDD	R.7 TDD	R.6 TDD	R.7 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	Normal	
E-UTRA RF	Channel Number		1	1	1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Cha (BW <sub>channel</sub> )	nnel Bandwidth	MHz	10	10	10	10	
Correlation M	Correlation Matrix and Antenna Configuration		1x2	2x2	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync	DCI format		1A	1A	1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmissio n parameters	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Qout and the corresponding
(Note 1)	Aggregation level	CCE	8	8	8	8	hypothetical PDCCH/PCFICH
	ρ <sub>A</sub> , ρ <sub>B</sub>		0	-3	0	-3	transmission
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	parameters are as specified in
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	clause 7.6.1 and Table 7.6.1-1 respectively.
DRX			OFF	OFF	OFF	OFF	
Layer 3 filteri	ng		Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	0	0	T310 is disabled
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	1	1	Minimum CQI reporting periodicity
Propagation	channel		AWGN	AWGN	ETU 70 Hz	ETU 70 Hz	
T1		S	1	1	1	1	
T2		S	0.4	0.4	0.4	0.4	
T3		S	0.5	0.5	0.5	0.5	
Nata 4. DE	OCCU/DOFICU	1:					to a fine alternational for Alexander

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

Parameter	Unit		Test 1		Test 2				
		T1	T2	T3	T1 T2 T3				
E-UTRA RF Channel			1		1				
Number									
BW <sub>channel</sub>	MHz		10			10			
Antenna			1x2		2x2				
Configuration									
Special subframe			6			6			
configuration Note1									
Uplink-downlink			1			1			
configuration Note2									
OCNG Pattern									
defined in A.3.2.2			OP.2 TDD		OP.2 TDD				
(TDD)									
$\rho_A$ , $\rho_B$			0		-3				
PCFICH_RB	dB		4		1				
PDCCH_RA	dB		4		1				
PDCCH_RB	dB		4		1				
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB		_						
PHICH_RA	dB		0			-3			
PHICH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 3</sup>	dB								
OCNG_RB <sup>Note 3</sup>	dB								
SNR Note 8	dB	-5.1	-9.1	-13.1	-5.2 -9.2 -13.2				
$N_{oc}$	dBm/15		-98		-98				
	kHz								
Propagation condition		AWGN AWGN							

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.3.1-1.

Table A.7.3.3.1-3: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit		Test 3		Test 4				
		T1	T2	T3	T1 T2 T3				
E-UTRA RF Channel			1		1				
Number									
BW <sub>channel</sub>	MHz		10			10			
Correlation Matrix			1x2 Low			2x2 Low			
and Antenna									
Configuration									
Special subframe			6			6			
configuration Note1									
Uplink-downlink			1			1			
configuration Note2									
OCNG Pattern									
defined in A.3.2.2			OP.2 TDD		OP.2 TDD				
(TDD)									
ра, рв			0		-3				
PCFICH_RB	dB		4		1				
PDCCH_RA	dB		4		1				
PDCCH_RB	dB		4		1				
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB		_			_			
PHICH_RA	dB		0		-3				
PHICH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 3</sup>	dB								
LOCNG RB <sup>NOTE 3</sup>	dB								
SNR Note 8	dB	-1.4	-5.3	-11.3	-2.3	-5.9	-11.9		
$N_{oc}$	dBm/15	-98			-98				
	kHz								
Propagation condition		ETU 70	Hz		ETU 70 Hz				

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.3.1-1.

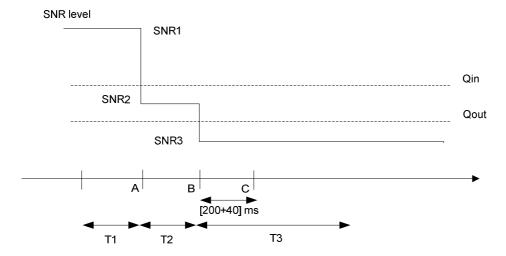


Figure A.7.3.3.1-1. SNR variation for out-of-sync testing

#### A.7.3.3.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

### A.7.3.4 E-UTRAN TDD Radio Link Monitoring Test for In-sync

#### A.7.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.4.1-1 and A.7.3.4.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.4.1-1: General test parameters for E-UTRAN TDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDC0 parameters	CH/PHICH		R.6 TDD	R.7 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.2 TDD	OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF	Channel Number		1	1	One E-UTRA FDD carrier frequency is used.
	nannel Bandwidth W <sub>channel</sub> )	MHz	10	10	
	Matrix and Antenna figuration		1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmissio	DCI format		1C	1C	As defined in clause 5.3.3.1.4 in TS 36.212
n parameters (Note 1)	Number of Control OFDM symbols		2	2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
(1000)	Aggregation level	CCE	4	4	PDCCH/PCFICH transmission parameters
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		0	-3	are as specified in clause and Table 7.6.1-2 respectively.
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmissio	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
n parameters (Note 1)	Number of Control OFDM symbols		2	2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
(11010 1)	Aggregation level	CCE	8	8	PDCCH/PCFICH transmission parameters
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		0	-3	are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PDCCH to RS EPRE	dB	4	1	, ,
	Ratio of PCFICH to RS EPRE	dB	4	1	
	DRX		OFF	OFF	
Layer 3 filtering	)	m	Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	2000	T310 is enabled

T311 timer	ms	1000	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	1	1	Minimum CQI reporting periodicity
Propagation channel		ETU 70 Hz	ETU 70 Hz	
T1	S	0.5	0.5	
T2	S	0.4	0.4	
Т3	S	1.46	1.46	
T4	S	0.4	0.4	
T5	S	1	1	
Note 1: PDCCH/PCFICH corr	esnondi	na to the in-sy	nc and out of	sync transmission

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.4.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1						Test 2					
		T1	T2	T3	T4	T5	T1 T2 T3 T4 T5						
E-UTRA RF Channel					1		1						
Number													
BW <sub>channel</sub>	MHz				0					0			
Correlation Matrix				1x2	Low				2x2	Low			
and Antenna													
Configuration													
Special subframe configuration Note1				(	6				(	6			
Uplink-downlink				•	1				•	1			
configuration Note2													
OCNG Pattern				000	<b>TDD</b>				00.0				
defined in A.3.2.2				OP.2	TDD				OP.2	TDD			
(TDD)					`								
ρα, ρΒ	ID.				)		-3						
PCFICH_RB	dB				4		1						
PDCCH_RA	dB				)		-3						
PDCCH_RB	dB			(	)		-3						
PBCH_RA	dB												
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB									•			
PHICH_RA	dB			,	)				-	3			
PHICH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA <sup>Note 3</sup>	dB												
OCNG_RB <sup>Note 3</sup>	dB												

SNR Note	8	dB	-1.4	-5.3	-11.3	-6.4	-1.4	-2.3	-5.9	-11.9	-7.3	-2.3			
$N_{oc}$		dBm/15 kHz	-98						-98						
Propagat	ETU 7	ETU 70 Hz ETU 70 Hz													
Note 1:	Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.														
Note 2:	For the uplin	k-downlink cor	nfiguration	on see ta	able 4.2-	2 in TS 3	36.211.								
Note 3:	OCNG shall	be used such	that the	resource	es in cell	# 1 are	fully allo	cated ar	nd a con	stant tota	al transn	nitted			
	power spectr	ral density is a	chieved	for all O	FDM syr	nbols.									
Note 4:	The uplink re	esources for C	QI repor	ting are	assigned	to the l	JE prior	to the st	art of tin	ne period	1T1.				
Note 5:	The timers a	nd layer 3 filte	ring rela	ted para	meters a	re confi	gured pr	ior to the	e start of	time per	riod T1.				
Note 6:	The signal co	ontains PDCC	H for UE	s other	than the	device u	inder tes	st as par	t of OCN	IG.					
Note 7:	SNR levels of	correspond to t	he signa	al to nois	se ratio o	ver the c	ell-spec	ific refer	ence sig	nal REs					
Note 8:		SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.  The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5  respectively in figure A 7 3 4 1-1													

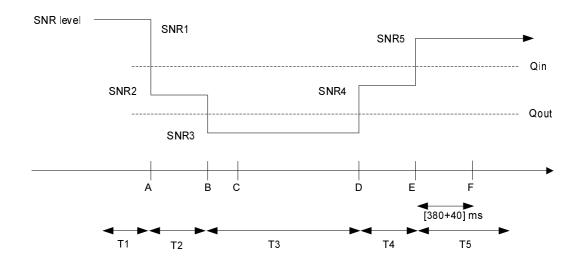


Figure A.7.3.4.1-1. SNR variation for in-sync testing

#### A.7.3.4.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

### A.7.3.5 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

#### A.7.3.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.5.1-1, A.7.3.5.1-2, A.7.3.5.1-3 and A.7.3.5.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.5.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send

periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.5.1-1: General test parameters for E-UTRAN FDD out-of-sync tests in DRX

Parameter		Unit	Val		Comment
			Test 1	Test 2	
PCFICH/PDC parameters	CH/PHICH		R.7 FDD	R.6 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.2 FDD	OP.2 FDD	As specified in clause A.3.2.1.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
	hannel Number		1	1	One E-UTRA FDD carrier frequency is used.
(BWchannel)	nnel Bandwidth	MHz	10	10	
Correlation Ma Antenna Confi			2x2 Low	1x2	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmission parameters (Note 1)	Number of Control OFDM symbols		2	2	Out of sync threshold Qout and the corresponding hypothetical
,	Aggregation level	CCE	8	8	PDCCH/PCFICH transmission parameters
	ρΑ, ρΒ		-3	0	are as specified in
	Ratio of PDCCH to RS EPRE	dB	1	4	clause 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	4	
DRX cycle		ms	40	1280	See Table A.7.3.5.1-3
Layer 3 filterin	g		Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	T310 is disabled
T311 timer		ms	1000	1000	T311 is enabled
	reporting mode		PUCCH 1-0	PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting		ms	2	2	Minimum CQI reporting periodicity
Propagation c	hannel		ETU 70 Hz	AWGN	
T1		S	4	32	
T2		S	1.6	12.8	
T3		S	1.8	13	

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.5.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2 in DRX

Parameter	Unit	Test 1		Test 2				
		T1	T2	Т3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
BW <sub>channel</sub>	MHz		10			10		
Correlation Matrix			2x2 Low			1x2		
and Antenna								
Configuration								
OCNG Pattern								
defined in A.3.2.1			OP.2 FDD			OP.2 FDD		
(FDD)								
ρ <sub>A</sub> , ρ <sub>B</sub>			-3			0		
PCFICH_RB	dB		1			4		
PDCCH_RA	dB	1			4			
PDCCH_RB	dB	1			4			
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB				0			
SSS_RA	dB		-3					
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note1</sup>	dB							
OCNG_RB <sup>Note1</sup>	dB							
SNR Note 6	dB	-2.3	-6.2	-12.2	-4.7	-9.5	-13.5	
$N_{oc}$	dBm/15 kHz		-98			-98		
Propagation condition		ETU 70 Hz			AWGN			
Note 1: OCNG shall	be used such t	hat the res	sources in o	ell # 1 are	fully alloca	ated and a	constant	
Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.								
Note 3: The timers a period T1.	nd layer 3 filter		•					
Note 4: The signal c	ontains PDCCI	CH for UEs other than the device under test as part of OCNG.						

Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.5.1-1.

Table A.7.3.5.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Test1	Test2	Comment
Field	Value	Value	
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.7.3.5.1-4: TimeAlignmentTimer - Configuration for E-UTRAN FDD out-of-sync testing

Field	Test1	Test2	Comment
rieid	Value	Value	
TimeAlignmentTimer	infinity	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

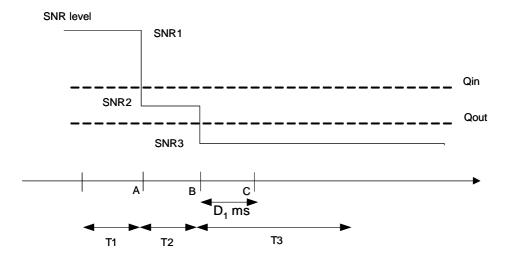


Figure A.7.3.5.1-1 SNR variation for out-of-sync testing in DRX

# A.7.3.5.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

In test 1 the UE shall stop transmitting uplink signal no later than time point C (duration  $D_1 = 900$  ms after the start of time duration T3).

In test 2 the UE shall stop transmitting uplink signal no later than time point C (duration  $D_1 = 6500$  ms after the start of time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.6 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

## A.7.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.6.1-1, A.7.3.6.1-2, A.7.3.6.1-3 and A.7.3.6.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.6.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.6.1-1: General test parameters for E-UTRAN FDD in-sync test in DRX

Parar	neter	Unit	Value	Comment
PCFICH/PDCCH/P	PCFICH/PDCCH/PHICH parameters		R.6 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	As specified in clause A.3.2.1.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF
				channel number 1
CP length			Normal	
E-UTRA RF Chann			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel B	andwidth	MHz	10	
(BW <sub>channel</sub> )	·		40	
Antenna Configurat	DCI format		1x2 1C	As defined in clause 5.3.3.1.4 in
				TS 36.212
In sync	Number of		2	In sync threshold Q <sub>in</sub> and the
transmission parameters	Control OFDM symbols			corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CC E	4	parameters are as specified in clause and Table 7.6.1-2
			0	respectively.
	ρ <sub>A</sub> , ρ <sub>B</sub> Ratio of PDCCH		0	i respectively.
	to RS EPRE			
	Ratio of PCFICH to RS EPRE		4	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission parameters	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CC E	8	parameters are as specified in clause 7.6.1 and Table 7.6.1-1
	ρ <sub>A</sub> , ρ <sub>B</sub>	_	0	respectively.
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.6.1-3
Layer 3 filtering			Enabled	Counters:
TOLOU		ļ	2000	N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer Periodic CQI report	ina modo	ms	1000 PUCCH 1-	T311 is enabled As defined in table 7.2.2-1 in
•			0	TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Propagation channel	el		AWGN	
T1		S	4	
T2		S	1.6	
T3		S	1.46	
T4		S	0.4	
Note 1: PDCCH/	DCEICH correspond	S ling to the	4	out of sync transmission

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.6.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test # 1 in DRX

Parameter	Unit			Test 1			
		T1	T2	T3	T4	T5	
E-UTRA RF Channel Number		1					
BW <sub>channel</sub>	MHz			10			
Antenna Configuration		1x2					
OCNG Pattern defined in							
A.3.2.1 (FDD)		OP.2 FDD					
ρ <sub>Α</sub> , ρ <sub>Β</sub>				0			
PCFICH_RB	dB			4			
PDCCH_RA	dB	0					
PDCCH_RB	dB	0					
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB			0			
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note1</sup>	dB						
OCNG_RB <sup>Note1</sup>	dB						
SNR Note 8	dB	-4.7	-9.5	-13.5	-8.7	-4.7	
$N_{oc}$	dBm/15	-98					
1 oc	kHz						
Propagation condition		AWGN					
Note 1: OCNG shall be used	such that the	resources in	cell # 1 are f	ully allocated	and a consta	ant total	

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.6.1-1.

Table A.7.3.6.1-3: DRX-Configuration for E-UTRAN FDD in-sync tests

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.6.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD in-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

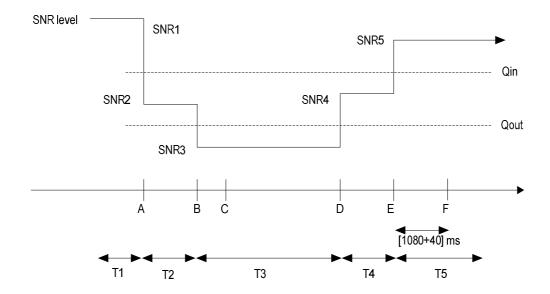


Figure A.7.3.6.1-1 SNR variation for in-sync testing in DRX

### A.7.3.6.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.7 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

## A.7.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.7.1-1, A.7.3.7.1-2, A.7.3.7.1-3 and A.7.3.7.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.7.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.7.1-1: General test parameters for E-UTRAN TDD out-of-sync tests in DRX

Parameter		Unit	Value		Comment	
			Test 1	Test 2		
PCFICH/PDC parameters	PCFICH/PDCCH/PHICH parameters		R.7 TDD	R.6 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are	
					intended for the UE under test	
OCNG param	eters		OP.2 TDD	OP.2 TDD	As specified in clause A.3.2.2.2.	
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length			Normal	Normal		
	Channel Number		1	1	One E-UTRA TDD carrier frequency is used.	
(BWchannel)	nnel Bandwidth	MHz	10	10		
Correlation Mantenna Conf			2x2 Low	1x2	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2	
Out of sync	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212	
transmission parameters (Note 1)	Number of Control OFDM symbols		2	2	Out of sync threshold Qout and the corresponding hypothetical	
	Aggregation level	CCE	8	8	PDCCH/PCFICH transmission parameters	
	ρΑ, ρΒ		-3	0	are as specified in	
	Ratio of PDCCH to RS EPRE	dB	1	4	clause 7.6.1 and Table 7.6.1-1 respectively.	
	Ratio of PCFICH to RS EPRE	dB	1	4		
DRX cycle		ms	40	1280	See Table A.7.3.7.1-3	
Layer 3 filterin	ng		Enabled	Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	0	0	T310 is disabled	
T311 timer		ms	1000	1000	T311 is enabled	
	reporting mode		PUCCH 1-0	PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting		ms	1	1	Minimum CQI reporting periodicity	
Propagation of	hannel		ETU 70 Hz	AWGN		
T1		S	4	32		
T2		S	1.6	12.8		
T3		S	1.8	13		
	COLUDO FIGURA		line at the second			

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.7.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2 in DRX

Parameter	Unit		Test 1			Test 2	
		T1 T2 T3		T1	T2	T3	
E-UTRA RF Channel		_	1	_		1	
Number							
BW <sub>channel</sub>	MHz		10			10	
Correlation Matrix			2x2 Low			1x2	
and Antenna							
Configuration							
Special subframe			6			6	
configuration Note1							
Uplink-downlink			1			1	
configuration Note2							
OCNG Pattern			00 0 755			0D 0 TD 0	
defined in A.3.2.2		OP.2 TDD				OP.2 TDD	
(TDD)		2		0			
ρα, ρΒ		-3					
PCFICH_RB	dB	1			4		
PDCCH_RA	dB		11		4		
PDCCH_RB	dB		1		4		
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB		-3		0		
PHICH_RA	dB		-3			U	
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note3</sup>	dB						
OCNG_RB <sup>Note3</sup>	dB	0.0		44.0			40.1
SNR Note 8	dB	-2.3	-5.9	-11.9	-5.1	-9.1	-13.1
$N_{oc}$	dBm/15		-98			-98	
	kHz		CT11 70 11			440/4/4	
Propagation condition	-1		ETU 70 Hz			AWGN	

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.7.1-1.

Table A.7.3.7.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests

Field	Test1	Test2	Comment
Field	Value	Value	
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

in TS 36.331 and section10.1 in TS 36.213.

sr-ConfigIndex

Field	Test1	Test2	Comment
Fleid	Value	Value	
TimeAlignmentTimer	infinity	infinity	As specified in clause 6.3.2 in TS 36.331
			For further information see clause 6.3.2

2

2

Table A.7.3.7.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD out-of-sync testing

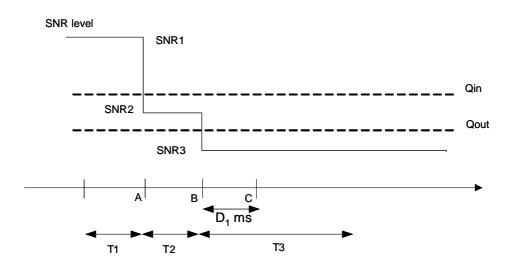


Figure A.7.3.7.1-1 SNR variation for out-of-sync testing in DRX

### A.7.3.7.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

In test 1 the UE shall stop transmitting uplink signal no later than time point C ( $D_1 = 900$  ms after the start of time duration T3).

In test 2 the UE shall stop transmitting uplink signal no later than time point C (duration  $D_1 = 6500$  ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.8 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

## A.7.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.8.1-1, A.7.3.8.1-2, A.7.3.8.1-3 and A.7.3.8.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.8.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and

to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.8.1-1: General test parameters for E-UTRAN TDD in-sync test in DRX

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PI	PCFICH/PDCCH/PHICH parameters		R.6 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	
E-UTRA RF Channe	el Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel B (BW <sub>channel</sub> )		MHz	10	
Antenna Configurat	ion		1x2	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmission parameters	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CCE	4	parameters are as specified in clause and Table 7.6.1-2
	ρ <sub>A</sub> , ρ <sub>B</sub>		0	respectively.
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission parameters	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CCE	8	parameters are as specified in clause 7.6.1 and Table 7.6.1-1
	ρΑ, ρΒ		0	respectively.
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.8.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI report			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting period	dicity	ms	1	Minimum CQI reporting periodicity
Propagation channe	el		AWGN	
T1		S	4	
T2		S	1.6	
T3		S	1.46	
T4 T5		S	0.4	
	PCFICH correspond	ing to the		l out of sync transmission
				Measurement Channel.

Table A.7.3.8.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test # 1 in DRX

Parameter	Unit						
		T1	T2	Т3	T4	T5	
E-UTRA RF Channel Number				1	•	•	
BW <sub>channel</sub>	MHz			10			
Antenna Configuration				1x2			
Special subframe				6			
configuration Note1							
Uplink-downlink				1			
configuration Note2							
OCNG Pattern defined in							
A.3.2.2 (TDD)				OP.2 TDD			
ρ <sub>A</sub> , ρ <sub>B</sub>	<u> </u>			0			
PCFICH_RB	dB	4					
PDCCH_RA	dB	0					
PDCCH_RB	dB	0					
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB			0			
PHICH_RA	dB			0			
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note3</sup>	dB						
OCNG_RB <sup>Note3</sup>	dB		0.4	10.4			
SNR Note 8	dB	-5.1	-9.1	-13.1	-9.1	-5.1	
$N_{oc}$	dBm/15			-98			
	kHz						
Propagation condition		AWGN					

- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and
  - SNR5 respectively in figure A.7.3.8.1-1.

Table A.7.3.8.1-3: DRX-Configuration for E-UTRAN TDD in-sync tests

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.8.1-4: TimeAlignmentTimer - Configuration for E-UTRAN TDD in-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

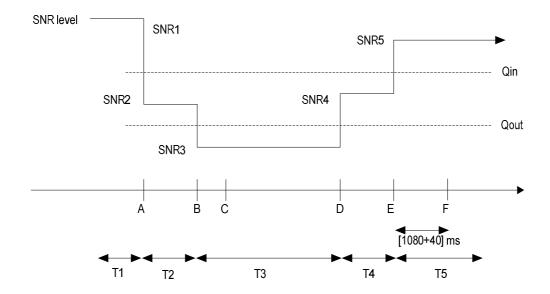


Figure A.7.3.8.1-1 SNR variation for in-sync testing in DRX

### A.7.3.8.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.9 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction and Non-MBSFN ABS

### A.7.3.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.9.1-1 and A.7.3.9.1-2 below. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.9.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.9.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS

Para	meter	Unit	Value	Comment				
PCFICH/PDC	CH/PHICH		R.9.FDD	As specified in clause A.3.1.2.1.				
parameters	parameters			None of the PDCCH are intended for the UE under test				
OCNG parame	eters		OP.6 FDD	As specified in clause A.3.2.1.6.				
Serving cell (F			Cell 1	Cell 1 is on E-UTRA RF channel number 1				
Neighbor cell	<u> </u>		Cell 2	Aggressor cell on E-UTRA RF channel number				
Neighbor cell	ABS		Non-MBSFN ABS	As defined in Table A.3.4.1.2-1				
configuration CP length			Normal					
E-UTRA RF C	hannel		1	One E-UTRA FDD carrier frequency is used.				
Number	TIAITITE!		'	One E-OTTAT DD camer frequency is used.				
	nel Bandwidth	MHz	10					
Correlation Ma	atriv and		2x2 Low	Correlation Matrix and Antenna Configuration				
Antenna Confi			ZAZ LOW	are defined in TS 36.101 [5] Annex B.2.3.2				
Out of sync	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212				
transmission	Number of		3	Out of sync threshold Qout and the				
parameters	Control			corresponding hypothetical PDCCH/PCFICH				
(Note 1)	OFDM			transmission parameters are as specified in				
	symbols			clause 7.6.1 and Table 7.6.1-1 respectively.				
	Aggregation level	CCE	8					
	ρΑ, ρΒ		-3					
	Ratio of	dB	1					
	PDCCH to RS EPRE							
	Ratio of	dB	1					
	PCFICH to RS EPRE							
DRX			OFF					
Layer 3 filterin	g		Enabled	Counters:: N310 = 1; N311 = 1				
T310 timer		ms	0	T310 is disabled				
T311 timer		ms	1000	T311 is enabled				
Periodic CQI r	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.				
CQI reporting		ms	2	Minimum CQI reporting periodicity				
Time offset be	tween cells		3 μs	Synchronous cells				
T1		S	1					
T2		S	0.4					
T3		S	0.5					
Physical cell II	D PCI		(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3!=	Cell IDs are chosen such that CRS from cells 1 and 2 do not overlap in frequency				
ABS pattern			10000000100000001000	FDD ABS Pattern Info IE, as defined in TS				
ADO pattern			0000100000010000000	36.423 [28], clause 9.2.54. Configured in Cell 2.				
				The first/leftmost bit corresponds to the PCell				
				subframe #0 of the radio frame satisfying SFN				
				mod x = 0, where x is the size of the bit string				
				(40) divided by 10. No MBSFN subframes are				
				cofigured in the ABS subframes.				
	measurement		'10000000100000001000	Time domain measurement resource restriction				
	resource restriction pattern					pattern for serving cell measurement signalle		
			00001000000010000000					
			00001000000010000000	to the UE in message				
			00001000000010000000					

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel

Table A.7.3.9.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1				Cell 2	
		T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10			10	
Correlation Matrix			2x2 Low			2x2 Low	
and Antenna							
Configuration							
OCNG Pattern							
defined in A.3.2.1.6			OP.6 FDD			OP.6 FDD	
(FDD)							
ρ <sub>A</sub> , ρ <sub>B</sub>			-3			-3	
PCFICH_RB	dB		1		Non-ABS and ABS subframe channel powers defined in		
PDCCH_RA	dB		1				
PDCCH_RB	dB		1		Table A.3.4.1.2-1.		
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB		_				
PHICH_RA	dB		-3				
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note1</sup>	dB						
OCNG_RB <sup>Note1</sup>	dB						
SNR Note 6	dB	-1.3	-5.4	-12.4		5	
$N_{oc}$	dBm/15		-98			-98	
- · oc	kHz						
Propagation condition			ETU 30 Hz			ETU 30 Hz	

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
- Note 6: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3. 9.1-1.

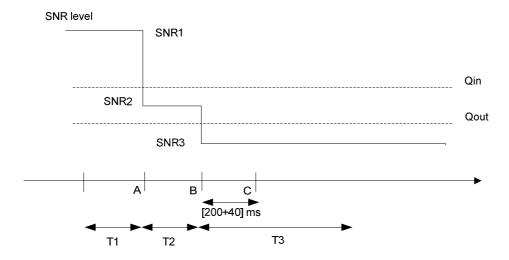


Figure A.7.3.9.1-1 SNR variation for out-of-sync testing

## A.7.3.9.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.10 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.7.3.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.10.1-1 and A.7.3.10.1-2 below. There are two cells, cell 1 is the serving cell and cell 2 is the neighbor aggressor cell. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.10.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Non-MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.10.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS

Par	ameter	Unit	Value	Comment				
PCFICH/PDC	CH/PHICH		R.9 TDD	As specified in clause A.3.1.2.2.				
parameters	parameters			None of the PDCCH are intended for the UE under test				
OCNG param	eters		OP.2 TDD	As specified in clause A.3.2.2.2.				
Serving cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1				
Neighbor cell			Cell 2	Cell 2 is the aggressor cell on E-UTRA RF channel number 1				
Neighbor cell configuration	ABS		Non-MBSFN ABS	As defined in Table A.3.4.1.2-1				
CP length			Normal					
E-UTRA RF C	Channel Number		1	One E-UTRA TDD carrier frequency is used.				
E-UTRA Char (BW <sub>channel</sub> )	nnel Bandwidth	MHz	10					
Correlation Ma Antenna Conf			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2				
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212				
Out of sync transmission parameters	Number of Control OFDM symbols		3	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission				
(Note 1)	Aggregation level	CCE	8	parameters are as specified in clause 7.6.1 and Table 7.6.1-1				
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		-3	respectively.				
	Ratio of PDCCH to RS EPRE	dB	1					
	Ratio of PCFICH to RS EPRE	dB	1					
Physical cell I	D PCI		(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3!=	Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency.				
ABS pattern			1000000001000000000	TDD ABS Pattern Info IE is configured in Cell 2 as defined in clause 9.2.54 in TS 36.423 [28]. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.				
Time domain resource restr			1000000001000000000	MeasSubframePattern IE is configured in UE for serving cell measurement as defined in clause 6.3.6 in TS 36.331.				
DRX			OFF					
Layer 3 filterin	ng		Enabled	Counters: N310 = 1; N311 = 1				
T310 timer		ms	0	T310 is disabled				
T311 timer		ms	1000	T311 is enabled				
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.				
Periodic CQI I		ms	1	Minimum CQI reporting periodicity				
CQI reporting	Time offset between cells		3					
CQI reporting		μs						
CQI reporting	etween cells	μs	ETU30					
CQI reporting Time offset be Propagation of T1	etween cells	μs s	ETU30 1					
CQI reporting Time offset be Propagation of	etween cells	•	ETU30					

the Reference Measurement Channel.

Table A.7.3.10.1-2: Cell specific test parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1				Cell 2				
		T1	T2	Т3	T1	T1 T2 T3				
E-UTRA RF Channel			1			1				
Number										
BW <sub>channel</sub>	MHz		10			10				
Correlation Matrix			2x2 Low			2x2 Low				
and Antenna										
Configuration										
Special subframe			6			6				
configuration Note1										
Uplink-downlink			1			1				
configuration Note2										
OCNG Pattern										
defined in A.3.2.2			OP.2 TDD		OP.2 TDD					
(TDD)					_					
ρа, ρв			-3		-3					
PCFICH_RB	dB		1		Non-ABS and ABS subframe channel powers defined in					
PDCCH_RA	dB		1							
PDCCH_RB	dB		1		Table A.3.4.1.2-1.					
PBCH_RA	dB									
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB		_							
PHICH_RA	dB		-3							
PHICH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 3</sup>	dB									
OCNG RB <sup>NOTE 3</sup>	dB									
SNR Note 8	dB	-1.3	-5.4	-12.4		5				
$N_{oc}$	dBm/15		-98 -98							
	kHz									
Propagation condition			ETU30			ETU30				

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2 and T3 of active cell is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.10.1-1.

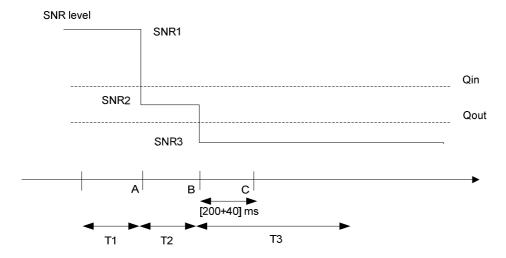


Figure A.7.3.10.1-1 SNR variation in active cell for out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS

# A.7.3.10.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.11 E-UTRAN FDD Radio Link Monitoring Test for In-sync for Non-MBSFN ABS

### A.7.3.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.11.1-1 and A.7.3.11.1-2 below. There are two cells in the test: Cell 1 is the Active cell and Cell 2 is the Neighbor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.11.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.11.1-1: General test parameters for E-UTRAN FDD in-sync testing under time domain measurement resource restriction

Par	ameter	Uni	Value	Comment
PCFICH/PD parameters	CCH/PHICH	t	R.9 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are
•				intended for the UE under test
OCNG para	meters		OP.6 FDD Cell 1	As specified in clause A.3.2.1.6.  Cell 1 is on E-UTRA RF channel
Active cell			Cell I	number 1
Neighbor ce	II		Cell 2	Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources.
Neighbor ce configuration			Non- MBSFN ABS	As defined in Table A.3.4.1.2-2
CP length			Normal	
E-UTRA RF	Channel		1	One E-UTRA FDD carrier
Number	annel Bandwidth	MH	10	frequency is used.
(BWchannel		Z		
Correlation I Antenna Cor	nfiguration		2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmissi on	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission
parameter s for the	Aggregation level	CC E	4	parameters are as specified in clause and Table 7.6.1-2
active cell	ρΑ, ρΒ		-3	respectively.
(Note 1)	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmissi	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission
on parameter	Aggregation level	CC E	8	parameters are as specified in clause 7.6.1 and Table 7.6.1-1
s for active	ρΑ, ρΒ		-3	respectively.
cell (Note 1)	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filter	ring		Enabled	Counters: N310 = 1; N311 = 1
T310 timer T311 timer		ms	2000 1000	T310 is enabled T311 is enabled
	I reporting mode	ms	PUCCH 1-	As defined in table 7.2.2-1 in TS 36.213.
CQI reportin	g periodicity	ms	2	Minimum CQI reporting periodicity
Time offset I	petween cells	μs	3	,
Propagation		•	ETU30	
T1		S	0.5	
T2		S	0.4	

T3	S	1.46	
T4	S	0.4	
T5	s	1	
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod3 != 0	Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency
ABS pattern		(100000001 000000010 000000100 000001000 0000'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern		'100000001 00000010 00000100 000001000	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
			-sync and out of sync

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.11.1-2: Cell specific test parameters for E-UTRAN FDD for in-sync radio link monitoring under time domain measurement resource restriction

Parameter	Unit	Cell 1						Cell 2			
		T1	T2	T3	T4	T5	T1 T2 T3 T4 T5			T5	
E-UTRA RF Channel				1	-				1		
Number											
BW <sub>channel</sub>	MHz			10					10		
Correlation Matrix				2x2 Low	1				2x2 Lo	W	
and Antenna											
Configuration											
PCFICH/PDCCH/PHI				R.9 FDE	)				R.9 FD	D	
CH parameters											
Number of Control				3					3		
OFDM symbols											
OCNG Pattern											
defined in A.3.2.1.6				OP.6 FD	D			(	OP.6 FI	DD	
(FDD)											
ρ <sub>A</sub> , ρ <sub>B</sub>				-3					-3		
PCFICH_RB	dB			11			Non-ABS and ABS subframe				
PDCCH_RA	dB			-3			channel powers defined in Table				
PDCCH_RB	dB			-3				А	3.4.1.2	2-2.	
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB			0							
PHICH_RA	dB			-3							
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG RBNote 1	dB										
SNR Note 6	dB	-1.3	-5.4	-12.4	-7.3	-1.3			5		
$N_{oc}$	dBm/15	-98							-98		
	kHz			ETIJOO					ETUS	0	
Propagation condition		ETU30					ETU30				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.

Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 6: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.11.1-1.

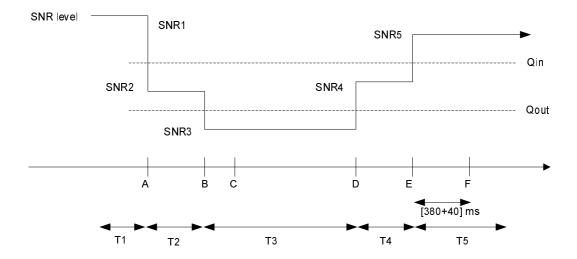


Figure A.7.3.11.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction

## A.7.3.11.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.12 E-UTRAN TDD Radio Link Monitoring Test for In-sync for Non-MBSFN ABS

#### A.7.3.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.12.1-1 and A.7.3.12.1-2 below. There are two cells in the test: Cell 1 is the Active cell and Cell 2 is the Neighbor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.12.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Non-MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.12.1-1: General test parameters for E-UTRAN TDD in-sync testing under time domain measurement resource restriction

Par	ameter	Uni t	Value	Comment
PCFICH/PD parameters	PCFICH/PDCCH/PHICH parameters		R.9 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parar	meters		OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor ce			Cell 2	Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources.
Neighbor ce configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.2-
CP length			Normal	
E-UTRA RF Number	Channel		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Cha (BWchannel	annel Bandwidth	MH z	10	
Correlation M Antenna Cor	Matrix and		2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmissi on	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission
parameter s for the	Aggregation level	CC E	4	parameters are as specified in clause and Table 7.6.1-2
active cell	ρΑ, ρΒ		-3	respectively.
(Note 1)	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmissi	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH
on parameter	Aggregation level	CC E	8	transmission parameters are as specified in clause 7.6.1
s for active	ρΑ, ρΒ		-3	and Table 7.6.1-1
cell (Note 1)	Ratio of PDCCH to RS EPRE	dB	1	respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filter	ing		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
	I reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reportin		ms	1	Minimum CQI reporting periodicity
Time offset b	oetween cells	μs	3	
Propagation	channel		ETU30	

T1	S	0.5	
T2	S	0.4	
T3	S	1.46	
T4	S	0.4	
T5	S	1	
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod3 != 0	Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency
ABS pattern		1000000000 1000000000	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern		100000000 1000000000	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2. Configured in Cell 1.

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.12.1-2: Cell specific test parameters for E-UTRAN TDD for in-sync radio link monitoring under time domain measurement resource restriction

Parameter	Unit	Cell 1						Cell 2					
		T1	T2	T3	T4	T1 T2 T3 T4 T5							
E-UTRA RF Channel				1			1						
Number													
BW <sub>channel</sub>	MHz			10									
Correlation Matrix				2x2 Low					2x2 Lc	w			
and Antenna													
Configuration													
Special subframe				6					6				
configuration Note1													
Uplink-downlink				1					1				
configuration Note2													
PCFICH/PDCCH/PHI				R.9 TDD	)				R.9 TE	D			
CH parameters													
Number of Control				3					3				
OFDM symbols													
OCNG Pattern													
defined in A.3.2.2				OP.2 TDI	)			(	OP.2 T	DD			
(TDD)													
$\rho_A,\rho_B$				-3			-3						
PCFICH_RB	dB			1			Non-ABS and ABS subframe						
PDCCH_RA	dB			-3			channel powers defined in Table						
PDCCH_RB	dB			-3			A.3.4.1.2-2.						
PBCH_RA	dB						1						
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PHICH_RA	dB			-3									
PHICH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA <sup>Note 3</sup>	dB												
OCNG RB <sup>Note 3</sup>	dB												
SNR Note 8	dB	-1.3	-5.4	-12.4	-7.3	-1.3			5				
λI	dBm/15			-98					-98		-		
$N_{oc}$	kHz												
Propagation condition				ETU30				ETU30					

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.12.1-1.

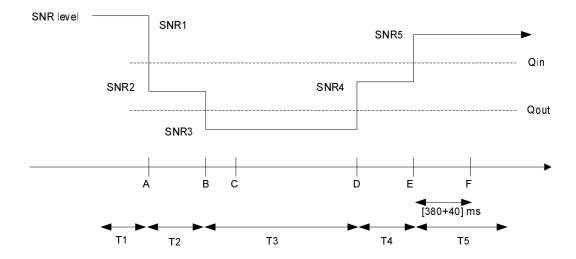


Figure A.7.3.12.1-1 SNR variation in active cell for in-sync testing under time domain measurement resource restriction

## A.7.3.12.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.13 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

# A.7.3.13.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.13.1-1 and A.7.3.13.1-2 below. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.13.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.13.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with MBSFN ABS

Parar	neter	Unit	Value	Comment
PCFICH/PDC0	CH/PHICH		R.9.FDD	As specified in clause A.3.1.2.1.
parameters				None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.6 FDD for the serving	As specified in clause A.3.2.1.6 and A.3.2.1.9
			cell (Cell 1)	respectively
			OP.9 FDD for the	
0 : 11/5	-0 "		neighbour cell (Cell 2)	O H ( ) E LITRA DE L
Serving cell (P	Cell)		Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cell			Cell 2	Aggressor cell on E-UTRA RF channel number 1
Neighbor cell A	ABS		MBSFN ABS	As defined in Table A.3.4.2.2-1
configuration				
CP length			Normal	
E-UTRA RF C	hannel		1	One E-UTRA FDD carrier frequency is used.
Number	15 1 1 11		10	
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	
Correlation Ma			2x2 Low	Correlation Matrix and Antenna Configuration
Antenna Confi				are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmission	Number of		3	Out of sync threshold Qout and the
parameters	Control			corresponding hypothetical PDCCH/PCFICH
(Note 1)	OFDM			transmission parameters are as specified in
	symbols	CCE	8	clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE		
	ρα, ρв		-3	
	Ratio of	dB	1	
	PDCCH to			
	RS EPRE			
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering	g		Enabled	Counters:: N310 = 1; N311 = 1
T310 timer	<u> </u>	ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI re	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	-	ms	2	Minimum CQI reporting periodicity
Time offset be	tween cells		3 μs	Synchronous cells
T1		S	1	
T2		S	0.4	
T3		s	0.5	
Physical cell ID	) PCI	-	(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> ) mod 3 =	Cell IDs are chosen such that CRS from cells 1
i riyəldal deli iL	J 1 OI		0, PCI <sub>cell1</sub> not equal to	and 2 overlap in frequency
			PCI <sub>cell2</sub>	and 2 overlap in nequency
ABS pattern			'010000010000001000	FDD ABS Pattern Info IE, as defined in TS
				36.423 [28], clause 9.2.54. Configured in Cell 2.
			00000010000001000000'	
			00000010000001000000'	The first/leftmost bit corresponds to the PCell
			00000010000001000000	The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN
			00000010000001000000'	The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string
			00000010000001000000'	The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are
Time				The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes.
Time domain n			'01000000100000001000	The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes.  Time domain measurement resource restriction
Time domain r resource restri				The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes.  Time domain measurement resource restriction pattern for serving cell measurement signalled
			'01000000100000001000	The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes.  Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePattern-
resource restri	ction pattern	Orrespon	'0100000010000001000 00000010000001000000	The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes.  Time domain measurement resource restriction pattern for serving cell measurement signalled

Table A.7.3.13.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit		Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		1			
Number								
BW <sub>channel</sub>	MHz		10			10		
Correlation Matrix			2x2 Low			2x2 Low		
and Antenna								
Configuration								
OCNG Pattern								
defined in A.3.2.1			OP.6 FDD			OP.9 FDD		
(FDD)								
ρ <sub>Α</sub> , ρ <sub>в</sub>			-3		-3			
PCFICH_RB	dB		11		Non-ABS and ABS subframe			
PDCCH_RA	dB		1		channel powers defined in Table A.3.4.2.2-1.			
PDCCH_RB	dB		11					
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB		_					
PHICH_RA	dB		-3					
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note1</sup>	dB							
OCNG_RB <sup>Note1</sup>	dB							
SNR Note 6	dB	-1.3	-5.4	-12.4		5		
$N_{oc}$	dBm/15 kHz		-98		-98			
Propagation condition			ETU 30 Hz			ETU 30 Hz		
		_ L						

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
- Note 6: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.13.1-1.

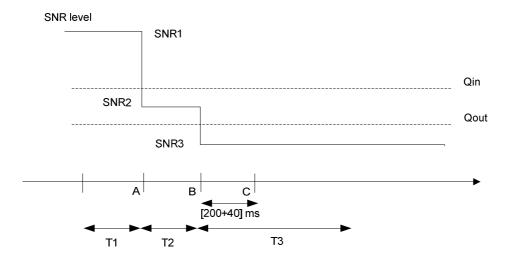


Figure A.7.3.13.1-1 SNR variation for out-of-sync testing

## A.7.3.13.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.14 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

# A.7.3.14.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.14.1-1 and A.7.3.14.1-2 below. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.14.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.14.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with MBSFN ABS

Para	meter	Unit	Value	Comment
PCFICH/PDC0 parameters	CH/PHICH		R.9.TDD	As specified in clause A.3.1.2.1.  None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.2 TDD for the serving cell (Cell 1) OP.6 TDD for the neighbour cell (Cell 2)	As specified in clause A.3.2.2.2 and A.3.2.2.6 respectively
Serving cell (F	Cell)		Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cell			Cell 2	Aggressor cell on E-UTRA RF channel number 1
Neighbor cell a configuration	ABS		MBSFN ABS	As defined in Table A.3.4.2.2-1
CP length			Normal	
E-UTRA RF C Number	hannel		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	
Correlation Ma			2x2 Low	Correlation Matrix and Antenna Configuration
Antenna Confi				are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync	DCI format	<u> </u>	1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmission parameters (Note 1)	Number of Control OFDM symbols		3	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρΑ, ρΒ		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX	•		OFF	
Layer 3 filterin	g		Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer	eporting mode	ms	1000 PUCCH 1-0	T311 is enabled  As defined in table 7.2.2-1 in TS 36.213.
CQI reporting		ms	1	Minimum CQI reporting periodicity
Time offset be	tween cells		3 μs	Synchronous cells
T1		S	1	
T2		S	0.4	
T3		S	0.5	
Physical cell II	D PCI		(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> ) mod 3 = 0, PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	Cell IDs are chosen such that CRS from cells 1 and 2 overlap in frequency
ABS pattern			'0000100000000100000'	MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. All ABS subframes are MBSFN subframes.
Time domain resource restri	ction pattern		'0000100000000100000'	Time-domain measurement resource restriction pattern for serving cell measurements signalled to the UE in message measSubframePattern-Serv-r10 as defined in TS 36.331, clause 6.3.2.
	CCH/PCFICH co erence Measure			nission parameters need not be included in the

**ETSI** 

Table A.7.3.14.1-2: Cell specific test parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit		Cell 1		Cell 2				
		T1	T2	Т3	T1	T2	Т3		
E-UTRA RF Channel			1			1			
Number									
BW <sub>channel</sub>	MHz		10			10			
Special subframe configuration Note1			6			6			
Uplink-downlink configuration Note2			1			1			
Correlation Matrix and Antenna Configuration			2x2 Low			2x2 Low			
OCNG Pattern defined in A.3.2.2 (TDD)			OP.2 TDD		OP.6 TDD				
ρа, ρв			-3		-3				
PCFICH_RB	dB		1		Non-ABS and ABS subframe				
PDCCH_RA	dB		1		channel powers defined in				
PDCCH_RB	dB		1		Table A.3.4.2.2-1.				
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB		_						
PHICH_RA	dB		-3						
PHICH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note3</sup>	dB								
OCNG_RB <sup>Note3</sup>	dB								
SNR Note 7,8	dB	-1.3	-5.4	-12.4		5			
$N_{oc}$	dBm/15 kHz		-98			-98			
Propagation condition			ETU 30 Hz	<u> </u>		ETU 30 Hz			

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink subframe configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
- Note 8: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.7.3.14.1-1.

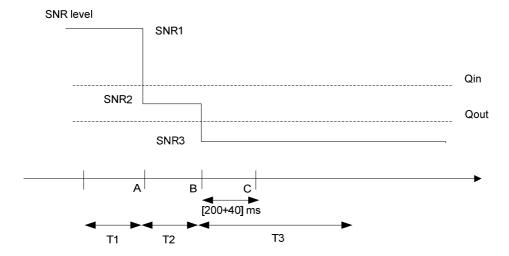


Figure A.7.3.14.1-1 SNR variation for out-of-sync testing

## A.7.3.14.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.15 E-UTRAN FDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

### A.7.3.15.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.15.1-1 and A.7.3.15.1-2 below. There are two cells, cell 1 is the serving cell and cell 2 is the neighbour aggressor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.15.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.15.1-1: General test parameters for E-UTRAN FDD in-sync testing under time domain measurement resource restriction with MBSFN ABS

Para	ımeter	Unit	Value	Comment				
PCFICH/PDCC			R.9 FDD	As specified in clause A.3.1.2.1.				
parameters				None of the PDCCH are intended for the UE under test				
Serving cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1				
Neighbour cell			Cell 2	Cell 2 is the aggressor cell on E- UTRA RF channel number 1				
Neighbour cell configuration	ABS		MBSFN ABS	As defined in Table A.3.4.2.2-2				
OCNG parame	eters for Cell 1		OP.6 FDD	As specified in clause A.3.2.1.6.				
OCNG parame			OP.9 FDD	As specified in clause A.3.2.1.9.				
CP length			Normal					
Neighbor cell A configuration			MBSFN ABS					
E-UTRA RF C	nannel Number		1	One E-UTRA FDD carrier frequency is used.				
E-UTRA Chani (BWchannel)	nel Bandwidth	MHz	10					
Correlation Ma Configuration	trix and Antenna		2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2				
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212				
In sync transmission parameters	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission				
(Note 1)	Aggregation level	CCE	4	parameters are as specified in clause and Table 7.6.1-2				
	ρΑ, ρΒ		-3	respectively.				
	Ratio of PDCCH to RS EPRE	dB	-3					
	Ratio of PCFICH to RS EPRE	dB	1					
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212				
Out of sync transmission parameters	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission				
(Note 1)	Aggregation level	CCE	8	parameters are as specified in clause 7.6.1 and Table 7.6.1-1				
	ρΑ, ρΒ		-3	respectively.				
	Ratio of PDCCH to RS EPRE	dB	1					
	Ratio of PCFICH to RS EPRE	dB	1					
Physical cell ID			(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> ) mod 3 =	Cell IDs are chosen such that CRS				
			0, PCIcell1 not equal to PCIcell2	from cells 1 and 2 overlap in frequency.				
ABS pattern			01000000100000010000 0000010000001000000	FDD ABS Pattern Info IE is configured in Cell 2 as defined in clause 9.2.54 in TS 36.423 [28]. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. All ABS subframes are MBSFN subframes.				
Time domain n	neasurement		010000001000000010000	MeasSubframePattern IE is				

resource restriction pattern		0000010000001000000	configured in UE for serving cell measurement as defined in
			clause 6.3.6 in TS 36.331.
DRX		OFF	
Layer 3 filtering		Enabled	Counters:
-			N310 = 1; N311 = 1
T310 timer	ms	2000	T310 is enabled
T311 timer	ms	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS
			36.213.
CQI reporting periodicity	ms	2	Minimum CQI reporting periodicity
Time offset between cells	μs	3	
Propagation channel		ETU30	
T1	S	0.5	
T2	S	0.4	
T3	S	1.46	
T4	S	0.4	
T5	S	1	

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Table A.7.3.15.1-2: Cell specific test parameters for E-UTRAN FDD for in-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Cell 1						Cell 2					
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5		
E-UTRA RF Channel				1					1				
Number													
BW <sub>channel</sub>	MHz	10						10					
Correlation Matrix				2x2 Lov	٧				2x2 Lo	W			
and Antenna													
Configuration													
OCNG Pattern					_								
defined in A.3.2.1				OP.6 FD	D			(	OP.9 FI	DD D			
(FDD)													
ρα, ρΒ				-3					-3				
PCFICH_RB	dB			1			Non-ABS and ABS subframe						
PDCCH_RA	dB			-3			channel powers defined in Table						
PDCCH_RB	dB			-3			A.3.4.2.2-2.						
PBCH_RA	dB												
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB			0									
PHICH_RA	dB			-3									
PHICH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA <sup>Note 1</sup>	dB												
OCNG_RB <sup>Note 1</sup>	dB												
SNR Note 6	dB	-1.3 -5.4 -12.4 -7.3 -1.3							5				
$N_{oc}$	dBm/15			-98					-98				
	kHz												
Propagation condition				ETU30					ETU3	U			

- Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.15.1-1.

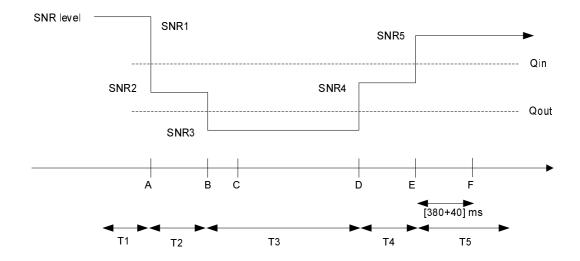


Figure A.7.3.15.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction with MBSFN ABS

## A.7.3.15.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.16 E-UTRAN TDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

#### A.7.3.16.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.16.1-1 and A.7.3.16.1-2 below. There are two cells, cell 1 is the serving cell and cell 2 is the neighbour aggressor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.15.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.16.1-1: General test parameters for E-UTRAN TDD in-sync testing under time domain measurement resource restriction with MBSFN ABS

Para	ımeter	Unit	Value	Comment
PCFICH/PDCC			R.9 TDD	As specified in clause A.3.1.2.2.
parameters				None of the PDCCH are intended for the UE under test
Serving cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbour cell			Cell 2	Cell 2 is the aggressor cell on E- UTRA RF channel number 1
Neighbour cell configuration	Neighbour cell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.2-2
OCNG parame	eters for Cell 1		OP.2 TDD	As specified in clause A.3.2.2.2.
OCNG parame			OP.6 TDD	As specified in clause A.3.2.2.6.
CP length			Normal	
Neighbor cell A configuration			MBSFN ABS	
E-UTRA RF CI	nannel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Chan (BWchannel)	nel Bandwidth	MHz	10	
Correlation Ma Configuration	trix and Antenna		2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmission parameters	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CCE	4	parameters are as specified in clause and Table 7.6.1-2
	ρΑ, ρΒ		-3	respectively.
	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission parameters	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CCE	8	parameters are as specified in clause 7.6.1 and Table 7.6.1-1
	ρΑ, ρΒ		-3	respectively.
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Physical cell ID			(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> ) mod 3 =	Cell IDs are chosen such that CRS
·			0, PCIcell1 not equal to PCIcell2	from cells 1 and 2 overlap in frequency.
ABS pattern			00001000000000100000	TDD ABS Pattern Info IE is configured in Cell 2 as defined in clause 9.2.54 in TS 36.423 [28]. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. All ABS subframes are MBSFN subframes.
Time domain n	neasurement		00001000000000100000	MeasSubframePattern IE is

resource restriction pattern			configured in UE for serving cell measurement as defined in clause 6.3.6 in TS 36.331.
DRX		OFF	
Layer 3 filtering		Enabled	Counters: N310 = 1; N311 = 1
T310 timer	ms	2000	T310 is enabled
T311 timer	ms	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	1	Minimum CQI reporting periodicity
Time offset between cells	μs	3	-
Propagation channel		ETU30	
T1	S	0.5	
T2	S	0.4	
T3	S	1.46	
T4	S	0.4	
T5	S	1	

Table A.7.3.16.1-2: Cell specific test parameters for E-UTRAN TDD for in-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Cell 1 T1 T2 T3 T4 T5						Cell 2	2		
						T1 T2 T3 T4 T5					
E-UTRA RF Channel		1			1						
Number											
BW <sub>channel</sub>	MHz			10					10		
Correlation Matrix				2x2 Lov	٧				2x2 Lc	W	
and Antenna											
Configuration											
Special subframe				6					6		
configuration Note1											
Uplink-downlink				1					1		
configuration <sup>Note2</sup>											
OCNG Pattern											
defined in A.3.2.2			(	OP.2 TD	D			(	OP.6 TI	DD	
(TDD)											
ρΑ, ρΒ				-3					-3		
PCFICH_RB	dB			1			Non-ABS and ABS subframe				
PDCCH_RA	dB			-3			channel powers defined in Table				
PDCCH_RB	dB			-3			A.3.4.2.2-2.				
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB			_							
PHICH_RA	dB			-3							
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG RR <sup>Note 1</sup>	dB										
SNR Note 8	dB	-1.3	-5.4	-12.4	-7.3	-1.3			5		
$N_{oc}$	dBm/15	-98			-98						
	kHz										
Propagation condition		ETU30						ETU3	0		

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.16.1-1.

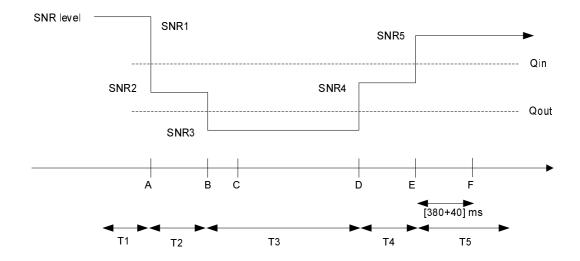


Figure A.7.3.16.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction with MBSFN ABS

### A.7.3.16.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.17 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

### A.7.3.17.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.17.1-1 and A.7.3.17.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.17.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing Pcell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2 and T3 in this test. The non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.17.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Para	meter	Unit	Value	Comment
PCFICH/PDC	CH/PHICH		R.7 FDD	As specified in clause A.3.1.2.1.
parameters				None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.6 FDD	As specified in section A.3.2.1.6.
PCell	31010		Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cells	i		Cell 2 and Cell 3	Both of aggressor cells on E-UTRA RF channel number 1
	Neighbor cell ABS		Non-MBSFN ABS	As defined in Table A.3.4.1.2-1
configuration			N	
CP length			Normal	0 5 1170 4 500
E-UTRA RF C Number	nannei		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	
Correlation Ma			2x2 Low	Correlation Matrix and Antenna Configuration
Antenna Confi				are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmission	Number of		2	Out of sync threshold Qout and the
parameters	Control			corresponding hypothetical PDCCH/PCFICH
(Note 1)	OFDM			transmission parameters are as specified in
	symbols			clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρΑ, ρΒ		-3	
	Ratio of	dB	1	
	PDCCH to RS EPRE			
	Ratio of PCFICH to	dB	1	
	RS EPRE			
DRX			OFF	
Layer 3 filterin	g		Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI r	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	· ·	ms	2	Minimum CQI reporting periodicity
Time offset be	tween cells	μs	Cell 2 time offset with	Three synchronous cells
			respect to Cell 1: 3	
			Cell 3 time offset with	
			respect to Cell 1: 2	
Frequency shi	ft between	Hz	Cell 2 frequency shift with	
cells			respect to Cell 1: 300	
			Cell 3 frequency shift with	
			respect to Cell 1: -100	
T1		S	1	
T2		S	0.4	
T3		S	0.5	
			(PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0	Cell PCIs are selected so that all conditions are
	_		(PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0	met
Physical cell II	Os		PCI <sub>cell1</sub> not equal to	mot
			PCI <sub>cell2</sub>	
ABS pattern			'100000010000001000	FDD ABS Pattern Info IE, as defined in TS
ABO pattern			00001000000010000000	36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes.
				Configured in both Cell 2 and Cell 3 prior to the start of T1.

	Time domain measurement resource restriction pattern		'100000010000001000 00001000000010000000'	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.				
CRS	physCellId		see PCI conditions above	The CRS assistance information is provided for				
assistance information	antennaPort sCount		an2	Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig				
	mbsfn- SubframeCo nfigList		oneFrame = '000000'	element with subframe allocation oneFrame='000000'				
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the								
Ref	erence Measure	Reference Measurement Channel						

Table A.7.3.17.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter	Unit	Cell 1		Cell 2	Cell 3					
		T1 T2 T3			T1-T3	T1-T3				
E-UTRA RF Channel		1			1	1				
Number										
BW <sub>channel</sub>	MHz		10		10	10				
Correlation Matrix			2x2 Low		2x2 Low	2x2 Low				
and Antenna										
Configuration										
OCNG Pattern										
defined in A.3.2.1.6			OP.6 FDD		OP.6 FDD	OP.6 FDD				
(FDD)										
ρа, ρв		-3			-3	-3				
PCFICH_RB	dB		1		Non-ABS and	Non-ABS and				
PDCCH_RA	dB		11		ABS subframe	ABS subframe				
PDCCH_RB	dB		1		channel powers	channel powers				
PBCH_RA	dB				defined in Table	defined in Table				
PBCH_RB	dB				A.3.4.1.2-1.	A.3.4.1.2-1.				
PSS_RA	dB									
SSS_RA	dB		•							
PHICH_RA	dB		-3							
PHICH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note1</sup>	dB									
OCNG_RB <sup>Note1</sup>	dB									
SNR Note 6	dB	-1.5	-1.5 -5.2 -13.7		-1.5 -5.2 -13.7		-1.5 -5.2 -13.7		4	2
$N_{oc}$	dBm/15		-98		-98	-98				
	kHz									
Propagation condition		ETU 30 Hz			ETU 30 Hz	ETU 30 Hz				

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS RFs.
- Note 6: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.17.1-1.

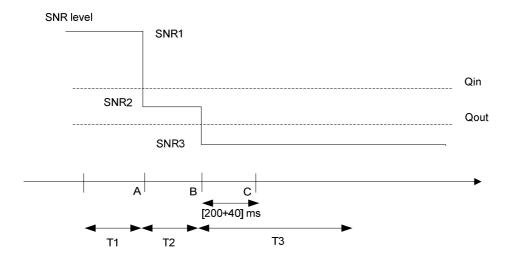


Figure A.7.3.17.1-1 SNR variation for out-of-sync testing

### A.7.3.17.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.18 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

### A.7.3.18.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.18.1-1 and A.7.3.18.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.18.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing Pcell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2 and T3 in this test. The non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.18.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Parai	neter	Unit	Value	Comment
PCFICH/PDC0	CH/PHICH		R.7.TDD	As specified in clause A.3.1.2.2.
parameters				None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.2 TDD	As specified in clause A.3.2.2.2
PCell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cells			Cell 2 and Cell 3	Both of aggressor cells on E-UTRA RF channel number 1
Neighbor cell ABS			Non-MBSFN ABS	As defined in Table A.3.4.1.2-1
configuration CP length			Normal	
E-UTRA RF C	hannal		1	One FUTDA TDD corrier fraguency is used
Number	nannei		I	One E-UTRA TDD carrier frequency is used.
E-UTRA Chan (BW <sub>channel</sub> )		MHz	10	
Correlation Ma			2x2 Low	Correlation Matrix and Antenna Configuration
Antenna Confi				are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmission	Number of		2	Out of sync threshold Qout and the
parameters	Control			corresponding hypothetical PDCCH/PCFICH
(Note 1)	OFDM			transmission parameters are as specified in
	symbols			clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρα, ρв		-3	
	Ratio of	dB	1	
	PDCCH to RS EPRE			
	Ratio of PCFICH to	dB	1	
	RS EPRE			
DRX			OFF	
Layer 3 filtering	g		Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI r	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting		ms	1	Minimum CQI reporting periodicity
Time offset be	tween cells	μs	Cell 2 time offset with	Three synchronous cells
			respect to Cell 1: 3	
			Cell 3 time offset with	
			respect to Cell 1: 2	
Frequency shi	ft between	Hz	Cell 2 frequency shift with	
cells			respect to Cell 1: 300	
			Cell 3 frequency shift with	
				i e
			respect to Cell 1: -100	
T1		S	respect to Cell 1: -100	
T1 T2		S S		
			1	
T2		S	1 0.4 0.5	Cell PCIs are selected so that all conditions are
T2 T3		S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0	Cell PCIs are selected so that all conditions are
T2	Os .	S	1 0.4 0.5	Cell PCIs are selected so that all conditions are met
T2 T3	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0	
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	met
T2 T3	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to	met  TDD ABS Pattern Info IE, as defined in TS
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS
T2 T3 Physical cell II	Os	S	1 0.4 0.5 (PCI <sub>cell1</sub> -PCI <sub>cell2</sub> )mod3 = 0 (PCI <sub>cell1</sub> -PCI <sub>cell3</sub> )mod3!= 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No

Time domain i resource restr			'00001000000000100000'	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.		
CRS	physCellId		see PCI conditions above	The CRS assistance information is provided for		
assistance information	antennaPort sCount		an2	Cell 2 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with		
	mbsfn- SubframeCo nfigList		oneFrame = '000000'	subframe allocation oneFrame='000000'		
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel						

Table A.7.3.18.1-2: Cell specific test parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2	Cell 3
		T1 T2 T3	T1-T3	T1-T3
E-UTRA RF Channel		1	1	1
Number				
BW <sub>channel</sub>	MHz	10	10	10
Special subframe		6	6	6
configuration Note1				
Uplink-downlink		1	1	1
configuration <sup>Note2</sup>				
Correlation Matrix		2x2 Low	2x2 Low	2x2 Low
and Antenna				
Configuration				
OCNG Pattern				
defined in A.3.2.2.2		OP.2 TDD	OP.2 TDD	OP.2 TDD
(TDD)			_	
ра, рв		-3	-3	-3
PCFICH_RB	dB	1	Non-ABS and	Non-ABS and
PDCCH_RA	dB	1	ABS subframe	ABS subframe
PDCCH_RB	dB	1	channel powers	channel powers
PBCH_RA	dB		defined in Table	defined in Table
PBCH_RB	dB		A.3.4.1.2-1.	A.3.4.1.2-1.
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB	-3		
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note1</sup>	dB			
OCNG_RB <sup>Note1</sup>	dB			
SNR Note 6	dB	-1.5 -5.2 -13.7	4	2
$N_{oc}$	dBm/15	-98	-98	-98
1 oc	kHz			
Propagation condition		ETU 30 Hz	ETU 30 Hz	ETU 30 Hz
· · · · · · · · · · · · · · · · · · ·				

- Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
- Note 2: For the uplink-downlink subframe configuration see table 4.2-2 in TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs
- Note 8: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.7.3.18.1-1.

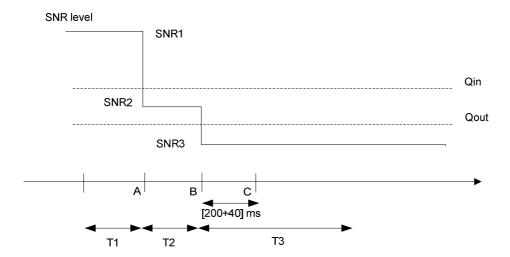


Figure A.7.3.18.1-1 SNR variation for out-of-sync testing

### A.7.3.18.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

### A.7.3.19 E-UTRAN FDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and Non-MBSFN ABS

### A.7.3.19.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.19.1-1 and A.7.3.19.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.19.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The Non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.19.1-1: General test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter		Unit		Value		Comment	
			2 !! 1	Test 1	0 !! 0		
PCFICH/PDC0 parameters	PCFICH/PDCCH/PHICH parameters		Cell 1 R.9 FDD	R.9 FDD	R.9 FDD	As specified in section A.3.1.2.1. None of the PDCCH are	
						intended for the UE under test	
OCNG parameters			OP.6 FDD	OP.6 FDD	OP.6 FDD	As specified in section A.3.2.1.6.	
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1	
CP length			Normal	Normal	Normal		
	hannel Number		1	1	1	One E-UTRA FDD carrier frequency is used.	
E-UTRA Chan (BW <sub>channel</sub> )		MHz	10	10	10		
Correlation Ma Antenna Confi	guration		2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2	
Neighbor Cell configuration	ABS		N/A	Non-MBSFN /	ABS	As defined in Table A.3.4.1.2-2	
ABS Pattern			N/A	'100000001 0000000100 0	'100000001 0000000100 0	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.	
Time domain r	neasurement		100000001	0000100000 0010000000 ,	0000100000 0010000000 ,	The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.  Configured in both Cell 2 and Cell 3 prior to the start of T1.	
resource restri	ction pattern		000000100 000010000 000100000 0'			measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCe II-r10 as defined in TS 36.331, clause 6.3.2.	
CRS assistant information	physCellId		N/A	see PCI conditions below	see PCI conditions below	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-	
	antennaPorts Count			an2	an2	AssistanceInfo. It includes a single MBSFN-	
	mbsfn- SubframeCo nfigList			oneFrame = '000000'	oneFrame = '000000'	SubframeConfig element with subframe allocation oneFrame='000000'	
Time offset be (With respect t	o Cell 1)	us	0	3	2		
	ft between cells	Hz	0	300	-100		
Physical Cell I			PCI <sub>cell1</sub>	(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> ) mod3 = 0, PCI <sub>cell1</sub> not equal to	(PCI <sub>cell1</sub> - PCI <sub>cell3</sub> ) mod3! = 0	Cell PCIs are selected so that all conditions are met	

				PCI <sub>cell2</sub>				
In sync transmis	ssion	DCI	1C	1C	1C			
parameters (No		format		. •	. •			
In sync transmission	Number of Control OFDM symbols		3	3	3	As defined in section 5.3.3.1.4 in TS 36.212		
parameters (Note 1)	Aggregatio n level	CCE	4	4	4	In sync threshold Q <sub>in</sub> and the corresponding		
	$\rho_A$ , $\rho_B$		-3	-3	-3	hypothetical		
	Ratio of PDCCH to RS EPRE		-3	Non-ABS and subframe cha defined in Tab		PDCCH/PCFICH transmission parameters are as specified in section		
	Ratio of PCFICH to RS EPRE		1			and Table 7.6.1-2 respectively.		
	DCI format		1A	1A	1A			
Out of sync transmission parameters	Number of Control OFDM symbols		3	3	3	As defined in section 5.3.3.1.3 in TS 36.212		
(Note 1)	Aggregatio n level	CCE	8	8	8	Out of sync threshold Q <sub>out</sub> and the corresponding		
	ρΑ, ρΒ		-3	-3	-3	hypothetical PDCCH/PCFICH transmission parameters are as specified in section		
	Ratio of PDCCH to RS EPRE	dB	1	Non-ABS and subframe cha defined in Tak				
	Ratio of PCFICH to RS EPRE	dB	1			7.6.1 and Table 7.6.1-1 respectively.		
DRX			OFF	OFF	OFF			
Layer 3 filtering			Enabled	Disable	Disable	Counters: N310 = 1; N311 = 1		
T310 timer		ms	2000	N/A		T310 is enabled		
T311 timer		ms	1000			T311 is enabled		
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1 in TS 36.213.		
CQI reporting periodicity		ms	2			Minimum CQI reporting periodicity		
T1		S	0.5	N/A				
T2		S	0.4					
T3		S	1.46					
T4		S	0.4					
T5		S	1					
Nata 4. DDC						4 1 41		

Table A.7.3.19.1-2: Cell specific test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter	Unit	Test 1						
		Cell1			Cell2	Cell3		
		T1	T2	Т3	T4	T5	T1-T5	T1-T5
E-UTRA RF Channel				1			1	1
Number								
BW <sub>channel</sub>	MHz			10			10	10
Correlation Matrix				2x2 Low			2x2 Low	2x2 Low
and Antenna								
Configuration								
PCFICH/PDCCH/PHI				R.9 FDD			R.9 FDD	R.9 FDD
CH parameters								
OCNG Pattern								
defined in A.3.2.1				OP.6 FDD	)		OP.6 FDD	OP.6 FDD
(FDD)								
ρа, ρв				-3			-3	-3
PCFICH_RB	dB			11				ABS subframe
PDCCH_RA	dB							ers defined in
PDCCH_RB	dB						l able A.	3.4.1.2-2.
PBCH_RA	dB							
PBCH_RB	dB			•				
PSS_RA	dB			-3				
SSS_RA	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
SNR Note 6	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2
$N_{oc}$	dBm/15			-98			-98	-98
1 oc	kHz							
Propagation condition	Hz			ETU 30			ETU 30	ETU 30

- Note 1: OCNG shall be used such that the resources in cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.19.1-1.

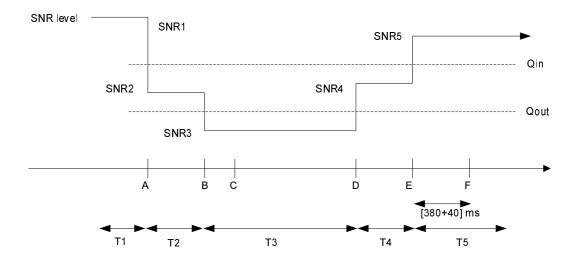


Figure A.7.3.19.1-1 SNR variation for in-sync testing

### A.7.3.19.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.20 E-UTRAN TDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and Non-MBSFN ABS

### A.7.3.20.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.20.1-1 and A.7.3.20.1-2 below. There are three active cells in the test: Cell 1 is the PCell and Cell 2 and 3 are the Neighbor cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.20.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The Non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.20.1-1: General test parameters for E-UTRAN TDD in-sync radio link monitoring test

Para	meter	Unit		Value		Comment
				Test 1		
			Cell 1	Cell 2	Cell 3	
PCFICH/PDCC parameters			R.9 TDD	R.9 TDD	R.9 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parame	eters		OP.2 TDD	OP.2 TDD	OP.2 TDD	As specified in section A.3.2.2.2.
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	
E-UTRA RF CI	hannel Number		1	1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	10	10	
Correlation Ma Antenna Config			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Neighbor Cell of configuration	ABS		N/A	Non-MBSFN /	ABS	As defined in Table A.3.4.1.2-1
ABS Pattern			N/A	'000010000 0000010000 0'	'000010000 0000010000 0'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2 and Cell 3. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes.
Time domain n resource restric			'000010000 0000010000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCe II-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistant	physCellId		N/A	see PCI conditions	see PCI conditions	The CRS assistance information is provided for
information			_	below	below	Cell 2 and Cell 3 in CRS-
	antennaPorts Count			an2	an2	AssistanceInfo. It includes a single MBSFN-
	mbsfn- SubframeCo nfigList			oneFrame = '000000'	oneFrame = '000000'	SubframeConfig element with subframe allocation oneFrame='000000'
Time offset from		us	0	3	2	
Frequency offs Physical Cell II		Hz	PCI <sub>cell1</sub>	300 (PCI <sub>cell1</sub> - PCI <sub>cell2</sub> ) mod3 = 0, PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	-100 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> ) mod3! = 0	Cell PCIs are selected so that all conditions are met

	DCI format		1C	1C	1C	As defined in section	
						5.3.3.1.4 in TS 36.212	
	Number of		3	3	3	In sync threshold Qin and	
In sync	Control					the corresponding	
transmission	OFDM					hypothetical	
parameters	symbols	005	1		4	PDCCH/PCFICH	
(Note 1)	Aggregatio n level	CCE	4	4	4	transmission parameters are as specified in section	
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	-3	-3	and Table 7.6.1-2	
	Ratio of		-3	Non-ABS and		respectively.	
	PDCCH to			subframe cha	nnel powers		
	RS EPRE			defined in Tal	ole A.3.4.1.2-2.		
	Ratio of		1				
	PCFICH to						
	RS EPRE DCI format		1A	4.0	144	As defined in section	
	DCI format		1A	1A	1A	5.3.3.1.3 in TS 36.212	
Out of sync	Number of		3	3	3	Out of sync threshold Q <sub>out</sub>	
transmission	Control			J		and the corresponding	
parameters	OFDM					hypothetical	
(Note 1)	symbols					PDCCH/PCFICH	
	Aggregatio	CCE	8	8	8	transmission parameters	
	n level					are as specified in section	
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	-3	-3	7.6.1 and Table 7.6.1-1	
	Ratio of	dB	1	Non-ABS and		respectively.	
	PDCCH to			subframe cha			
	RS EPRE	-ID	4	defined in Tal	ole A.3.4.1.2-2.		
	Ratio of PCFICH to	dB	1				
	RS EPRE						
	INO ET INE						
DRX			OFF	OFF	OFF		
Layer 3 filtering			Enabled	Disable	Disable	Counters:	
						N310 = 1; N311 = 1	
T310 timer		ms	2000	N/A		T310 is enabled	
T311 timer	<u> </u>	ms	1000			T311 is enabled	
Periodic CQI reporting mode		]	PUCCH 1-0			As defined in table 7.2.2-1	
						in TS 36.213.	
CQI reporting pe	riodicity	ms	1			Minimum CQI reporting periodicity	
T1		s	0.5	N/A		periodicity	
T2		s	0.4	]			
T3		s	1.46	1			
T4		S	0.4				
T5		S	1				
Note 1: DDCC	LL/DOELOLL					romotore pood not be	

Table A.7.3.20.1-2: Cell specific test parameters for E-UTRAN TDD in-sync radio link monitoring test

Parameter	Unit	Test 1							
				Cell1			Cell2	Cell3	
		T1	T2	T3	T4	T5	T1-T5	T1-T5	
E-UTRA RF Channel		1			1	1			
Number									
BW <sub>channel</sub>	MHz			10			10	10	
Correlation Matrix				2x2 Low			2x2 Low	2x2 Low	
and Antenna									
Configuration									
Special subframe				6			6	6	
configuration Note 1									
Uplink-downlink				1			1	1	
configuration Note 2									
PCFICH/PDCCH/PHI				R.9 TDD			R.9 TDD	R.9 TDD	
CH parameters									
OCNG Pattern					_				
defined in A.3.2.2				OP.2 TDI	)		OP.2 TDD	OP.2 TDD	
(TDD)									
ρа, ρв				-3			-3	-3	
PCFICH_RB	dB			1				ABS subframe	
PDCCH_RA	dB							ers defined in	
PDCCH_RB	dB						l able A.	3.4.1.2-2.	
PBCH_RA	dB								
PBCH_RB	dB			•					
PSS_RA	dB			-3					
SSS_RA	dB								
PHICH_RA	dB								
PHICH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 3</sup>	dB								
OCNG_RB <sup>Note 3</sup>	dB								
SNR Note 8	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2	
$N_{oc}$	dBm/15	_		-98			-98	-98	
	kHz								
Propagation condition	Hz			ETU 30			ETU 30	ETU 30	
N 4 5 4							0.1.1		

- Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3,
  - SNR4 and SNR5 respectively in figure A.7.3.20.1-1.

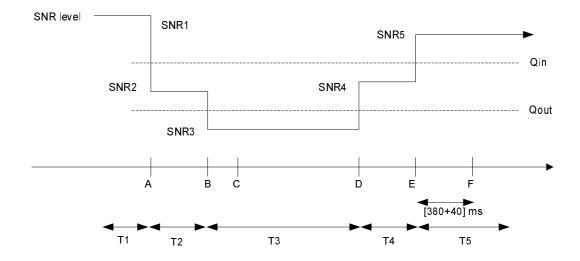


Figure A.7.3.20.1-1 SNR variation for in-sync testing

### A.7.3.20.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.21 E-UTRAN FDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and MBSFN ABS

### A.7.3.21.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information and MBSFN ABS. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.21.1-1 and A.7.3.21.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.21.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.21.1-1: General test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter		Unit		Value		Comment
			2 !! 4	Test 1	0 !! 0	
PCFICH/PDC	CH/PHICH		Cell 1 R.9 FDD	Cell 2 R.9 FDD	Cell 3 R.9 FDD	As specified in section A.3.1.2.1.
parameters						None of the PDCCH are intended for the UE under test
OCNG param	eters		OP.6 FDD	OP.9 FDD	OP.9 FDD	As specified in section A.3.2.1.
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	
E-UTRA RF C	Channel Number		1	1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Char (BW <sub>channel</sub> )	nnel Bandwidth	MHz	10	10	10	
Correlation Ma Antenna Conf			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Neighbor Cell configuration	ABS		N/A	MBSFN ABS		As defined in Table A.3.4.2.2-2
ABS Pattern			N/A	'01000001 000000100 000000100 0000100000 0'	'010000001 0000000100 000000100 0000100000 0'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes configured in Cell 2 and Cell 3 prior to the start of T1.
Time domain resource restr	iction pattern		'010000001 000000100 000000100 0000100000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCe II-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistance information	physCellId		N/A	see PCI conditions below	see PCI conditions below	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-
	antennaPorts Count			an2	an2	AssistanceInfo. It includes a single MBSFN-
	mbsfn- SubframeCo			fourFrames =	fourFrames =	SubframeConfig element with subframe allocation
	nfigList			- '100001000 1000001000 01000'	'100001000 1000001000 01000'	fourFrames = '1000010000100001 000'
Time offset be (With respect	to Cell 1)	us	0	3	2	
	ift between cells	Hz	0	300	-100	
Physical Cell			PCI <sub>cell1</sub>	(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> ) mod3 = 0,	(PCI <sub>cell1</sub> - PCI <sub>cell3</sub> ) mod3 != 0	Cell PCIs are selected so that all conditions are met

			1	T =		<u> </u>
				PCI <sub>cell1</sub> not		
				equal to		
In sync transmis	nion	DCI	1C	PCI <sub>cell2</sub>	1C	
parameters (Not		format	10	10	10	
parameters (Not	Number of	Tomat	3	3	3	As defined in section
	Control			3	٦	5.3.3.1.4 in TS 36.212
In sync	OFDM					0.0.0.1.1 111 10 00.212
transmission	symbols					
parameters	Aggregatio	CCE	4	4	4	In sync threshold Qin and
(Note 1)	n level					the corresponding
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		-3	-3	-3	hypothetical
	Ratio of		-3	Non-ABS and	IABS	PDCCH/PCFICH
	PDCCH to			subframe cha	nnel powers	transmission parameters
	RS EPRE			defined in Tab	ole A.3.4.2.2-2.	are as specified in section
	Ratio of		1			and Table 7.6.1-2
	PCFICH to					respectively.
	RS EPRE					
	DCI format		1A	1A	1A	
	Number of		3	3	3	As defined in section
Out of sync	Control					5.3.3.1.3 in TS 36.212
transmission	OFDM					
parameters (Note 1)	symbols	CCE	8	8	8	Out of sync threshold Q <sub>out</sub>
(Note 1)	Aggregatio n level	CCE	0	0	0	and the corresponding
	ρΑ, ρΒ		-3	-3	-3	hypothetical
	Ratio of	dB	1	Non-ABS and		PDCCH/PCFICH
	PDCCH to	GB.	'	subframe cha		transmission parameters are as specified in section
	RS EPRE				ole A.3.4.2.2-2.	
	Ratio of	dB	1			7.6.1 and Table 7.6.1-1
	PCFICH to					respectively.
	RS EPRE					·
DRX			OFF	OFF	OFF	
Layer 3 filtering			Enabled	Disable	Disable	Counters:
Layor o intorning			Zilabioa	Dicable	Dicable	N310 = 1; N311 = 1
T310 timer		ms	2000	N/A	1	T310 is enabled
T311 timer		ms	1000			T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1
· ·		<u></u>				in TS 36.213.
CQI reporting periodicity		ms	2			Minimum CQI reporting
						periodicity
T1		s s	0.5	N/A		
	T2		0.4	1		
T3		S	1.46			
T4		S	0.4	_		
T5		S	1			

Table A.7.3.21.1-2: Cell specific test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter	Unit	Test 1						
		Cell1			Cell2	Cell3		
		T1	T2	Т3	T4	T5	T1-T5	T1-T5
E-UTRA RF Channel				1			1	1
Number								
BW <sub>channel</sub>	MHz			10			10	10
Correlation Matrix				2x2 Low			2x2 Low	2x2 Low
and Antenna								
Configuration								
PCFICH/PDCCH/PHI				R.9 FDD			R.9 FDD	R.9 FDD
CH parameters								
OCNG Pattern								
defined in A.3.2.1				OP.6 FDE	)		OP.9 FDD	OP.9 FDD
(FDD)								
ρΑ, ρΒ				-3			-3	-3
PCFICH_RB	dB			1				ABS subframe
PDCCH_RA	dB							ers defined in
PDCCH_RB	dB						Table A.	3.4.2.2-2.
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB			-3				
SSS_RA	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG RB <sup>Note 1</sup>	dB							
SNR Note 6	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2
N	dBm/15			-98	<u> </u>		-98	-98
$N_{oc}$	kHz							
Propagation condition	Hz			ETU 30			ETU 30	ETU 30
N. 4								

- Note 1: OCNG shall be used such that the resources in cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.21.1-1.

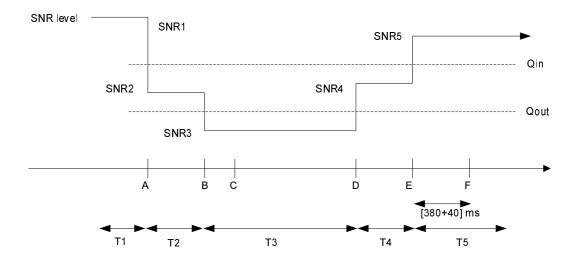


Figure A.7.3.21.1-1 SNR variation for in-sync testing

### A.7.3.21.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.22 E-UTRAN TDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and MBSFN ABS

### A.7.3.22.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.22.1-1 and A.7.3.22.1-2 below. There are three active cells in the test: Cell 1 is the PCell and Cell 2 and 3 are the Neighbor cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.22.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.22.1-1: General test parameters for E-UTRAN TDD in-sync radio link monitoring test

Para	meter	Unit	Value			Comment	
				Test 1			
5051011/5500			Cell 1	Cell 2	Cell 3		
PCFICH/PDCC parameters	CH/PHICH		R.9 TDD	R.9 TDD	R.9 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test	
OCNG parame	eters		OP.2 TDD	OP.6 TDD	OP.6 TDD	As specified in section A.3.2.2.	
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1	
CP length			Normal	Normal	Normal		
	hannel Number		1	1	1	One E-UTRA TDD carrier frequency is used.	
E-UTRA Chan (BW <sub>channel</sub> )		MHz	10	10	10		
Correlation Ma Antenna Confi			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2	
Neighbor Cell a configuration	ABS		N/A	MBSFN ABS		As defined in Table A.3.4.2.2-1	
ABS Pattern			N/A	'000010000 0000010000 0'	'000010000 0000010000 0'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2 and Cell 3 The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod 20 = 0, where x is the size of the bit string (20) divided by 10. MBSFN subframes are configured in the ABS subframes.	
Time domain n resource restri	ction pattern		'000010000 0000010000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCe II-r10 as defined in TS 36.331, clause 6.3.2.	
CRS assistance	physCellId		N/A	see PCI conditions	see PCI conditions	The CRS assistance information is provided for	
information	antennaPorts			below an2	below an2	Cell 2 and Cell 3 in CRS- AssistanceInfo. It includes	
	Count					a single MBSFN-	
	mbsfn- SubframeCo			fourFrames =	fourFrames =	SubframeConfig element with subframe allocation	
	nfigList			'010000100 0010000100 00000'	'010000100 0010000100 00000'	fourFrames = '0100001000010000 000'	
Time offset fro		US	0	3 300	2		
Frequency offs Physical Cell II		Hz	O PCI <sub>cell1</sub>	(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> ) mod3 = 0, PCI <sub>cell1</sub> not equal to	-100 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> ) mod3 != 0	Cell PCIs are selected so that all conditions are met	

				PCI <sub>cell2</sub>			
	DCI format		1C	1C	1C	As defined in section 5.3.3.1.4 in TS 36.212	
In sync transmission parameters	Number of Control OFDM symbols		2	2	2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical PDCCH/PCFICH	
(Note 1)	Aggregatio n level	CCE	4	4 4		transmission parameters are as specified in section	
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	-3	-3	and Table 7.6.1-2	
	Ratio of PDCCH to RS EPRE		-3	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		respectively.	
	Ratio of PCFICH to RS EPRE		1				
	DCI format		1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212	
Out of sync transmission parameters (Note 1)	Number of Control OFDM symbols		2	2	2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH	
	Aggregatio n level	CCE	8	8	8	transmission parameters are as specified in section	
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	-3	-3	7.6.1 and Table 7.6.1-1	
	Ratio of PDCCH to RS EPRE	dB	1	Non-ABS and subframe characteristics defined in Ta		respectively.	
	Ratio of PCFICH to RS EPRE	dB	1				
DRX			OFF	OFF	OFF		
Layer 3 filtering			Enabled	Disable	Disable	Counters: N310 = 1; N311 = 1	
T310 timer		ms	2000	N/A	•	T310 is enabled	
T311 timer		ms	1000			T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting periodicity		ms	1			Minimum CQI reporting periodicity	
T1		S	0.5	N/A			
T2		S	0.4				
T3		S	1.46				
T4		S	0.4				
T5		S	1				

Table A.7.3.22.1-2: Cell specific test parameters for E-UTRAN TDD in-sync radio link monitoring test

Parameter	Unit	Test 1	
		Cell1	Cell2 Cell3
		T1 T2 T3 T4 T5	T1-T5 T1-T5
E-UTRA RF Channel		1	1 1
Number			
BW <sub>channel</sub>	MHz	10	10 10
Correlation Matrix		2x2 Low	2x2 Low 2x2 Low
and Antenna			
Configuration			
Special subframe		6	6 6
configuration Note 1			
Uplink-downlink		1	1 1
configuration Note 2			
PCFICH/PDCCH/PHI		R.9 TDD	R.9 TDD R.9 TDD
CH parameters			
OCNG Pattern			
defined in A.3.2.2		OP.2 TDD	OP.6 TDD OP.6 TDD
(TDD)			
ρΑ, ρΒ		-3	-3 -3
PCFICH_RB	dB	1	Non-ABS and ABS subframe
PDCCH_RA	dB		channel powers defined in
PDCCH_RB	dB		Table A.3.4.2.2-1.
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB	-3	
SSS_RA	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG RA <sup>Note 3</sup>	dB		
OCNG RB <sup>Note 3</sup>	dB		
SNR Note 8	dB	-1.5 -5.2 -13.7 -8.6 -1.5	4 2
	dBm/15	-98	-98 -98
$N_{oc}$	kHz		
Propagation condition	Hz	ETU 30	ETU 30 ETU 30
		#	

- Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
- Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3,
  - SNR4 and SNR5 respectively in figure A.7.3.22.1-1.

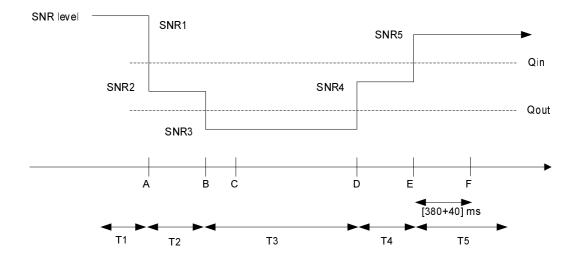


Figure A.7.3.22.1-1 SNR variation for in-sync testing

### A.7.3.22.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.23 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync for 5MHz Bandwidth

### A.7.3.23.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.3.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.3.23.1-1 and A.7.3.23.1-2 will replace the values of corresponding parameters in Test 4 in Tables A.7.3.1.1-1 and A.7.3.1.1-2. Only Test 4 is defined for the 5MHz bandwidth.

Table A.7.3.23.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under 5MHz

Bandwidth

Par	ameter	Unit	Value	Comment
			Test 4	
PCFICH/PDC parameters	CH/PHICH		R.12 FDD	As specified in clause A.3.1.2.1.  None of the PDCCH are intended for the UE under test
OCNG param	eters		OP.16 FDD	As specified in clause A.3.2.1.16.
E-UTRA Char (BW <sub>channel</sub> )	nnel Bandwidth	MHz	5	
Out of sync transmission parameters (Note 1)	Number of Control OFDM Symbols		3	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

Note 2: See Table A.7.3.1.1-1 for other general test parameters.

Note 3: This test is according to the principle defined in section A.3.7.2.

Table A.7.3.23.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring test #4 under 5MHz Bandwidth

Parameter	Unit	Test 4				
		T1	T2	Т3		
BW <sub>channel</sub>	MHz	5				
OCNG Pattern						
defined in A.3.2.1.16		OP.16 FDD				
(FDD)						
SNR Note 6	dB	-2.3	-5.7	-12.2		
Note 1: See Table A.7.3.1.1-2 for other cell specific test						
parameters.	·					

### A.7.3.23.2 Test Requirements

The requirements defined in section A.7.3.1.2 shall apply to this test case.

## A.7.3.24 E-UTRAN FDD Radio Link Monitoring Test for In-sync for 5MHz Bandwidth

### A.7.3.24.1 Test Purpose and Environment

The purpose of this test case is the same as for the Test 2 defined in subclause A.7.3.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.3.24.1-1 and A.7.3.24.1-2 will replace the values of corresponding parameters in Tables A.7.3.2.1-1 and A.7.3.2.1-2.

Table A.7.3.24.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Value	Comment
PCFICH/PDCC parameters	CH/PHICH		R.12 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
E-UTRA Chanr (BW <sub>channel</sub> )	nel Bandwidth	MHz	5	
In sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	In sync threshold Q <sub>in</sub> and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
Out of sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.

Table A.7.3.24.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test

Parameter	Unit	T1	T2	T3	T4	T5
BW <sub>channel</sub>	MHz	5				
OCNG Pattern defined in A.3.2.1.16 (FDD)				OP.16 FDD		
SNR	dB	-2.3	-5.7	-12.2	-7.3	-2.3
Propagation condition		ETU 70 Hz				
Note 1: See Table A.7.3.2.1-2 for other general test parameters.						

### A.7.3.24.2 Test Requirements

The requirements defined in section A.7.3.2.2 shall apply to this test case.

## A.7.3.25 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX for 5MHz Bandwidth

### A.7.3.25.1 Test Purpose and Environment

The purpose of this test case is the same as for the Test 2 defined in subclause A.7.3.6. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.3.25.1-1 and A.7.3.25.1-2 will replace the values of corresponding parameters in Tables A.7.3.6.1-1 and A.7.3.6.1-2.

Table A.7.3.25.1-1: General test parameters for E-UTRAN FDD in-sync testing

Pai	Parameter		Value	Comment	
PCFICH/PDCCH/PHICH parameters			R.12 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test	
E-UTRA Cha (BW <sub>channel</sub> )	nnel Bandwidth	MHz	5		
In sync transmissio n parameters (Note 1)	Number of Control OFDM symbols		3	In sync threshold Q <sub>in</sub> and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.	
Out of sync transmissio n symbols  Parameters (Note 1)  Number of Control OFDM symbols			3	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.	
Note 1: See Table A.7.3.6.1-1 for other general test parameters.  Note 2: This test is performed according to the principle defined in section A.3.7.2					

Table A.7.3.25.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test

Parameter	Unit	T1	T2	T3	T4	T5
BW <sub>channel</sub>	MHz	5				
OCNG Pattern defined in A.3.2.1.16 (FDD)				OP.16 FDD		
SNR	dB	-2.3	-5.7	-12.2	-7.3	-2.3
Propagation condition		AWGN				
Note 1: See Table A.7.3.6.1-2 for other general test parameters.						

### A.7.3.25.2 Test Requirements

The requirements defined in section A.7.3.6.2 shall apply to this test case.

# A.7.3.26 E-UTRAN FD-FDD Radio Link Monitoring Test for Out-of-sync for UE Category 0

### A.7.3.26.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.26.1-1, A.7.3.26.1-2 and A.7.3.26.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.26.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.26.1-1: General test parameters for E-UTRAN FD-FDD out-of-sync testing for UE Category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	
CP length			Normal	
Out of sync	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
transmission parameters (Note 1)	Number of Control OFDM symbols		2	Out of sync threshold Qout and the corresponding
	Aggregation level	CCE	8	hypothetical PDCCH/PCFICH
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	transmission
	Ratio of PDCCH to RS EPRE	dB	4	parameters are as specified in section
	Ratio of PCFICH to RS EPRE	dB	1	7.11.1 and Table 7.11.1-1 respectively.
DRX			OFF	
Layer 3 filterin	g		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		S	1	
T2		S	0.4	
T3		S	0.5	

Table A.7.3.26.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for out-of-sync radio link monitoring tests for UE Category 0

Parameter	Unit		Test 1		
i didilictei	O.I.I.	T1	T2	Т3	
E-UTRA RF Channel			1		
Number			•		
BW <sub>channel</sub>	MHz		10		
PCFICH/PDCCH/PHIC			R.7 FDD		
H parameters defined					
in A.3.1.2.1					
OCNG Pattern defined			OP.2 FDD		
in A.3.2.1 (FDD)					
ρα, ρΒ			-3		
PCFICH_RB	dB		1		
PDCCH_RA	dB		4		
PDCCH_RB	dB		4		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB		-3		
PHICH_RA	dB		-3		
PHICH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}$	dBm/15		-98		
SNR Note 6	kHz	0.4	0.0	40.0	
_	dB	-2.1	-6.9	-12.9	
Propagation condition			ETU 70Hz		
Correlation Matrix and			2x1 Low		
Antenna Configuration Note 1: OCNG shall be	l used such :	that tha ra	acuraca in	aall # 1	
are fully alloca					
	spectral density is achieved for all OFDM symbols.  The uplink resources for CQI reporting are assigned to				
	the UE prior to the start of time period T1.				
	The timers and layer 3 filtering related parameters are				
Note 3: The timers and			d paramete	rs are	
Note 3: The timers and configured price	d layer 3 filte	ring related		rs are	

device under test as part of OCNG.

A.7.3.26.1-1.

SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs. The SNR in time periods T1, T2 and T3 is denoted as

SNR1, SNR2 and SNR3 respectively in figure

Note 5:

Note 6:

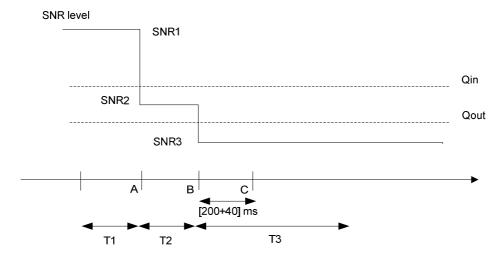


Figure A.7.3.26.1-1: SNR variation for out-of-sync testing

### A.7.3.26.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.27 E-UTRAN FD-FDD Radio Link Monitoring Test for In-sync for UE Category 0

### A.7.3.27.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN FD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.27.1-1 and A.7.3.27.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.27.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.27.1-1: General test parameters for E-UTRAN FD-FDD in-sync testing for UE Category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF
	Channal Number		1	channel number 1 One E-UTRA FDD carrier
E-UTRA RF Channel Number			ļ	frequency is used.
E-UTRA Cha	nnel Bandwidth	MHz	10	noducitoy to docu.
(BW <sub>channel</sub> )				
CP length	I = 4.4		Normal	
In sync	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
transmissio n parameters	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
(Note 1)	Aggregation level	CCE	4	PDCCH/PCFICH transmission parameters
	ρΑ, ρΒ		-3	are as specified in clause
	Ratio of PDCCH to RS EPRE	dB	1	7.11.1 and Table 7.11.1-2 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmissio n parameters	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
(Note 1)	Aggregation level	CCE	8	PDCCH/PCFICH transmission parameters
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	are as specified in
	Ratio of PDCCH to RS EPRE	dB	4	clause 7.11.1 and Table 7.11.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filteri	ng		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer			1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	CQI reporting periodicity		2	Minimum CQI reporting periodicity
T1		S	0.5	
T2		S	0.4	
T3		S	1.46	
T4		S	0.4	
T5	OCCU/DOFICIL com	S	1	out of sync transmission

Table A.7.3.27.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for in-sync radio link monitoring test for UE Category 0

Parameter	Parameter Unit		Test 1				
		T1	T2	Т3	T4	T5	
E-UTRA RF Channel		1					
Number							
BW <sub>channel</sub>	MHz			10			
PCFICH/PDCCH/PHICH				R.7 FDD			
parameters defined in							
clause A.3.1.2.1							
OCNG Pattern defined in			(	OP.2 FDI	)		
A.3.2.1 (FDD)							
ρ <sub>A</sub> , ρ <sub>B</sub>				-3			
PCFICH_RB	dB			1			
PDCCH_RA	dB			1			
PDCCH_RB	dB			1			
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB			-3			
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}$	dBm/15 kHz			-98			
SNR Note 6	dB	-2.1	-6.9	-12.9	-7.1	-2.1	
Propagation condition		ETU 70Hz					
Correlation Matrix and		2x1 Low					
Antenna Configuration							

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.27.1-1.

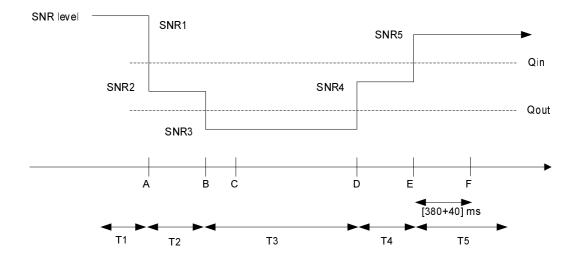


Figure A.7.3.27.1-1: SNR variation for in-sync testing

### A.7.3.27.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.28 E-UTRAN FD-FDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category 0

### A.7.3.28.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN FD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.28.1-1, A.7.3.28.1-2, A.7.3.28.1-3 and A.7.3.28.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.28.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.28.1-1: General test parameters for E-UTRAN FD-FDD out-of-sync tests in DRX for UE category 0

Para	Parameter		Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF
				channel number 1
E-UTRA RF C	hannel Number		1	One E-UTRA FDD
				carrier frequency is
				used.
	nel Bandwidth	MHz	10	
(BWchannel)				
CP length	DOL ( )		Normal	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS
Out of sync				36.212
transmission	Number of		2	Out of sync threshold
parameters	Control OFDM			Qout and the
(Note 1)	symbols			corresponding
	Aggregation	CCE	8	hypothetical
	level			PDCCH/PCFICH
	ρа, ρв		-3	transmission parameters
	Ratio of	dB	4	are as specified in clause 7.11.1 and Table
	PDCCH to RS			7.11.1-1 respectively.
	EPRE	-ID	1	7.11.1-1 Tespectively.
	Ratio of	dB	1	
	PCFICH to RS EPRE			
DRX cycle	LFNL	ms	1280	See Table A.7.3.28.1-3
Layer 3 filterin	a		Enabled	Counters:
,	9			N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer	T311 timer		1000	T311 is enabled
Periodic CQI r	Periodic CQI reporting mode		PUCCH 1-	As defined in table 7.2.2-
-			0	1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting
				periodicity
T1		S	32	
T2		S S	12.8	
T3	T3		13	

Table A.7.3.28.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for out-of-sync radio link monitoring tests in DRX for UE category 0

Parameter	Unit		Test 1			
		T1	T2	Т3		
E-UTRA RF Channel			1			
Number						
BW <sub>channel</sub>	MHz		10			
PCFICH/PDCCH/PHICH			R.7 FDD			
parameters defined in						
clause A.3.1.2.1						
OCNG Pattern defined in			OP.2 FDD			
A.3.2.1 (FDD)			2			
ρα, ρΒ	ID		-3			
PCFICH_RB	dB		1			
PDCCH_RA	dB		4			
PDCCH_RB PBCH RA	dB dB		4			
PBCH_RB	dB dB					
PSS RA	dB					
SSS RA	dB					
PHICH_RA	dB		-3			
PHICH_RB	dB	$\dashv$				
PDSCH_RA	dB					
PDSCH_RB	dB	╡				
OCNG_RA <sup>Note1</sup>	dB	-				
OCNG_RB <sup>Note1</sup>	dB					
	dBm/15		-98			
$N_{oc}$	kHz					
SNR Note 6	dB	-6.1	-10.0	-14.0		
Propagation condition			AWGN			
Correlation Matrix and			2x1			
Antenna Configuration						
Note 1: OCNG shall be						
are fully allocate						
spectral density						
Note 2: The uplink resou				ned to		
	the UE prior to the start of time period T1.					
	The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.					
	contains PDCCH for UEs other than the					
	r test as part of OCNG.					
	vels correspond to the signal to noise ratio over					
the cell-specific						
Note 6: The SNR in time p						
SNR1, SNR2 and SNR3 re	spectively	in figure A.	7.3.28.1-1.			

Table A.7.3.28.1-3: DRX-Configuration for E-UTRAN FD-FDD out-of-sync tests for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.7.3.28.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FD-FDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS
Time, digriment time	ii ii ii ii ii y	36.331
		For further information see
sr-ConfigIndex	0	clause 6.3.2 in TS 36.331 and
-		section10.1 in TS 36.213.

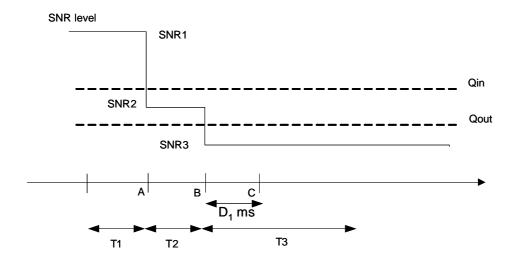


Figure A.7.3.28.1-1: SNR variation for out-of-sync testing in DRX

#### A.7.3.28.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (duration  $D_1 = 6500$  ms after the start of time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.29 E-UTRAN FD-FDD Radio Link Monitoring Test for In-sync in DRX for UE Category 0

#### A.7.3.29.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN FD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.29.1-1, A.7.3.29.1-2, A.7.3.29.1-3 and A.7.3.29.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.29.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.29.1-1: General test parameters for E-UTRAN FD-FDD in-sync test in DRX for UE category 0

P	arameter	Unit	Value	Comment	
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1	
E-UTRA RF C	E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.	
E-UTRA Chan (BW <sub>channel</sub> )	E-UTRA Channel Bandwidth		10		
CP length			Normal		
3	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212	
In sync transmission	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical	
parameters	Aggregation level	CCE	4	PDCCH/PCFICH	
(Note 1)	ρα, ρв		-3	transmission parameters are	
	Ratio of PDCCH to RS EPRE		1	as specified in clause 7.11.1 and Table 7.11.1-2	
	Ratio of PCFICH to RS EPRE		1	respectively.	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212	
Out of sync transmission	Number of Control OFDM symbols		2	Out of sync threshold Qout and the corresponding	
parameters	Aggregation level	CCE	8	hypothetical PDCCH/PCFICH	
(Note 1)	ρΑ, ρΒ		-3	transmission parameters are	
	Ratio of PDCCH to RS EPRE	dB	4	as specified in clause 7.11.1 and Table 7.11.1-1	
	Ratio of PCFICH to RS EPRE	dB	1	respectively.	
DRX cycle		ms	40	See Table A.7.3.29.1-3	
Layer 3 filtering	g		Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	2000	T310 is enabled	
T311 timer		ms	1000	T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity	
T1		S	4		
T2		S	1.6		
T3		S	1.46		
T4		S	0.4		
T5		S	4		
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission					

Table A.7.3.29.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for in-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit			Test 1		
		T1	T2	Т3	T4	T5
E-UTRA RF Channel Number		1				
BW <sub>channel</sub>	MHz			10		
PCFICH/PDCCH/PHICH				R.7 FDD		
parameters defined in						
clause A.3.1.2.1						
OCNG Pattern defined in						
A.3.2.1 (FDD)				OP.2 FDD	)	
ρ <sub>A</sub> , ρ <sub>B</sub>				-3		
PCFICH_RB	dB			1		
PDCCH_RA	dB			1		
PDCCH_RB	dB			1		
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB			0		
PHICH_RA	dB			-3		
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note1</sup>	dB					
OCNG_RB <sup>Note1</sup>	dB					
$N_{oc}$	dBm/15			-98		
	kHz		1	1	T	
SNR Note 8	dB	-6.1	-10.0	-14.0	-10.1	-6.1
Propagation condition				AWGN		
Correlation Matrix and				2x1		
Antenna Configuration						
Note 1: OCNG shall be used					d and a con	stant total
transmitted power sp						
Note 2: The uplink resources						
Note 3: The timers and layer	3 filtering rela	ated param	eters are con	figured prior to	o the start of	f time period

- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs. Note 5:
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and
  - SNR5 respectively in figure A.7.3.29.1-1.

Table A.7.3.29.1-3: DRX-Configuration for E-UTRAN FD-FDD in-sync tests for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.29.1-4: TimeAlignmentTimer - Configuration for E-UTRAN FD-FDD in-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

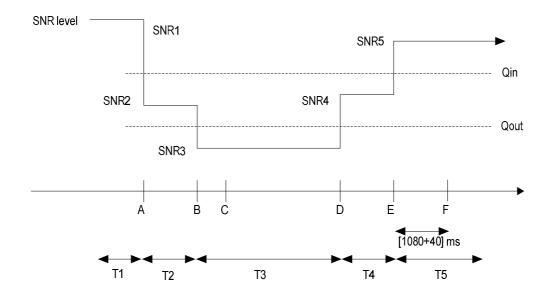


Figure A.7.3.29.1-1: SNR variation for in-sync testing in DRX

### A.7.3.29.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.30 E-UTRAN HD-FDD Radio Link Monitoring Test for Out-of-sync for UE Category 0

### A.7.3.30.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.30.1-1, A.7.3.30.1-2 and A.7.3.30.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.30.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of [TBD] ms.

Table A.7.3.30.1-1: General test parameters for E-UTRAN HD-FDD out-of-sync testing for UE Category 0

Pa	rameter	Unit	Value	Comment	
Active cell	Active cell		Cell 1	Cell 1 is on E-UTRA	
				RF channel number 1	
E-UTRA RF C	hannel Number		1	One E-UTRA FDD	
				carrier frequency is	
				used.	
	nel Bandwidth	MHz	10		
(BW <sub>channel</sub> )					
CP length	T =		Normal		
	DCI format		1A	As defined in section	
				5.3.3.1.3 in TS	
Out of sync				36.212	
transmission	Number of		2	Out of sync threshold	
parameters	Control OFDM			Q <sub>out</sub> and the	
(Note 1)	symbols	005		corresponding	
	Aggregation level	CCE	8	hypothetical	
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	PDCCH/PCFICH	
	Ratio of PDCCH	dB	4	transmission	
	to RS EPRE			parameters are as specified in section	
	Ratio of PCFICH	dB	1	7.11.1 and Table	
	to RS EPRE			7.11.1-1 respectively.	
DRX			OFF	7.11.1 1 Toopootivory.	
Layer 3 filterin	a		Enabled	Counters:	
	3			N310 = 1; N311 = 1	
T310 timer		ms	0	T310 is disabled	
T311 timer		ms	1000	T311 is enabled	
Periodic CQI r	Periodic CQI reporting mode		PUCCH 1-0	As defined in table	
-				7.2.2-1 in TS 36.213.	
CQI reporting	periodicity	ms	[TBD]	Minimum CQI	
				reporting periodicity	
T1		S	1		
T2		S	0.4		
T3		S	0.5		
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission					

Table A.7.3.30.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for out-of-sync radio link monitoring for UE Category 0

Pa	rameter	Unit				
			T1	T2	T3	
E-UTRA	RF Channel		1			
Number						
BW <sub>channel</sub>		MHz		10		
	PDCCH/PHIC		R	k.4 HD-FDI	)	
	eters defined					
	n A.3.1.2.3					
	attern defined					
in A.3.2.1	l (FDD)			OP.2 FDD		
ρ <sub>A</sub> , ρ <sub>B</sub>				-3		
PCFICH_		dB		1		
PDCCH_		dB		4		
PDCCH_		dB		4		
PBCH_R		dB				
PBCH_R		dB				
PSS_RA		dB				
SSS_RA		dB	-3			
PHICH_F		dB dB	-5			
	PHICH_RB					
	PDSCH_RA		_			
PDSCH_	PDSCH_RB OCNG_RA <sup>Note 1</sup>					
OCNG_F	OCNG_RA OCNG RB <sup>Note 1</sup>		4			
	KD.	dB dBm/15				
$N_{oc}$		kHz		-98		
SNR Note of	6	dB	-1.2	-6.0	-12.0	
	ion condition	ų D		ETU 70Hz		
	on Matrix and			2x1 Low		
	Configuration			ZXI LOW		
Note 1:	OCNG shall be	e used such	that the res	ources in o	cell # 1	
	are fully alloca					
	spectral densit					
Note 2:	The uplink reso					
		to the start of time period T1.				
Note 3:		rs and layer 3 filtering related parameters are				
		rior to the start of time period T1.				
Note 4:		ntains PDCCH for UEs other than the				
1		test as part of OCNG.				
Note 5:		orrespond to the signal to noise ratio over				
No.	the cell-specific			·o :		
Note 6:	The SNR in tin					
	SNR1, SNR2 and SNR3 respectively in figure A.7.3.30.1-					

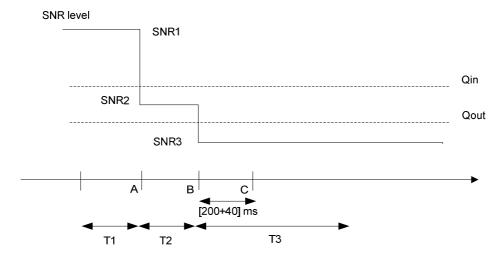


Figure A.7.3.30.1-1: SNR variation for out-of-sync testing

### A.7.3.30.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.31 E-UTRAN HD-FDD Radio Link Monitoring Test for In-sync for UE Category 0

### A.7.3.31.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.31.1-1 and A.7.3.31.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.31.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of [TBD] ms.

Table A.7.3.31.1-1: General test parameters for E-UTRAN HD-FDD in-sync testing for UE category 0

Pa	arameter	Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF (	Channel Number		1	One E-UTRA FDD carrier frequency is used.
(BW <sub>channel</sub> )	nnel Bandwidth	MHz	10	
CP length			Normal	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmissio	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
n	Aggregation level	CCE	4	PDCCH/PCFICH transmission
parameters	ρα, ρΒ		-3	parameters are as specified in
(Note 1)	Ratio of PDCCH to RS EPRE	dB	1	clause 7.11.1 and Table 7.11.1-2 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmissio	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding
n	Aggregation level	CCE	8	hypothetical PDCCH/PCFICH
parameters	ρΑ, ρΒ		-3	transmission parameters are
(Note 1)	Ratio of PDCCH to RS EPRE	dB	4	as specified in clause 7.11.1 and Table 7.11.1-1
	Ratio of PCFICH to RS EPRE	dB	1	respectively.
DRX			OFF	
Layer 3 filteri	ng		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI	reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
	CQI reporting periodicity		[TBD]	Minimum CQI reporting periodicity
T1		S	0.5	
T2		S	0.4	
T3		S	1.46	
T4 T5		S S	0.4	

Table A.7.3.31.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for in-sync radio link monitoring test for UE category 0

Parameter	Unit	Test 1					
		T1	T2	T3	T4	T5	
E-UTRA RF Channel Number			1				
BW <sub>channel</sub>	MHz		10				
PCFICH/PDCCH/PHICH				R.4 HD-FD	D		
parameters defined in							
clause A.3.1.2.3							
OCNG Pattern defined in							
A.3.2.1 (FDD)				OP.2 FDD	1		
$\rho_{A},\rho_{B}$				-3			
PCFICH_RB	dB		·	1		<u> </u>	
PDCCH_RA	dB	1					
PDCCH_RB	dB			1			
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB			-3			
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}$	dBm/15		·	-98			
	kHz						
SNR Note 6	dB	-1.2	-6.0	-12.0	-6.2	-1.2	
Propagation condition				ETU 70Hz			
Correlation Matrix and				2x1 low			
Antenna Configuration							

- Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.31.1-1.

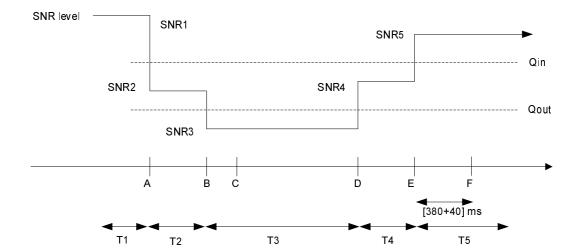


Figure A.7.3.31.1-1: SNR variation for in-sync testing

### A.7.3.31.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.32 E-UTRAN HD-FDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category 0

### A.7.3.32.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.32.1-1, A.7.3.32.1-2, A.7.3.32.1-3 and A.7.3.32.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.32.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 5ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.32.1-1: General test parameters for E-UTRAN HD-FDD out-of-sync tests in DRX for UE category 0

P	arameter	Unit	Value	Comment	
Active cell			Cell 1	Cell 1 is on E-UTRA RF	
				channel number 1	
E-UTRA RF C	Channel Number		1	One E-UTRA FDD carrier	
				frequency is used.	
E-UTRA Char	nnel Bandwidth	MHz	10		
(BWchannel)					
CP length			Normal		
	DCI format		1A	As defined in clause 5.3.3.1.3	
0.4.4.5.	N 1 (O 1 1			in TS 36.212	
Out of sync	Number of Control		2	Out of sync threshold Qout	
transmission	OFDM symbols	005		and the corresponding	
parameters	Aggregation level	CCE	8	hypothetical PDCCH/PCFICH	
(Note 1)	ρΑ, ρΒ		-3	transmission parameters are	
	Ratio of PDCCH to	dB	4	as specified in clause 7.11.1 and Table 7.11.1-1	
	RS EPRE			respectively.	
	Ratio of PCFICH to	dB	1	respectively.	
DDV susla	RS EPRE		4000	Con Table A 7 2 22 4 2	
DRX cycle		ms	1280	See Table A.7.3.32.1-3	
Layer 3 filterin	ig		Enabled	Counters:	
TO 4 O 4 inn a r			0	N310 = 1; N311 = 1	
T310 timer		ms	ŭ	T310 is disabled	
T311 timer		ms	1000	T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting periodicity		ms	5	Minimum CQI reporting periodicity	
T1		S	32	<u> </u>	
T2		S	12.8		
T3		S	13		
Note 1: PDCCH/PCEICH corresponding to the out of sync transmission parameters need					

Table A.7.3.32.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for out-of-sync radio link monitoring tests in DRX for UE category 0

Parameter	Unit		Test 1			
		T1	T2	T3		
E-UTRA RF Channel			1			
Number						
BW <sub>channel</sub>	MHz		10			
PCFICH/PDCCH/PHICH		F	R.4 HD-FD	D		
parameters specified in						
clause A.3.1.2.3						
OCNG Pattern defined in			OP.2 FDD	)		
A.3.2.1 (FDD)						
$\rho_A$ , $\rho_B$			-3			
PCFICH_RB	dB		1			
PDCCH_RA	dB		4			
PDCCH_RB	dB		4			
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB	-3				
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note1</sup>	dB					
OCNG_RB <sup>Note1</sup>	dB					
$N_{oc}$	dBm/15	-98				
	kHz	- 1	0.5	10.5		
SNR Note 6	dB	-5.4 -9.5 -13.5				
Propagation condition		AWGN				
Correlation Matrix and			2x1			
Antenna Configuration	uood oueb i	that the rea	ouroon in	ooll # 1		
Note 1: OCNG shall be are fully allocated						
spectral density						
	Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.					
Note 3: The timers and layer 3 filtering related parameters are						
configured prior to the start of time period T1.						
Note 4: The signal contains PDCCH for UEs other than the						
device under test as part of OCNG.						
Note 5: SNR levels correspond to the signal to noise ratio over						
the cell-specific reference signal REs.						
Note 6: The SNR in time	e periods T	1, T2 and T				
SNR1, SNR2 ar	nd SNR3 re	spectively i	in figure A.	7.3.32.1-		
1.	• • • •					

Table A.7.3.32.1-3: DRX-Configuration for E-UTRAN HD-FDD out-of-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf5	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.7.3.32.1-4: TimeAlignmentTimer -Configuration for E-UTRAN HD-FDD out-of-sync testing for UE category 0 in DRX

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS
TimeAlignmentTimer	IIIIIIIIIIIIII	36.331
		For further information see
sr-ConfigIndex	0	clause 6.3.2 in TS 36.331 and
		section10.1 in TS 36.213.

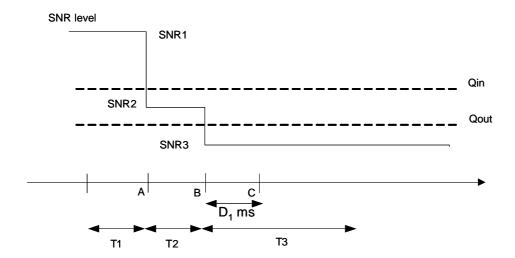


Figure A.7.3.32.1-1: SNR variation for out-of-sync testing in DRX

#### A.7.3.32.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (duration  $D_1 = 6500$  ms after the start of time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.33 E-UTRAN HD-FDD Radio Link Monitoring Test for In-sync in DRX for UE Category 0

#### A.7.3.33.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.33.1-1, A.7.3.33.1-2, A.7.3.33.1-3 and A.7.3.33.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.33.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.33.1-1: General test parameters for E-UTRAN HD-FDD in-sync test in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	
CP length			Normal	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmission	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
parameters (Note 1)	Aggregation level	CCE	4	PDCCH/PCFICH transmission parameters are as specified in
	ρ <sub>Α</sub> , ρ <sub>Β</sub>		-3	clause7.11.1 and Table 7.11.1- 2 respectively.
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
parameters (Note 1)	Aggregation level	CCE	8	PDCCH/PCFICH transmission parameters are as specified in
	ра, рв		-3	clause 7.11.1 and Table 7.11.1- 1 respectively.
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	40	See Table A.7.3.33.1-3
Layer 3 filtering	g		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
	CQI reporting periodicity		5	Minimum CQI reporting periodicity
T1		S	4	
T2		S	1.6	
T3		S	1.46	
T4		S	0.4	
T5 Note 1: PD0	2011/2011	S	4	d out of sync transmission

Table A.7.3.33.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for in-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit			Test 1		
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number				1		
BW <sub>channel</sub>	MHz			10		
PCFICH/PDCCH/PHICH				R.4 HD-FD	D	
parameters specified in						
clause A.3.1.2.3						
OCNG Pattern defined in				OP.2 FDD	1	
A.3.2.1 (FDD)						
ρ <sub>A</sub> , ρ <sub>B</sub>				-3		
PCFICH_RB	dB			1		
PDCCH_RA	dB			1		
PDCCH_RB	dB	1				
PBCH_RA	dB	_				
PBCH_RB	dB	_				
PSS_RA	dB					
SSS_RA	dB	_		2		
PHICH_RA	dB	_		-3		
PHICH_RB	dB	_				
PDSCH_RA	dB	_				
PDSCH_RB	dB	_				
OCNG_RA <sup>Note1</sup>	dB	_				
OCNG_RB <sup>Note1</sup>	dB					
$N_{oc}$	dBm/15			-98		
SNR Note 6	kHz dB	-5.4	-9.5	-13.5	-9.4	-5.4
	UD	-0.4	-9.0	AWGN	-9.4	-0.4
Propagation condition						
Correlation Matrix and				2x1		
Antenna Configuration	1 1 1 1 1 1			<b>( II ) II :</b>		
Note 1: OCNG shall be used					d and a cor	istant total
transmitted power sp						ma nariad T1
Note 2: The uplink resources						
Note 3: The timers and layer						

- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and
  - SNR5 respectively in figure A.7.3.33.1-1.

Table A.7.3.33.1-3: DRX-Configuration for E-UTRAN HD-FDD in-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf5	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.33.1-4: TimeAlignmentTimer -Configuration for E-UTRAN HD-FDD in-sync testing for UE category 0 in DRX

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

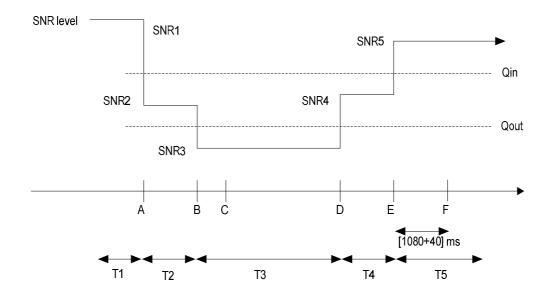


Figure A.7.3.33.1-1: SNR variation for in-sync testing in DRX

### A.7.3.33.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.34 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync for UE Category 0

#### A.7.3.34.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.34.1-1, A.7.3.34.1-2 and A.7.3.34.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.34.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.34.1-1: General test parameters for E-UTRAN TDD out-of-sync testing for UE Category 0

Par	ameter	Unit	Value	Comment	
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1	
E-UTRA RF C	hannel Number		1	One E-UTRA TDD carrier frequency is used.	
E-UTRA Chan (BW <sub>channel</sub> )	nel Bandwidth	MHz	10		
CP length			Normal		
Out of sync	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212	
transmission parameters (Note 1)	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding	
	Aggregation level	CCE	8	hypothetical PDCCH/PCFICH	
	$\rho_A$ , $\rho_B$		-3	transmission	
	Ratio of PDCCH to RS EPRE	dB	4	parameters are as specified in section	
	Ratio of PCFICH to RS EPRE	dB	1	7.11.1 and Table 7.11.1-1 respectively.	
DRX			OFF		
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1	
T310 timer	T310 timer		0	T310 is disabled	
T311 timer	T311 timer		1000	T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity	
T1	T1		1		
T2		S	0.4		
T3		S	0.5		
Note 1: DDCCH/DCEICH corresponding to the out of supe transmission					

Table A.7.3.34.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring for UE Category 0

Par	ameter	Unit		Test 1		
			T1	T2	Т3	
E-UTRA R	RF Channel			1		
Number						
BW <sub>channel</sub>		MHz		10		
Special su	bframe			6		
configurati	ion <sup>Note 1</sup>					
Uplink-dov	vnlink			1		
configurati	ion Note 1					
	DCCH/PHIC			R.7 TDD		
	ters defined					
in section						
	ttern defined					
in A.3.2.2	(TDD)			OP.2 TDD		
$\rho_A$ , $\rho_B$				-3		
PCFICH_F		dB		1		
PDCCH_F		dB		4		
PDCCH_F		dB		4		
PBCH_RA		dB				
PBCH_RE	3	dB				
PSS_RA		dB				
SSS_RA		dB		•		
PHICH_R		dB	-3			
PHICH_RI		dB				
PDSCH_R		dB				
PDSCH_R	RB	dB				
OCNG_RA	Anote 2	dB				
OCNG_RE	3 <sup>Note 2</sup>	dB				
$N_{oc}$		dBm/15		-98		
		kHz	4.0		44.0	
SNR Note 7		dB	-1.6	-5.9	-11.9	
	on condition			ETU 70Hz		
	n Matrix and			2x1 Low		
	Configuration					
Note 1:	For special sul				urations	
	see Tables 4.2					
Note 2:	OCNG shall be					
	are fully allocated and a constant total transmitted power					
Note 2	spectral density is achieved for all OFDM symbols.					
Note 3:						
Note 4:	the UE prior to the start of time period T1.					
Note 4.	The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.					
Note 5:						
INOIG J.	device under test as part of OCNG.					
Note 6:						
1.1010 0.	the cell-specifi				0 0 0 0 1	
Note 7:	The SNR in tin				ed as	
SNR1, SNR2 and SNR3 respectively in figure A.7.3.34.1-						

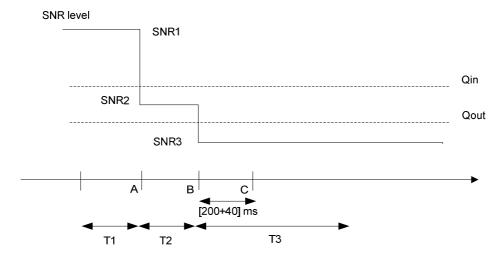


Figure A.7.3.34.1-1: SNR variation for out-of-sync testing

### A.7.3.34.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.35 E-UTRAN TDD Radio Link Monitoring Test for In-sync for UE category 0

### A.7.3.35.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.35.1-1 and A.7.3.35.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.35.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.35.1-1: General test parameters for E-UTRAN TDD in-sync testing for UE category 0

Pa	rameter	Unit	Value	Comment
			Test 1	
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Ch	nannel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Chanr (BW <sub>channel</sub> )	nel Bandwidth	MHz	10	
CP length			Normal	
In sync	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
transmission parameters	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding
(Note 1)	Aggregation level	CCE	4	hypothetical
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	PDCCH/PCFICH
	Ratio of PDCCH to RS EPRE	dB	1	transmission parameters are as specified in clause 7.11.1
	Ratio of PCFICH to RS EPRE	dB	1	and Table 7.11.1-2 respectively.
Out of sync	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
transmission parameters	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding
(Note 1)	Aggregation level	CCE	8	hypothetical
	ρΑ, ρΒ		-3	PDCCH/PCFICH
	Ratio of PDCCH to RS EPRE	dB	4	transmission parameters are as specified in clause 7.11.1
	Ratio of PCFICH to RS EPRE	dB	1	and Table 7.11.1-1 respectively.
DRX			OFF	
Layer 3 filtering	)		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI re	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting p	periodicity	ms	1	Minimum CQI reporting periodicity
T1	T1		0.5	
T2		S	0.4	
T3		S	1.46	
T4		S	0.4	
T5		S	1	

Table A.7.3.35.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test for UE category 0

Parameter	Unit			Test 1		
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number				1		
BW <sub>channel</sub>	MHz			10		
Special subframe				6		
configuration Note 1						
Uplink-downlink configuration				1		
PCFICH/PDCCH/PHICH				R.7 TDD		
parameters defined in section						
A.3.1.2.2						
OCNG Pattern defined in						
A.3.2.2 (TDD)		OP.2 TDD				
ρ <sub>Α</sub> , ρ <sub>Β</sub>				-3		
PCFICH_RB	dB			1		
PDCCH_RA	dB			1		
PDCCH_RB	dB			1		
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB			-3		
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 2</sup>	dB					
OCNG_RB <sup>Note 2</sup>	dB					
$N_{oc}$	dBm/15	-98				
	kHz					
SNR Note 7	dB	-1.6	-5.9	-11.9	-6.6	-1.6
Propagation condition				ETU 70Hz		
Correlation Matrix and		2x1 low				
Antenna Configuration						

- Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
- Note 2: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 3: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 4: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 5: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 6: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 7: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.35.1-1.

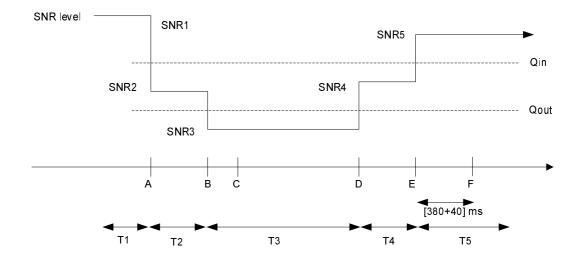


Figure A.7.3.35.1-1: SNR variation for in-sync testing

### A.7.3.35.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.36 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category 0

### A.7.3.36.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.36.1-1, A.7.3.36.1-2, A.7.3.36.1-3 and A.7.3.36.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.36.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.36.1-1: General test parameters for E-UTRAN TDD out-of-sync test in DRX for UE category 0

Parameter	Ur	nit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA
				RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA TDD
				carrier frequency is
				used.
E-UTRA Channel Band	width MH	ΗZ	10	
(BWchannel)			NI I	
CP length			Normal	A
DCI forr	nat		1A	As defined in
Out of owns				clause 5.3.3.1.3 in TS
Out of sync transmission Number	of		2	36.212 Out of sync threshold
parameters Control			2	Qout and the
(Note 1) symbols	-			corresponding
Aggrega		ìF.	8	hypothetical
level		)_ 	O	PDCCH/PCFICH
ρΑ, ρΒ			-3	transmission
Ratio of	d	B	4	parameters are as
PDCCH			•	specified in
EPRE				clause 7.11.1 and
Ratio of	dl	В	1	Table 7.11.1-1
PCFICH	I to RS			respectively.
EPRE				
DRX cycle	m	ıs	1280	See Table A.7.3.36.1-
				3
Layer 3 filtering			Enabled	Counters:
				N310 = 1; N311 = 1
T310 timer	m	ıs	0	T310 is disabled
T311 timer		ıs	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table
				7.2.2-1 in TS 36.213.
CQI reporting periodicity		ıs	1	Minimum CQI
				reporting periodicity
T1	S	_	32	
T2 T3	S	6	12.8 13	

Table A.7.3.36.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit					
		T1	Test 2	T3		
E-UTRA RF Channel			1	l		
Number						
BW <sub>channel</sub>	MHz		10			
Special subframe			6			
configuration Note 1						
I Uplink-downlink			1			
configuration Note 1						
PCFICH/PDCCH/PHICH			R.7 TDD			
parameters defined in						
section A.3.1.2.2						
OCNG Pattern defined in			OP.2 TDD	'		
A.3.2.2 (TDD)						
ρα, ρΒ			-3			
PCFICH_RB	dB		1			
PDCCH_RA	dB		4			
PDCCH_RB	dB		4			
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB		2			
PHICH_RA	dB		-3			
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note2</sup>	dB					
OCNG_RB <sup>Note2</sup>	dB	00				
$N_{oc}$	dBm/15		-98			
SNR Note 7	kHz dB	-5.6	0.6	-13.6		
Propagation condition	иь	-5.0	-9.6 AWGN	-13.0		
Correlation Matrix and			2x1			
Antenna Configuration  Note 1: For special sub	frome and i	Inlink down	alink confic	urations		
see Tables 4.2				urations		
Note 2: OCNG shall be				Cell # 1		
are fully allocat						
spectral density						
	uplink resources for CQI reporting are assigned to JE prior to the start of time period T1.					
	The timers and layer 3 filtering related parameters are					
	configured prior to the start of time period T1.					
	The signal contains PDCCH for UEs other than the					
	levice under test as part of OCNG.					
	IR levels correspond to the signal to noise ratio over					
	e cell-specific reference signal REs.					
Note 7: The SNR in tim						
SNR1, SNR2 a	ind SNR3 re	spectively	in figure A.	.7.3.36.1-		
1.						

Table A.7.3.36.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.7.3.36.1-4: TimeAlignmentTimer - Configuration for E-UTRAN TDD out-of-sync testing for UE category 0 in DRX

Field	Value	Comment			
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS			
TimeAlignmentTimer	ii ii ii ii ty	36.331			
		For further information see			
sr-ConfigIndex	2	clause 6.3.2 in TS 36.331 and			
_		section10.1 in TS 36.213.			

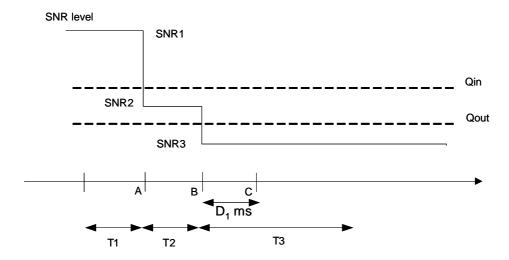


Figure A.7.3.36.1-1: SNR variation for out-of-sync testing in DRX

### A.7.3.36.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0)

The UE shall stop transmitting uplink signal no later than time point C (duration  $D_1 = 6500$  ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.37 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX for UE category 0

### A.7.3.37.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.37.1-1, A.7.3.37.1-2, A.7.3.37.1-3 and A.7.3.37.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.37.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode

PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.37.1-1: General test parameters for E-UTRAN TDD in-sync test in DRX for UE category 0

Pa	rameter	Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel
				number 1
E-UTRA RF Ch	nannel Number		1	One E-UTRA TDD carrier
E LIEDA OL	15 1:10	N 41 1	4.0	frequency is used.
E-UTRA Chanr (BW <sub>channel</sub> )	nei Bandwidth	MHz	10	
CP length			Normal	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmission	Number of Control OFDM symbols		2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
parameters	Aggregation level	CCE	4	PDCCH/PCFICH transmission
(Note 1)	ρΑ, ρΒ		-3	parameters are as specified in
	Ratio of PDCCH to RS EPRE	dB	1	clause 7.11.1 and Table 7.11.1-2 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
parameters	Aggregation level	CCE	8	PDCCH/PCFICH transmission
(Note 1)	ρΑ, ρΒ		-3	parameters are as specified in
	Ratio of PDCCH to RS EPRE	dB	4	clause 7.11.1 and Table 7.11.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	40	See Table A.7.3.37.1-3
Layer 3 filtering	)		Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		S	4	
T2		S	1.6	
T3	<u> </u>	S	1.46	
T4		S	0.4	
T5		S	4	out of eyec transmission

Table A.7.3.37.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit	Test 1					
		T1	T2	T3	T4	T5	
E-UTRA RF Channel Number		1					
BW <sub>channel</sub>	MHz			10			
Special subframe configuration Note 1				6			
Uplink-downlink configuration Note 1				1			
PCFICH/PDCCH/PHICH parameters defined in section A.3.1.2.2				R.7 TDD			
OCNG Pattern defined in A.3.2.2 (TDD)				OP.2 TDD			
ρ <sub>Α</sub> , ρ <sub>Β</sub>				-3			
PCFICH RB	dB			1			
PDCCH_RA	dB			1			
PDCCH_RB	dB			1			
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB			-3			
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note2</sup>	dB						
OCNG_RB <sup>Note2</sup>	dB						
$N_{oc}$	dBm/15 kHz	-98					
SNR Note 7	dB	-5.6	-9.6	-13.6	-9.6	-5.6	
Propagation condition				AWGN			
Correlation Matrix and Antenna Configuration		2x1					

- OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total Note 2: transmitted power spectral density is achieved for all OFDM symbols.
- The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 3:
- Note 4: The timers and layer 3 filtering related parameters are configured prior to the start of time period
- Note 5: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 6: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and Note 7:

SNR5 respectively in figure A.7.3.37.1-1.

Table A.7.3.37.1-3: DRX-Configuration for E-UTRAN TDD in-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.37.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD in-sync testing for UE category 0 in DRX

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

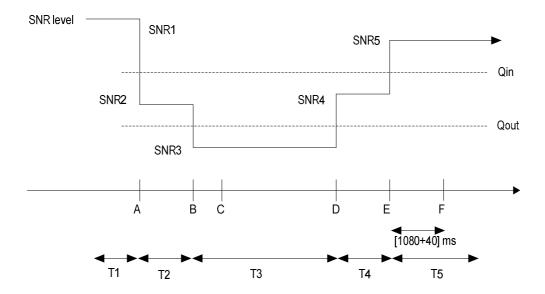


Figure A.7.3.37.1-1: SNR variation for in-sync testing in DRX

#### A.7.3.37.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.38 E-UTRAN FDD-FDD DC Radio Link Monitoring Test for Out-of-sync in DRX in synchronous DC

### A.7.3.38.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.38.1-1, A.7.3.38.1-2, A.7.3.38.1-3, and A.7.3.38.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of three successive time periods with time duration of T1, T2 and T3 respectively. Figure A.7.3.38.1-1 shows the variation of the downlink SNR in the PCell and PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.38.1-1: General test parameters for E-UTRAN FDD out-of-sync tests in DRX in synchronous dual connectivity

Pa	rameter	Unit	Value	Comment
Active cell			Cell 1	Cell 1 is PCell on E-UTRA RF channel number 1, and
			Cell 2	cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
E-UTRA RF C	Channel Number		1, 2	Two E-UTRA FDD carrier frequencies are used.
	nnel Bandwidth	MHz	5, 10, 20	
(BWchannel)				
	atrix and Antenna		2x2 Low	Correlation Matrix and Antenna Configuration are
Configuration				defined in TS 36.101 [5] Annex B.2.3.2
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control		5MHz: 3	Out of sync threshold Q <sub>out</sub> and the corresponding
	OFDM symbols		10MHz: 2	hypothetical PDCCH/PCFICH transmission parameters
Out of sync		005	20MHz: 2	are as specified in clause 7.6.1 and Table 7.6.1-1
transmission	Aggregation level	CCE	8	respectively.
parameters	ρΑ, ρΒ		-3	
(Note 1)	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle on	cell 1	ms	640	See Table A.7.3.38.1-3
DRX cycle on	cell 2	ms	40	See Table A.7.3.38.1-3
Timing offset	between cell 1 and	μS	33	For synchronous dual connectivity
cell 2				
Layer 3 filterin	ng		Enabled	Counters:
				N310 = 1; N311 = 1; N313 = 1; N314 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	0	T313 is disabled
	reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	periodicity	ms	2	Minimum CQI reporting periodicity
T1		S	4	
T2		S	1.6	
T3		S	1.8	
Nista 4: DD	00LL/D0E10LL			

Table A.7.3.38.1-2: Cell specific test parameters for E-UTRAN FDD out-of-sync radio link monitoring in DRX in synchronous dual connectivity

Parameter	Unit		Cell 1		Cell 2		
		T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel Number			1			2	
BW <sub>channel</sub>	MHz		5, 10, 20			5, 10, 20	
Correlation Matrix and Antenna Configuration			2x2 Low			2x2 Low	
PCFICH/PDCCH/PHICH parameters None of the PDCCH are intended for the UE under test		10	MHz: R.12 FI MHz: R.7 FI MHz: R.13 F	DD	5MHz: R.12 FDD 10MHz: R.7 FDD 20MHz: R.13 FDD		
OCNG Pattern		101	Hz: OP.16 F  MHz: OP.2 F   Hz: OP.12	:DD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
ρΑ, ρΒ			-3			-3	
PCFICH_RB	dB	1			1		
PDCCH_RA	dB		1		1		
PDCCH_RB	dB		1		1		
PBCH_RA	dB				-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB		-3				
PHICH_RB	dB		-3				
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note1</sup>	dB						
OCNG_RB <sup>Note1</sup>	dB						
SNR Note 6 (5MHz bandwidth)	dB	-2.3	-2.3	-2.3	-2.3	-5.7	-12.2
SNR Note 6 (10MHz bandwidth)	dB	-2.3	-2.3	-2.3	-2.3	-6.2	-12.2
SNR Note 6 (20MHz bandwidth)	dB	-2.9	-2.9	-2.9	-2.9	-6.8	-12.8
$N_{oc}$	dBm/15 kHz	-98				-98	
Propagation condition		ETU 70 Hz				ETU 70 Hz	
Time offset to cell1	μS		-			33	

Note 1: OCNG shall be used such that the resources in cell 1 and cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.7.3.38.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests in synchronous dual connectivity

Field	Va	lue	Comment
rieid	Cell 1	Cell 2	Comment
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	Sf640	Sf40	
shortDRX	disable	disable	

Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.

Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 6: The SNR in time periods T1, T2, and T3 are denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.38.1-1.

Table A.7.3.38.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD out-of-sync testing in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section 10.1 in TS 36.213.

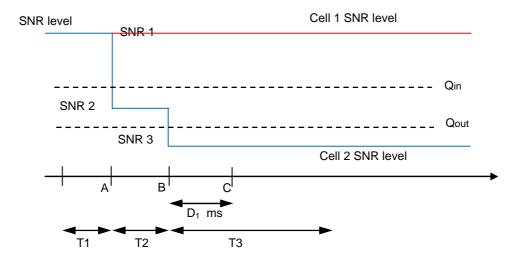


Figure A.7.3.38.1-1 SNR variation for out-of-sync testing in DRX

### A.7.3.38.2 Test Requirements

The UE behaviour during time durations T1, T2, and T3 shall be as follows:

During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CQI transmission on Cell1.

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe on Cell2.

The UE shall stop transmitting uplink signal no later than time point C (duration D1 = 900 ms after the start of time duration T3) on PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.39 E-UTRAN FDD-FDD DC Radio Link Monitoring Test for Out-of-sync in DRX in asynchronous DC

### A.7.3.39.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in asynchronous dual connectivity. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.39.1-1, A.7.3.39.1-2, A.7.3.39.1-3 and A.7.3.39.1-4. There are two cells in the test. Cell 1 is PCell in MCG and cell 2 is PSCell in SCG. Before the test starts the UE is connected to cell 1 on radio channel 1 and to cell 2 on radio channel 2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. The downlink SNR in cell 1 keeps constant in the test. Figure A.7.3.39.1-1 shows the variation of the downlink SNR in the cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2 in asynchronous dual connectivity. For both cells, the UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH

and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.39.1-1: General test parameters for E-UTRAN FDD out-of-sync in DRX

F	Parameter	Unit	Value	Comment
Active cells			Cell 1 and cell 2	Cell 1 (PCell) is on E-UTRA RF channel number 1 and cell 2 (PSCell) is on E-UTRA RF channel number 2
CP length			Normal	
Correlation Mate Configuration	rix and Antenna		2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
Out of sync transmission parameters	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission
(Note 1)	Aggregation level	CCE	8	parameters are as specified in
	ρ <sub>A</sub> , ρ <sub>B</sub>		-3	section 7.6.1 and Table 7.6.1-1
	Ratio of PDCCH to RS EPRE	dB	1	respectively.
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle in ce	II 1	ms	640	See Table A.7.3.39.1-3
DRX cycle in ce	II 2	ms	40	See Table A.7.3.39.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1; N313 = 1; N314 = 1;
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	0	T313 is disabled
Periodic CQI rep	porting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting pe	CQI reporting periodicity		2	Minimum CQI reporting periodicity
T1		S	4	
T2		s	1.6	
T3		S	1.8	

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

Note 3: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.6.11.

Note 2: The test parameters in the table apply to both cell 1 and cell 2 unless specified otherwise.

Table A.7.3.39.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring in DRX

Parameter		Unit	Cell 1 (PCell)		Cell 2 (PSCell)			
			T1	T2	T3	T1	T2	T3
E-UTRA RF Channel				1			2	
Number		MHz						
	E-UTRA Channel		5, 10, 20			5, 10, 20		
Bandwidth						5141 8 40 585		
PCFICH/PDCCH/PHI			5MHz: R.12 FDD			5MHz: R.12 FDD		
CH parame			10MHz: R.7 FDD			10MHz: R.7 FDD		
None of the PDCCH are intended for the			20MHz: R.13 FDD			20MHz: R.13 FDD		
UE under t								
Correlation			2x2 Low			2x2 Low		
and Antenr			ZXZ LOW		ZXZ LOW			
Configurati								
OCNG Pat			5MHz: OP.16 FDD					
defined in A			10MHz: OP.2 FDD		5MHz: OP.16 FDD			
(FDD)			20MHz: OP.12 FDD		10MHz: OP.2 FDD			
			20141121 01 112 1 00			20MHz: OP.12 FDD		
ρ <sub>A</sub> , ρ <sub>B</sub>			-3			-3		
PCFICH_RB		dB	1			1		
PDCCH_R		dB	1			1		
PDCCH_R		dB	1			1		
PBCH_RA		dB						
PBCH_RB		dB						
PSS_RA		dB						
SSS_RA		dB	-3					
PHICH_RA		dB						
PHICH_RB		dB						
PDSCH_RA		dB						
PDSCH_R	B Note1	dB dB						
OCNG_RA	OCNG_RA <sup>Note1</sup>							
OCNG_RB		dB						100
SNR Note 6	5MHz	dB	-2.3	-2.3	-2.3	-2.3	-5.7	-12.2
	BW <sub>channel</sub>	4D	0.0	0.0	0.0	0.0	0.0	40.0
	10MHz	dB	-2.3	-2.3	-2.3	-2.3	-6.2	-12.2
	BW <sub>channel</sub>	dB	-2.9	-2.9	-2.9	-2.9	-6.8	-12.8
	BW <sub>channel</sub>	uВ	-2.9	-2.9	-2.9	-2.9	-0.8	-12.8
$N_{oc}$		dBm/15	-98		-98			
		kHz						
Propagation condition			ETU 70 Hz		ETU 70 Hz			
Receive time offset to cell1 Note 7		μs	-			500		

- Note 1: OCNG shall be used such that the resources in Cell 1 and Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.39.1-1.
- Note 7: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.3.39.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Va	lue	Comment
Field	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in
drx-InactivityTimer	psf1	psf1	section 6.3.2 in
drx-RetransmissionTimer	psf1	psf1	3GPP TS 36.331
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.39.1-4: TimeAlignmentTimer - Configuration for E-UTRAN FDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

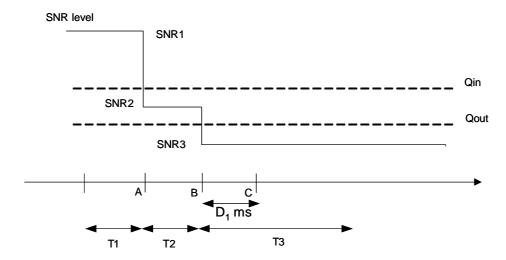


Figure A.7.3.39.1-1 SNR variation for out-of-sync test in DRX

### A.7.3.39.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In the test, during time durations T1, T2 and T3, the UE shall transmit uplink signal on cell 1 at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

In the test, during the period from time point A to time point B the UE shall transmit uplink signal on cell 2 at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

In the test, the UE shall stop transmitting uplink signal on cell 2 no later than time point C (duration  $D_1 = 900$  ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

### A.7.3.40 E-UTRAN TDD-TDD DC Radio Link Monitoring Test for Out-of-sync in DRX in synchronous DC

### A.7.3.40.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.40.1-1, A.7.3.40.1-2, A.7.3.40.1-3, and A.7.3.40.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of three successive time periods with time duration of T1, T2 and T3 respectively. Figure A.7.3.40.1-1 shows the variation of the downlink SNR in the PCell and PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.40.1-1: General test parameters for E-UTRAN TDD out-of-sync tests in DRX in synchronous dual connectivity

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is PCell on E-UTRA RF channel number 1, and
			Cell 2	cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
E-UTRA RF C	E-UTRA RF Channel Number		1, 2	Two E-UTRA TDD carrier frequencies are used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	5, 10, 20	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1
transmission	Aggregation level	CCE	8	respectively.
parameters	ρΑ, ρΒ		-3	
(Note 1)	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle on cell 1		ms	640	See Table A.7.3.40.1-3
DRX cycle on	DRX cycle on cell 2		40	See Table A.7.3.40.1-3
Timing offset between cell 1 and cell 2		μS	33	For synchronous dual connectivity
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1; N313 = 1; N314 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	0	T313 is disabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		S	4	
T2		s	1.6	
T3		s	1.8	

Table A.7.3.40.1-2: Cell specific test parameters for E-UTRAN TDD out-of-sync radio link monitoring in DRX in synchronous dual connectivity

Parameter	Unit	Cell 1		Cell 2				
		T1 T2 T3		T1	T2	Т3		
E-UTRA RF Channel Number			1			2		
BW <sub>channel</sub>	MHz		5, 10, 20			5, 10, 20		
Correlation Matrix and Antenna Configuration			2x2 Low			2x2 Low		
Special subframe configuration Note1			6			6		
Uplink-downlink configuration Note2			1			1		
PCFICH/PDCCH/PHICH parameters None of the PDCCH are intended for the UE under test		5MHz: R.12 TDD 10MHz: R.7 TDD 20MHz: R.13 TDD			5MHz: R.12 TDD 10MHz: R.7 TDD 20MHz: R.13 TDD			
OCNG Pattern		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			
ρΑ, ρΒ		-3			-3			
PCFICH_RB	dB	1			1			
PDCCH_RA	dB		1		1			
PDCCH_RB	dB		1		1			
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB		0					
PHICH_RB	dB		-3		-3			
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note3</sup>	dB							
OCNG RB <sup>Note3</sup>	dB	1						
SNR Note 8 (5MHz bandwidth)	dB	-1.6	-1.6	-1.6	-1.6	-5.2	-11.9	
SNR Note 8 (10MHz bandwidth)	dB	-2.3	-2.3	-2.3	-2.3	-5.9	-11.9	
SNR Note 8 (20MHz bandwidth)	dB	-3.0	-3.0	-3.0	-3.0	-6.6	-12.6	
$N_{oc}$	dBm/15 kHz	-98						
Propagation condition		ETU 70 Hz ETU 70 Hz						
Time offset to cell1	μS		- - TO 6			33		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.

Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted Note 3: power spectral density is achieved for all OFDM symbols.

The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 4:

Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 6:

Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure Note 8:

A.7.3.40.1-1.

Table A.7.3.40.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests in synchronous dual connectivity

Field	Value		Comment
rieid	Cell 1	Cell 2	Comment
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	Sf640	Sf40	
shortDRX	disable	disable	

Table A.7.3.26.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD out-of-sync testing in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section 10.1 in TS 36.213.

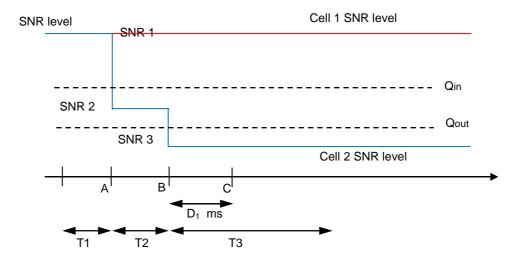


Figure A.7.3.40.1-1 SNR variation for out-of-sync testing in DRX

### A.7.3.40.2 Test Requirements

The UE behaviour during time durations T1, T2, and T3 shall be as follows:

During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CQI transmission on Cell1.

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe on Cell2.

The UE shall stop transmitting uplink signal no later than time point C (duration D1 = 900 ms after the start of time duration T3) on PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.41 E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

## A.7.3.41.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in dual connectivity. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.41.1-1, A.7.3.41.1-2, A.7.3.41.1-3 and A.7.3.41.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.41.1-1 shows the variation of the downlink SNR in the PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration for PCell and PSCell is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.41.1-1: General test parameters for E-UTRAN FDD-FDD Radio Link Monitoring Test for Insync in DRX in synchronous dual connectivity

	Parameter	Unit	Value	Comment
E-UTRA RF C	hannel Number		1, 2	Two E-UTRA FDD carrier frequency are used.
Active cell			Cell 1, Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmission	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
parameters (Note 1)	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	4	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
	ρΑ, ρΒ		0	PDCCH/PCFICH transmission parameters
	Ratio of PDCCH to RS EPRE		0	are as specified in clause 7.6.1 and Table 7.6.1-2 respectively.
	Ratio of PCFICH to RS EPRE		4	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
parameters (Note 1)	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	8	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
	ρΑ, ρΒ		0	PDCCH/PCFICH transmission parameters
	Ratio of PDCCH to RS EPRE	dB	4	are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle on		ms	640	See Table A.7.3.41.1-3
DRX cycle on		ms	40	See Table A.7.3.41.1-3
Layer 3 filterin	g		Enabled	Counters: N310 = 1; N311 = 1, N313 = 1, N314 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	2000	T313 is enabled
	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	periodicity	ms	2	Minimum CQI reporting periodicity
T1		S	4	
T2		S	1.6	
T3		S	1.46	
T4		S	0.4	
T5		S	4	

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.

Note 7:

Table A.7.3.41.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

E-UTRA RF Cha BW <sub>channel</sub>	nnel Number	Unit MHz	T1 ~ T5	T1	T2	T3	T4	T5
BW <sub>channel</sub>	nnel Number	MHz	1					
		MHz				2		
			5: $N_{RB,c} = 25$			$: N_{RB,c} = 2$		
			10: $N_{RB,c} = 50$			$): N_{RB,c} = 3$		
			20: N <sub>RB,c</sub> = 100			$: N_{RB,c} = 1$		
PCFICH/PDCCH	/PHICH		5MHz: R.11 FDD		5MI	Hz: R.11 F	FDD	
parameters defin	ed in A.3.1.2.1		10MHz: R.6 FDD		10N	//Hz: R.6 F	FDD	
			20MHz: R.10 FDD			Hz: R.10		
OCNG Pattern de	efined in A.3.2.1		5MHz: OP.16 FDD			lz: OP.16		
(FDD)			10MHz: OP.2 FDD		-	Hz: OP.2		
			20MHz: OP.12 FDD		20M	Hz: OP.12	FDD	
$\rho_A$ , $\rho_B$			0			0		
PCFICH_RB		dB	4			4		
PDCCH_RA		dB	0			0		
PDCCH_RB		dB	0			0		
PBCH_RA		dB						
PBCH_RB		dB						
PSS_RA		dB						
SSS_RA		dB dB						
	PHICH_RA PHICH_RB		- 0	0				
						· ·		
PDSCH_RA		dB						
PDSCH_RB		dB						
OCNG_RA <sup>Note1</sup>		dB						
OCNG_RB <sup>Note1</sup>		dB					1	
Note 6	5MHz BW <sub>channel</sub>		-2.3	-2.3	-5.7	-12.2	-7.3	-2.3
SNR Note 6	10MHz	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
	BW <sub>channel</sub>							
	20MHz		-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
	BW <sub>channel</sub>							
$N_{oc}$		dBm/15 kHz			-98			
Propagation cond	dition		AWGN			AWGN		
Correlation Matrix	x and Antenna		1x2 1x2					
Receive time offset to cell1 Note 7 µs - 33								
Note 1: OCNG	shall be used suc	h that the reso	ne resources in cell 1 and cell 2 are fully allocated and a constant total					
transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.  Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.								
Note 4: The signal contains PDCCH for OEs other than the device under test as part of OCNG.  Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.  Note 6: The SNR of cell 2 in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.41.1-1.								

Table A.7.3.41.1-3: DRX-Configuration for E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

antenna connector including time alignment error between the two cells.

Receive time difference between subframe boundaries of signals received from the two cells at the UE

Field	Va	lue	Comment
Field	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in
drx-InactivityTimer	psf1	psf1	section 6.3.2 in
drx-RetransmissionTimer	psf1	psf1	3GPP TS 36.331
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.41.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD-FDD Radio Link Monitoring
Test for In-sync in DRX in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

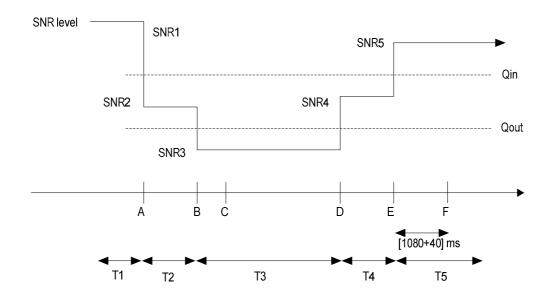


Figure A.7.3.41.1-1 SNR variation of cell 2 (PSCell) for in-sync testing in DRX

### A.7.3.41.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0) on PCell and PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.3.42 E-UTRAN FDD-FDD DC Radio Link Monitoring Test for In-sync in DRX in asynchronous DC

#### A.7.3.42.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in asynchronous dual connectivity. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.42.1-1, A.7.3.42.1-2, A.7.3.42.1-3 and A.7.3.42.1-4. There are two cells in the test. Cell 1 is PCell in MCG and cell 2 is PSCell in SCG. Before the test starts the UE is connected to cell 1 on radio channel 1 and to cell 2 on radio channel 2. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. The downlink SNR in cell 1 keeps constant in the test. Figure A.7.3.42.1-1 shows the variation of the downlink SNR in cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2 in asynchronous dual connectivity. For both cell 1 and cell 2, the UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.42.1-1: General test parameters for E-UTRAN FDD in-sync test in DRX

F	Parameter	Unit	Value	Comment
Active cells			Cell 1 and cell 2	Cell 1 (PCell) is on E-UTRA RF channel number 1 and cell 2 (PSCell) is on E-UTRA RF channel number 2
CP length	CP length		Normal	
Antenna Conf			1x2	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmissio n	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	In sync threshold Q <sub>in</sub> and the corresponding hypothetical PDCCH/PCFICH transmission
parameters	Aggregation level	CCE	4	parameters are as specified in
(Note 1)	ρ <sub>A</sub> , ρ <sub>B</sub>		0	clause and Table 7.6.1-2
	Ratio of PDCCH to RS EPRE		0	respectively.
	Ratio of PCFICH to RS EPRE		4	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmissio	Number of Control OFDM symbols		2	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
n	Aggregation level	CCE	8	PDCCH/PCFICH transmission
parameters	ρ <sub>A</sub> , ρ <sub>B</sub>		0	parameters are as specified in
(Note 1)	Ratio of PDCCH to RS EPRE	dB	4	clause 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle in		ms	640	See Table A.7.3.42.1-3
DRX cycle in		ms	40	See Table A.7.3.42.1-3
Layer 3 filtering	Layer 3 filtering		Enabled	Counters: N310 = 1; N311 = 1; N313 = 1; N314 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer	T311 timer		1000	T311 is enabled
T313 timer		ms	2000	T313 is enabled
Periodic CQI reporting mode			PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		S	4	
T2		S	1.6	
T3		S	1.46	
T4		S	0.4	
T5		S	4	

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Note 2: The parameters in the table apply to both cell 1 and cell 2 unless defined otherwise.

Note 3: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.6.11.

Table A.7.3.42.1-2: Cell specific test parameters for E-UTRAN FDD for in-sync radio link monitoring in DRX

-	)anamatan	l lmit	Cell 1 (PCell)	ell) Cell 2 (PSCell)				
•	Parameter	Unit	T1 ~ T5	T1	T2	T3	T4	T5
E-UTRA RF	Channel Number		1			2		
E-UTRA Cha	E-UTRA Channel Bandwidth		5, 10, 20	5, 10, 20				
(BW <sub>channel</sub> )								
PCFICH/PD	CCH/PHICH		5MHz: R.11			IHz: R.11 I		
parameters.			FDD			MHz: R.6 I		
	PDCCH are intended		10MHz: R.6		201	//Hz: R.10	FDD	
for the UE u	nder test.		FDD					
			20MHz: R.10					
00110 P #			FDD					
OCNG Patte	rn		5MHz: OP.16					
			FDD 10MHz: OP.2		5MI	Hz: OP.16	FDD	
			FDD		10N	/IHz: OP.2	FDD	
			20MHz: OP.12		20M	Hz: OP.12	FDD	
			FDD					
ρ <sub>A</sub> , ρ <sub>B</sub>			0	0				
PCFICH_RE		dB	4	4				
PDCCH RA		dB	0	0				
PDCCH_RB		dB	0			0		
PBCH_RA		dB						
PBCH_RB		dB						
PSS_RA		dB						
SSS_RA		dB						
PHICH_RA		dB	0			0		
PHICH_RB		dB				U		
PDSCH_RA		dB						
PDSCH_RB	2601	dB						
OCNG_RAN		dB	_					
OCNG_RB <sup>NO</sup>		dB				1		
SNR Note 6	5MHz BW <sub>channel</sub>	dB	-2.3	-2.3	-5.7	-12.2	-7.3	-2.3
	10MHz BW <sub>channel</sub>	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
	20MHz BW <sub>channel</sub>	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
$N_{oc}$		dBm/15	-98		.1			
		kHz						
Propagation condition				AWGN	<u> </u>			
Receive time	e offset to cell1 Note 7	μs	-			500		
	CNG shall be used such					ated and a	constant t	otal
transmitted power spectral density is achieved for all OFDM symbols.								

Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.

Table A.7.3.42.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Cell 1	Cell 2	Comment
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in
drx-InactivityTimer	psf1	psf1	TS 36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 6: The SNR of cell 2 in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.6.1-1.

Note 7: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells..

Table A.7.3.42.1-4: TimeAlignmentTimer - Configuration for E-UTRAN FDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

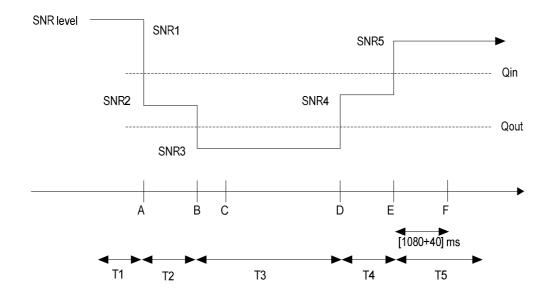


Figure A.7.3.42.1-1 Cell 2 SNR variation for in-sync testing in DRX

#### A.7.3.42.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal on cell 2 at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.3.43 E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

### A.7.3.43.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in dual connectivity. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.43.1-1, A.7.3.43.1-2, A.7.3.43.1-3 and A.7.3.43.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.43.1-1 shows the variation of the downlink SNR in the PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration for PCell and PSCell is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.43.1-1: General test parameters for E-UTRAN TDD-TDD Radio Link Monitoring Test for Insync in DRX in synchronous dual connectivity

	Parameter	Unit	Value	Comment
E-UTRA RF C	hannel Number		1, 2	Two E-UTRA TDD carrier frequency are used.
Active cell			Cell 1, Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
In sync transmission	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
parameters (Note 1)	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	4	In sync threshold Q <sub>in</sub> and the corresponding hypothetical
	ρΑ, ρΒ		0	PDCCH/PCFICH transmission parameters
	Ratio of PDCCH to RS EPRE		0	are as specified in clause 7.6.1 and Table 7.6.1-2 respectively.
	Ratio of PCFICH to RS EPRE		4	
	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
Out of sync transmission	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
parameters (Note 1)	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	8	Out of sync threshold Q <sub>out</sub> and the corresponding hypothetical
	ρΑ, ρΒ		0	PDCCH/PCFICH transmission parameters
	Ratio of PDCCH to RS EPRE	dB	4	are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle on		ms	640	See Table A.7.3.43.1-3
DRX cycle on		ms	40	See Table A.7.3.43.1-3
Layer 3 filterin	g		Enabled	Counters: N310 = 1; N311 = 1, N313 = 1, N314 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	2000	T313 is enabled
Periodic CQI r			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	periodicity	ms	1	Minimum CQI reporting periodicity
T1		S	4	
T2		S	1.6	
T3		S	1.46	
T4		S	0.4	
T5		S	4	sync transmission parameters need not be

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.

Table A.7.3.43.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Parameter		Unit	Cell 1(PCell)		Ce	II 2 (PSC	ell)	
Pa			T1 ~ T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number			1			2		
BW <sub>channel</sub>		MHz	5: N <sub>RB,c</sub> = 25		5: N <sub>RB,c</sub> = 25			
			10: $N_{RB,c} = 50$		10	$O: N_{RB,c} = $	50	
			20: N <sub>RB,c</sub> = 100		20	: N <sub>RB,c</sub> = 1	00	
Special subfra	me		6			6		
configuration	ote i							
	nk configuration Note2		1			1		
PCFICH/PDC			5MHz: R.11 TDD			Hz: R.11 <sup>-</sup>		
parameters de	fined in A.3.1.2.1		10MHz: R.6 TDD			//Hz: R.6		
			20MHz: R.10 TDD		20M	Hz: R.10	TDD	
	defined in A.3.2.1		5MHz: OP.10 TDD		5ME	lz: OP.10	TDD	
(FDD)			10MHz: OP.2 TDD		-	Hz: OP.2		
			20MHz: OP.8 TDD			Hz: OP.8		
ρ <sub>A</sub> , ρ <sub>B</sub>		-ID	0			0		
PCFICH_RB		dB	4			4		
PDCCH_RA		dB	0	0				
PDCCH_RB		dB	0			0		
PBCH_RA		dB						
PBCH_RB		dB						
PSS_RA		dB	4					
SSS_RA		dB						
PHICH_RA		dB	0	0 0				
PHICH_RB		dB						
PDSCH_RA		dB						
PDSCH_RB	1	dB						
OCNG_RA <sup>Note</sup>	1	dB						
OCNG_RB <sup>Note</sup>		dB				10.4	0.4	
SNR Note 6	5MHz BW <sub>channel</sub>	ID.	-5.1	-5.1	-9.1	-13.1	-9.1	-5.1
SNR	10MHz	dB	-5.1	-5.1	-9.1	-13.1	-9.1	-5.1
	BW <sub>channel</sub>							
	20MHz		-5.1	-5.1	-9.1	-13.1	-9.1	-5.1
BW <sub>channel</sub>								
$N_{oc}$		dBm/15 kHz	-98					
Propagation condition			AWGN			AWGN		
Correlation Ma	atrix and Antenna		1x2			1x2		
Configuration	Configuration							
Receive time of	offset to cell1 Note 9	μS	- 33					

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.

Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.

Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.

Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.43.1-1.

Note 9: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.3.43.1-3: DRX-Configuration for E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Field	Value		Comment
Field	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in
drx-InactivityTimer	psf1	psf1	section 6.3.2 in
drx-RetransmissionTimer	psf1	psf1	3GPP TS 36.331
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.43.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD-TDD Radio Link Monitoring
Test for In-sync in DRX in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

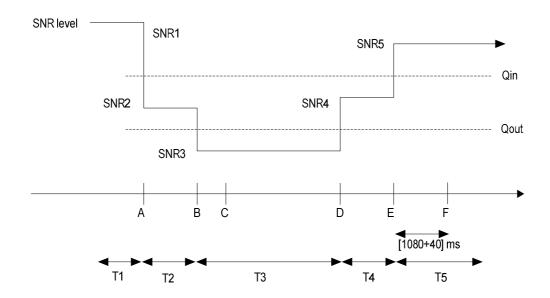


Figure A.7.3.43.1-1 SNR variation of cell 2 (PSCell) for in-sync testing in DRX

### A.7.3.43.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0) on PCell and PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.4 Interruption for Dual Connectivity

## A.7.4.1 E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

## A.7.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that when PCell is in non-DRX and PSCell is in DRX, PCell interruptions due to transitions from active to non-active and from non-active to active during PSCell DRX the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for FDD PCell in dual connectivity requirements in clause 7.12.2.

The test parameters are given in Table A.7.4.1.1-1, A.7.4.1.1-2 and A.7.4.1.1-3 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. PCell is continuously scheduled in DL while PSCell is not scheduled and has DRX configured. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as PCell and Cell2 shall be configured as PSCell. Prior to start of T1 the DRX inactivity timer for the PSCell have already expired. During T1 the UE shall be continuously scheduled on PCell while not scheduled on PSCell.

Table A.7.4.1.1-1: General test parameters for E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test.
Active PCell		Cell1	PCell on RF channel number 1.
Configured PSCell		Cell2	PSCell on RF channel number 2.
CP length		Normal	
DRX		ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measurement gap pattern Id		OFF	
T1	s	10	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: A UE capable of both synchronous and asynchronous DC operations is only required to pass this test case in accordance with the principle defined in section A.3.11.

Table A.7.4.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Cell1	Cell2
		T1	T1
E-UTRA RF Channel		1	2
Number	NAL I-	EMILE: N. OF	EMILE: NI OF
BW <sub>channel</sub>	MHz	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$
		$1000Hz$ : $N_{RB,c} = 30$ $20MHz$ : $N_{RB,c} = 100$	$1000Hz$ : $N_{RB,c} = 30$ $20MHz$ : $N_{RB,c} = 100$
PDSCH parameters:		5MHz: R.TBD FDD	5MHz: R.5 FDD
DL Reference		10MHz: R.3 FDD	10MHz: R.0 FDD
Measurement Channel		20MHz: R.6 FDD	20MHz: R.4 FDD
PCFICH/PDCCH/PHICH		5MHz: R.11 FDD	5MHz: R.11 FDD
parameters:		10MHz: R.6 FDD	10MHz: R.6 FDD
DL Reference		20MHz: R.10 FDD	20MHz: R.10 FDD
Measurement Channel			
OCNG Patterns		5MHz: OP.16 FDD	5MHz: OP.15 FDD
		10MHz: OP.2 FDD 20MHz: OP.12 FDD	10MHz: OP.1 FDD 20MHz: OP.11 FDD
PBCH_RA	dB	201VII 12. OF . 12 FDD	ZUIVII IZ. OF. I I FDD
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_PB	dB	0	0
PDCCH_RA	dB		
PDCCH_PB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup> OCNG_RB <sup>Note 1</sup>	dB		
	dB dBm/15		
$N_{oc}$ Note 2	KHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	19	19
$\hat{E}_s/I_{ot}$	dB	19	19
RSRP Note 3	dBm/15	-82	-82
SCH_RP Note 3	KHz		<u> </u>
	dBm/15 KHz	-82	-82
lo Note 3	dBm/Ch	-54.16	-54.16
	BW	+10log	+10log
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
Propagation Condition		AWGN	AWGN
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low
Time offset to cell1 Note 4	II.C	_	33
	μS	ot both calls are fully alles	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.7.4.1.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer <sup>Note 1</sup>	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	Sf160	
shortDRX	disable	disable	
Note 1: UE is continuously scheduled	in PCell		

### A.7.4.1.2 Test Requirements

The UE shall shall be continuously scheduled in PCell during the entire length of T1. UE shall not be scheduled in PSCell during T1. During the time duration T1 the UE shall transmit at leat 99% of ACK/NACK on PCell.

The UE shall not miss transmitting two consequtive ACK/NACK.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.4.2 E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

### A.7.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that when PCell is in non-DRX and PSCell is in DRX, PCell interruptions due to transitions from active to non-active and from non-active to active during PSCell DRX the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for TDD PCell in dual connectivity requirements in clause 7.12.2.

The test parameters are given in Table A.7.4.2.1-1, A.7.4.2.1-2 and A.7.4.2.1-3 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. PCell is continuously scheduled in DL while PSCell is not scheduled and has DRX configured. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as PCell and Cell2 shall be configured as PSCell. Prior to start of T1 the DRX inactivity timer for the PSCell have already expired. During T1 the UE shall be continuously scheduled on PCell while not scheduled on PSCell.

Table A.7.4.2.1-1: General test parameters for E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2	Two radio channels are used for this test.
Number		1, 2	
Active PCell		Cell1	PCell on RF channel number 1.
Configured PSCell		Cell2	PSCell on RF channel number 2.
Special subframe		6	As specified in table 4.2-1 in TS 36.211.
configuration			Applicable to cell 1
Uplink-downlink		1	As specified in table 4.2-1 in TS 36.211.
configuration			Applicable to Cell1
CP length		Normal	As specified in table 4.2-2 in TS 36.211.
			Applicable to Cell1
DRX		ON	DRX related parameters are defined in
		ON	Table A.8.23.4.1-3
Measurement gap pattern		OFF	
Id		OFF	
T1	S	10	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: A UE capable of both synchronous and asynchronous DC operations is only required to pass this test case in accordance with the principle defined in section A.3.11.

Table A.7.4.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Cell1	Cell2		
		T1	T1		
E-UTRA RF Channel		1	2		
Number		•	<del>-</del>		
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB,c</sub> = 25	5MHz: N <sub>RB,c</sub> = 25		
		10MHz: $N_{RB,c} = 50$	10MHz: $N_{RB,c} = 50$		
DDCCU parameters:		20MHz: N <sub>RB,c</sub> = 100	20MHz: $N_{RB,c} = 100$ 5MHz: R.TBD TDD		
PDSCH parameters: DL Reference		5MHz: R.4 TDD 10MHz: R.0 TDD	10MHz: R.TBD TDD		
Measurement Channel		20MHz: R.4 FDD	20MHz: R.TBD TDD		
PCFICH/PDCCH/PHICH					
parameters:		5MHz: R.11 TDD	5MHz: R.11 TDD		
DL Reference		10MHz: R.6 TDD	10MHz: R.6 TDD		
Measurement Channel		20MHz: R.10 TDD	20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.10 TDD	5MHz: OP.9 TDD		
		10MHz: OP.2 TDD	10MHz: OP.1 TDD		
		20MHz: OP.8 TDD	20MHz: OP.7 TDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB	0	0		
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}^{ m Note~2}$	dBm/15 KHz	-101	-101		
	dB				
$\hat{E}_s/N_{oc}$	QD.	19	19		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	19	19		
RSRP Note 2	dBm/15				
	KHz	-82	-82		
SCH_RP Note 2	dBm/15	20	20		
	KHz	-82	-82		
lo Note 3	dBm/Ch	-54.16	-54.16		
	BW	+10log	+10log		
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)		
Propagation Condition		AWGN	AWGN		
Correlation Matrix and	]	1x2 Low	1x2 Low		
Antenna Configuration	ļ	IAZ LUW			
Time offset to cell1 Note 3	μs	-	33		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.7.4.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer <sup>Note 1</sup>	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	Sf160	
shortDRX	disable	disable	
Note 1: UE is continuously scheduled	in PCell		

### A.7.4.2.2 Test Requirements

The UE shall shall be continuously scheduled in PCell during the entire length of T1. UE shall not be scheduled in PSCell during T1. During the time duration T1 the UE shall transmit at leat 99% of ACK/NACK on PCell.

The UE shall not miss transmitting two consequtive ACK/NACK.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.7.4.3 E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

### A.7.4.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE fulfils the requirement on interruptions on PCell at transitions between active and non-active during DRX in TS36.133 section 7.12.2.

The test parameters are given in Table A.7.4.3.1-1, Table A.7.4.3.1-2 and Table A.7.4.3.1-3 below. In the test there are two cells: Cell 1 and Cell 2. Cell 1 is PCell on the FDD primary component (RF channel 1). Cell 2 is PSCell on the FDD secondary component (RF channel 2). The test consists of 1 time period, with time duration of T1. PDCCH indicating a new transmission on PCell shall be sent continuously during the whole time duration to ensure UE would not enter DRX state on PCell. PSCell is in DRX state with 320ms DRX cycle.

Table A.7.4.3.1-1: General test parameters for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Parameter	Unit	Value	Comment		
E-UTRA RF Channel		1, 2	Two radio channels are used for this test		
Number		1, 2			
Active Cell			Cell 1 is PCell on E-UTRA RF channel		
		Cell 1, Cell 2	number 1, and cell 2 is PSCell on E-UTRA		
			RF channel number 2		
CP length		Normal			
DRX on Cell1		OFF			
DRX on Cell2	ms	320			
Filter coefficient		0	L3 filtering is not used		
T1	S	5			
Note 1: Even a UE capable of both synchronous and asynchronous DC operations is required to pass					

Note 1: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.

Table A.7.4.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Parameter	Unit Cell 1		Cell 2
		T1	T1
E-UTRA RF Channel		1	2
Number			
BW <sub>channel</sub>	MHz	5: $N_{RB,c} = 25$	5: $N_{RB,c} = 25$
		10: $N_{RB,c} = 50$	10: $N_{RB,c} = 50$
		20: $N_{RB,c} = 100$	20: $N_{RB,c} = 100$
Correlation Matrix and		1x2 Low	1x2 Low
Antenna Configuration			
PDSCH parameters		5MHz: R.7 FDD	-
		10MHz: R.3 FDD	
		20MHz: R.6 FDD	
PCFICH/PDCCH/PHIC		5MHz: R.11 FDD	5MHz: R.11 FDD
H parameters		10MHz: R.6 FDD	10MHz: R.6 FDD
		20MHz: R.10 FDD	20MHz: R.10 FDD
OCNG Patterns		5MHz: OP.20 FDD	5MHz: OP.16 FDD
defined in A.3.2.1.1		10MHz: OP.10 FDD	10MHz: OP.2 FDD
(OP.1 FDD)		20MHz: OP.17 FDD	20MHz: OP.12 FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB	0	0
PHICH_RA	dB	0	0
PHICH_PB	dB		
PDCCH_RA	dB		
PDCCH_PB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$N_{oc}^{ m Note~3}$	dBm/15 KHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	19	19
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	19	19
RSRP Note 4	dBm/15 KHz	-82	-82
SCH_RP Note 4	dBm/15 KHz	-82	-82
lo Note 3	dBm/Ch BW	-54.16+10log	-54.16+10log
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
Propagation Condition		AWGN	AWGN
Antenna Configuration		1x2	1x2
Receive timing offset to Cell1 Note 5	μs	-	500

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission on PCell are assigned to the UE prior to the start of time period T1 to the end of T2. The resources for uplink transmission on PSCell are assigned to the UE prior to the start of time period T3 to the end of T4.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.4.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Field	PSCell Value	Comment			
onDurationTimer	psf1				
drx-InactivityTimer	psf1				
drx-RetransmissionTimer	psf1				
longDRX-CycleStartOffset	sf320				
shortDRX	disable				
Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.7.4.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Field	PSCell	Comment
rield	Value	
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.7.4.3.2 Test Requirements

The UE shall be scheduled on PCell continuously during the whole time duration T1. During time durations T1, at least 99% of all expected ACK/NACKs shall be transmitted on PCell by the UE.

Each interruption shall not exceed 1 subframe.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.7.5 Proximity-based Services

# A.7.5.1 E-UTRAN FDD – UE ProSe Direct Discovery Transmission Timing Accuracy Test

### A.7.5.1.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Discovery transmissions when PCell downlink timing is used as a reference with  $N_{\rm TA,SL}=0$ . This test will verify the requirements in clause 7.16.2.1.1.1 ProSe Direct Discovery transmissions. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.7.5.1.1-1 below. There is one active cell (PCell) in this test. The transmit timing is verified using the transmission timing of PSDCH.

Table A.7.5.1.1-1: Test parameters for ProSe Transmission Timing Accuracy test for E-UTRAN FDD

Cell 1	Parameter	Unit	Value	Comment
Active cellCell 1E-UTRA FDD Cell 1 on RF channel number 1CP length of Cell 1Normaldrx-ConfigurationDRX_P1As specified in Table A.3.12.12.11ProSe Direct Discovery resource pool configurationAs specified in Table A.3.12.4-1 (Configuration #1)IE values unless specified otherwise in this test.PDCCH/PCFICH/PHICH Reference measurement channel Note 1R.11 FDDIE values unless specified otherwise in this test.OCNG Pattern Note 2OP.16 FDDPDCH_RAPBCH_RAPBCH_RAPBCH_RAPBCH_RAPSS_RABRABRASSS_RABRABRAPDCCH_RABRABRABRAPDCCH_RABRABRABRAPDCCH_RABRABRA	E-UTRA RF Channel Number		1	
Cell 1	Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
drx-ConfigurationDRX_P1As specified in Table A.3.12 1ProSe Direct Discovery resource pool configurationAs specified in Table A.3.12.4-1 (Configuration #1)IE values unless specified otherwise in this test.PDCCH/PCFICH/PHICH Reference measurement channel Note1R.11 FDDOCNG Pattern Note2OP.16 FDDPBCH_RAOP.16 FDDPBCH_RBPBCH_RBPSS_RASSS_RAPCFICH_RBBACKPHICH_RABACKPDCCH_RBBACKPDCCH_RBBACKPDCCH_RBBACKOCNG_RA Note3CONG_RA Note3OCNG_RB Note3CONG_RA Note3OCNG_RA Note3CONG_RA Note3OCN	Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
ProSe Direct Discovery resource pool configuration	CP length of Cell 1		Normal	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	drx-Configuration		DRX_P1	As specified in Table A.3.12.2-
measurement channel Note1R.TTFDDOCNG Pattern Note2OP.16 FDDPBCH_RAOP.16 FDDPBCH_RBPSS_RAPSS_RASSS_RAPCFICH_RBOP.16 FDDPHICH_RAOPHICH_RBOPDCCH_RAOCNG_RAOCNG_RANOte3OCNG_RANOte3OCNG_RBNOte3OCNG_RANOte3 $P$ DCNG_NOTE $P$			Table A.3.12.4-1	IE values unless specified otherwise in this test.
OCNG Pattern Note2         OP.16 FDD           PBCH_RA         PBCH_RB           PSS_RA         SSS_RA           PCFICH_RB         DESCHIEF NOTE NOTE NOTE NOTE NOTE NOTE NOTE NOTE	measurement channel <sup>Note1</sup>		R.11 FDD	
PBCH_RA         PBCH_RB         PSS_RA         SSS_RA         PCFICH_RB         PHICH_RA       dB         PDCCH_RB         PDCCH_RB         OCNG_RA         OCNG_RBNote3         OCNG_RBNote3         dBm/15 kHz       -98 $\hat{E}_s/N_{oc}$ dB       3         RSRP Note4       dBm/15 kHz       -95         SCH_RP Note 4       dBm/15 kHz       -95	OCNG Pattern <sup>Note2</sup>		OP.16 FDD	
$\hat{E}_s/N_{oc}$ dB 3 RSRP Note 4 dBm/15 kHz -95 SCH_RP Note 4 dBm/15 kHz -95	PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note3	dB	0	
RSRP Note 4         dBm/15 kHz         -95           SCH_RP Note 4         dBm/15 kHz         -95	$N_{oc}$	dBm/15 kHz	-98	
SCH_RP Note 4 dBm/15 kHz -95		dB	3	
			-95	
Propagation condition AWGN		dBm/15 kHz	-95	
1 U	Propagation condition		AWGN	

Note 1: For the reference measurement channels, see clause A.3.1.

### A.7.5.1.2 Test Requirements

For parameters specified in Tables A.7.5.1.1-1, the timing accuracy for ProSe Direct Discovery transmissions shall be within the limits defined in clause 7.16.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 5MHz channel bandwidth, the test sequence shall be carried out in RRC\_CONNECTED DRX with a cycle length of 320ms:

- a) After a connection is set up with the cell, the test system shall verify that the ProSe UE transmit timing offset is within  $\pm$  12×T<sub>S</sub> with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+32\times T_S$  (approximately  $+1\mu s$ ) compared to that in (a). The test system shall wait for at least one discovery period (320ms) before verifying the requirement again in (c).
- c) The test system shall verify that the UE transmit timing offset stays within  $\pm$  12×T<sub>S</sub> with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

Note 2: For the OCNG pattern, see clause A.3.2.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.7.5.2 E-UTRAN TDD – UE ProSe Direct Discovery Transmission Timing Accuracy Test

### A.7.5.2.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Discovery transmissions when PCell downlink timing is used as a reference with  $N_{\rm TA,SL}=0$ . This test will verify the requirements in clause 7.16.2.1.1.1 for ProSe Direct Discovery transmissions. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.7.5.2.1-1 below. There is one active cell (PCell) in this test. The transmit timing is verified using the transmission timing of PSDCH.

Table A.7.5.2.1-1: Test parameters for ProSe Transmission Timing Accuracy test for E-UTRAN TDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
Uplink/Downlink Configuration		Config 0	
Special Subframe Configuration		6	
CP length of Cell 1		Normal	
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-3 (Configuration #3)	IE values unless specified otherwise in this test.
PDCCH/PCFICH/PHICH Reference measurement channel <sup>Note1</sup>		R.11 TDD	
OCNG Pattern <sup>Note2</sup>		OP.10 TDD	
PBCH_RA			
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA	dB	0	
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
OCNG_RA <sup>Note3</sup>			
OCNG_RB <sup>Note3</sup>			
$N_{oc}$	dBm/15 kHz	-98	
$\hat{E}_{s}/N_{oc}$	dB	3	
RSRP Note4	dBm/15 kHz	-95	
SCH_RP Note 4	dBm/15 kHz	-95	
Propagation condition		AWGN	

Note 1: For the reference measurement channels, see clause A.3.1.

Note 2: For the OCNG pattern, see clause A.3.2.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.7.5.1.2 Test Requirements

For parameters specified in Tables A.7.5.2.1-1, the timing accuracy for ProSe Direct Discovery transmissions shall be within the limits defined in clause 7.16.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 5MHz channel bandwidth, the test sequence shall be carried out in RRC\_CONNECTED DRX with a cycle length of 320ms:

- a) After a connection is set up with the cell, the test system shall verify that the ProSe UE transmit timing offset is within  $624 \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+32 \times T_S$  (approximately  $+1 \mu s$ ) compared to that in (a). The test system shall wait for at least one discovery period (320ms) before verifying the requirement again in (c).
- c) The test system shall verify that the UE transmit timing offset stays within  $624 \times T_S \pm 12 \times T_S$  with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

## A.7.5.3 E-UTRAN FDD - Interruptions due to ProSe Direct Discovery

#### A.7.5.3.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to the allowed PCell interruptions due to ProSe Direct Discovery defined in clause 7.16.3.1 and clause 7.16.3.3. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to monitor ProSe Direct Discovery.

The test parameters are given in Table A.7.5.3.1-1 and Table A.7.5.3.1-2 below. There is one active cell (PCell) in this test and 24 active Sidelink transmissions in this test (with 12 active Sidelink UEs per configured discovery subframe). Two tests (Test 1 and Test 2) are defined to verify interruptions due to synchronous (Test 1) and asynchronous (Test 2) ProSe Direct Discovery.

The tests consist of three successive time periods, with time duration of T1, T2 and T3 respectively.

During T1, the UE is in RRC\_IDLE and monitoring the ProSe Direct Discovery announcements from other active Sidelink UEs on the ProSe Direct Discovery resources.

During T2, the test system establishes a RRC connection with the UE. No PDSCH traffic is scheduled for UE during T2, and the UE is expected to transmit *SidelinkUEInformation* indicating *discRxInterest* during T2. On reception of *SidelinkUEInformation*, the test system shall RRC reconfiguration message to the UE and wait for the UE to respond with RRC reconfiguration complete message before transitioning to T3. If the UE does not transmit *SidelinkUEInformation* for up to [2] sec, the test system shall transition to T3.

During T3, the UE is scheduled with PDSCH traffic on PCell downlink. The test system will count the missed ACK/NACKs during T3 to verify the allowed interruptions during ProSe Direct Discovery.

Table A.7.5.3.1-1: Test parameters for interruption due to ProSe Direct Discovery tests

Parameter	Unit	Value		Comment
Farameter	Onit	Test 1	Test 2	Comment
E-UTRA RF Channel Number		1		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	5	
Active cell		Cell 1		E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Nor	mal	
T1	S	5.	12	
T2	S	Up to receiving RRC reconfiguration setup complete from the UE, or up to [2] sec if UE does not transmit <i>SidelinkUEInformation</i> during this period.		
Т3	S	10.		

Table A.7.5.3.1-2: ProSe Direct Discovery configuration for interruption due to ProSe Direct Discovery tests

Parameter	Unit	Value		Comment
Parameter	Unit	Test 1	Test 2	Comment
E-UTRA RF Channel Number		1	ĺ	UL carrier frequency
Channel Bandwidth	MHz	5		
(BW <sub>channel</sub> )	IVII IZ	3		
ProSe Direct Discovery		As specified in Table	As specified in Table	IE values unless
resource pool configuration		A.3.12.4-1	A.3.12.4-2	specified otherwise
		(Configuration #1)	(Configuration #2)	in this test.
Antivo Cidalink III.		PDP.1.FDD	PDP.2.FDD	Transmitting ProSe
Active Sidelink UEs Configuration		As specified in Table	As specified in Table	Direct Discovery (Test 1 and 2) and
Configuration		A.3.12.8.2-1	A.3.12.8.2-1	SLSS (for Test 2)

Table A.7.5.3.1-3: Cell specific test parameters for interruption due to ProSe Direct Discovery tests

Dara	meter	Unit	Cell 1		
Para	meter	Unit	T1 T2		T3
E-UTRA RF Channel N	lumber		1		
BW <sub>channel</sub>		MHz		5	
UE RRC state			IDLE	CONN	ECTED
Paging configuration	defaultPagingCycle nB		rf256 T / 32	١	I/A
DRX	1115		N/A	С	FF
PDSCH Reference med defined in A.3.1.1.1 Note:	1		N/A	None	R.5 FDD
PDCCH/PCFICH/PHIC	H Reference defined in A.3.1.2.1 <sup>Note1</sup>			R.11 FDD	
OCNG Pattern				OP.16 FDD	
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB		dB		0	
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RANote 1					
OCNG_RB <sup>Note 1</sup>					
$N_{oc}^{$		dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$		dB	16		
RSRP Note3		dBm/15 kHz	-82		
SCH_RP Note 3		dBm/15 kHz	-82		
Propagation Condition				AWGN	
density is ac	be used such that cell is for chieved for all OFDM symbol from other cells and noise	ols.		•	•

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.7.5.3.2 Test Requirements

The UE shall be scheduled on PCell continuously during T3.

In Test 1, at least 98.75% of all expected ACK/NACKs during T3 shall be transmitted by the ProSe UE. The missed ACK/NACKs can occur only on subframe 'n', if either n±1 subframe is a discovery subframe, or if n-3, or n-5 is a discovery subframe.

NOTE: For the test configuration in Table A.7.5.3.1-1 and Table A.7.5.3.1-2, the specific subframes where missed ACK/NACKs are allowed are when (subframe mod 320) = 159, 163, 162, 166, corresponding to allowed interruptions on subframe 159 and 162.

In Test 2, at least 97.5% of all expected ACK/NACKs during T3 shall be transmitted by the ProSe UE. The missed ACK/NACK can occur only on subframe 'n', if either n±5 subframe is a discovery or SLSS subframe, or if n+1, or n-9 is a discovery or SLSS subframe.

NOTE: For the test configuration in Table A.7.5.3.1-1 and Table A.7.5.3.1-2, the specific subframes where missed ACK/NACKs are allowed are when (subframe mod 320) = 135, 139, 145, 149, 155, 159, 166, 170, corresponding to allowed interruptions on subframes 135, 145, 155 and 166.

# A.7.5.4 E-UTRAN FDD – UE ProSe Direct Communication Transmission Timing Accuracy Test

## A.7.5.4.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Communication transmissions when PCell downlink timing is used as a reference with  $N_{\rm TA,SL}=0$ . This test will verify the requirements in clause 7.16.2.1.1.1 for ProSe Direct Communication transmissions. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A.7.5.4.1-1 below. There is one active cell (PCell) in this test. The test system will configure the ProSe UE to transmit SLSS in each period (40ms) by configuring *networkControlledSyncTx* as ON via dedicated RRC signaling. The transmit timing is verified using the transmission timing of SLSS transmissions.

Table A.7.5.4.1-1: Test parameters for ProSe Transmission Timig Accuracy test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5 or 10	Note 5
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
ProSe Direct Communication configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test.
networkControlledSyncTx		ON	Configured
PDCCH/PCFICH/PHICH Reference measurement channel Note1		5 MHz: R.11 FDD 10 MHz: R.6 FDD	
OCNG Pattern <sup>Note2</sup>		5 MHz: OP.16 FDD 10 MHz: OP.2 FDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA OCNG_RB Note3	dB	0	
$N_{oc}$	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
RSRP Note4	dBm/15 kHz	-95	
SCH_RP Note 4	dBm/15 kHz	-95	
Propagation condition		AWGN	

Note 1: For the reference measurement channels, see clause A.3.1.

Note 2: For the OCNG pattern, see clause A.3.2.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: This test is according to the principle defined in section A.3.12.3.

### A.7.5.4.2 Test Requirements

For parameters specified in Tables A.7.5.4.1-1, the timing accuracy for ProSe Direct Communication transmissions shall be within the limits defined in clause 7.16.2. The timing accuracy is verified using SLSS transmissions.

The following sequence of events shall be used to verify that the requirements are met.

For 5MHz or 10MHz channel bandwith, the test sequence shall be carried out in RRC\_CONNECTED DRX with a cycle length of 320ms:

- a) After a connection is set up with the cell, the test system shall verify that the ProSe UE SLSS transmission timing offset is within  $\pm$  12×T<sub>S</sub> with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.
- b) The test system adjusts the downlink transmit timing for the cell by  $+32 \times T_S$  (approximately  $+1 \mu s$ ) compared to that in (a). The test system shall wait for at least one SLSS period (40ms) before verifying the requirement again in (c).
- c) The test system shall verify that the UE SLSS transmissiontiming offset stays within  $\pm$  12×T<sub>S</sub> with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

## A.7.5.5 E-UTRAN FDD - Interruptions due to ProSe Direct Communication

#### A.7.5.5.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to PCell interruptions due to ProSe Direct Communication defined in clause 7.16.3. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to monitor ProSe Direct Communication.

The test parameters are given in Table A.7.5.5.1-1, Table A.7.5.5.1-2 and Table A.7.5.5.1-3 below. There is one active cell (PCell) in this test and 12 (5MHz) or 16 (10 MHz) active Sidelink UEs in this test transmitting ProSe Direct Communication.

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively.

During T1, the UE is in RRC\_IDLE and monitoring the ProSe Direct Communication transmission from other active Sidelink UEs on the ProSe Direct Communication resoruces.

During T2, the test system establishes a RRC connection with the UE. No PDSCH traffic is scheduled for UE during T2, and the UE is expected to transmit *SidelinkUEInformation* indicating *commRxInterestedFreq* during T2. On reception of *SidelinkUEInformation*, the test system shall RRC reconfiguration message to the UE and wait for the UE to repond with RRC reconfiguration complete message before transitioning to T3. If the UE does not transmit *SidelinkUEInformation* for up to [2] sec, the test system shall transition to T3.

During T3, the UE is scheduled with PDSCH traffic on PCell downlink. The test system will count the missed ACK/NACKs during T3 to verify the allowed interruptions during ProSe Direct Communication (no missed ACK/NACKs are allowed).

Table A.7.5.5.1-1: Test parameters for interruption due to ProSe Direct Communication tests

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
T1	S	5.12	
T2	s	Up to receiving RRC reconfiguration setup complete from the UE, or up to [2] sec if UE does not transmit SidelinkUEInformation during this period.	
Т3	S	10.24	
Note 1: This test is according to the p	rinciple d	efined in section A.3.12.3.	

Table A.7.5.5.1-2: ProSe Direct Communication specific configuration for interruption due to ProSe Direct Communication tests

Parameter	Unit	Value	Comment		
E-UTRA RF Channel Number		1	UL carrier frequency		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5 or 10	According to principle defined in clause A.3.12.3		
ProSe Direct Communication configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test.		
Active Sidelink UEs Configuration Note 1  PCP.1.FDD  As specified in Table A.3.12.8.1-1  PCP.1.FDD  Communication (PSCCH + PSSCH)					
Note 1: This test is according to the prin	nciple def	ned in section A.3.12.3.	·		

Table A.7.5.5.1-2: Cell specific test parameters for interruption due to ProSe Direct Communication tests

Para	meter	Unit	Cell 1		
		Offic	T1	T2	T3
E-UTRA RF Channel N	umber			1	
BW <sub>channel</sub> Note 4		MHz		5 or 10	
UE RRC state			IDLE	CONN	ECTED
Danis a sastinuartica	defaultPagingCycle		rf256	N	/^
Paging configuration	nB		T / 32	IN IN	/A
DRX			N/A	0	FF
PDSCH Reference mea defined in A.3.1.1.1 Note1			N/A	None	R.7 FDD (5MHz) or R.3 FDD (10MHz) (Note 5 applies)
PDCCH/PCFICH/PHIC	H Reference		_	5 MHz: R.11 FD	n
measurement channel on Note 4	defined in A.3.1.2.1 Note1,			10 MHz: R.6 FD	
OCNG Pattern Note 4			10	5 MHz: OP.16 0 MHz: OP.2 FD	)D
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB		dB		0	
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note 1</sup>					
OCNG_RB <sup>Note 1</sup>					
$N_{oc}^{$		dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$		dB		16	
RSRP Note3		dBm/15 kHz		-82	
SCH_RP Note 3		dBm/15 kHz		-82	
Propagation Condition			AWGN		
density is ac	be used such that cell is f hieved for all OFDM symb from other cells and noise	ools.		·	
	and time and shall be mod	•			
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					not settable
Note 4: This test is according to the principle defined in section A.3.12.3.					
Note 4. This test is according to the principle defined in section A.3.12.3.  Note 5: The PDSCH scheduled subframes for R.7 FDD (5MHz) / R.3 FDD (10MHz) is changed as per the following bitmap that repeats every 40ms.  PDSCH scheduled subframe bitmap: {01110111 11110111 11110111 11110110}.					

## A.7.5.3.2 Test Requirements

The UE shall be scheduled on PCell continuously during T3. During T3, 100% of all expected ACK/NACKs shall be transmitted by the ProSe UE.

## A.8 UE Measurements Procedures

The reference channels in this clause assume transmission of PDSCH with a maximum number of 5 HARQ transmissions unless otherwise specified.

## A.8.1 E-UTRAN FDD Intra-frequency Measurements

## A.8.1.1 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

### A.8.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.1.2.2.1.1.

The test parameters are given in Table A.8.1.1.1-1 and A.8.1.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.1.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	5	

Table A.8.1.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	C	ell 1	Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel		1 1		1		
Number						
BW <sub>channel</sub>	MHz		10		10	
Correlation Matrix and		1x2	2 Low	1	x2 Low	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.	1 FDD	0	P.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		0	0		
PHICH_PB	dB					
PDCCH_RA	dB					
PDCCH_PB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
$N_{oc}^{ m Note~3}$	dBm/15 KHz	-98				
$\hat{E}_s/N_{oc}$	dB	4 4		-Infinity	4	
RSRP Note 4	dBm/15 KHz	-94 -94		-Infinity	-94	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
Propagation Condition			E	TU70		
N. 4 4 00NO 1 III				1		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.1.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\rm acc}$  to be fulfilled.

# A.8.1.2 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

## A.8.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.1.2.2.1.1

The test parameters are given in Table A.8.1.2.1-1 and A.8.1.2.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.2.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	s	5	

Table A.8.1.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1 T1 T2			Cell 2		
				T1	T2		
E-UTRA RF Channel			1		1		
Number							
BW <sub>channel</sub>	MHz	1	0		10		
Correlation Matrix and		1x2	Low	12	<2 Low		
Antenna Configuration							
OCNG Patterns							
defined in A.3.2.1.1		OP.1	FDD	OF	P.2 FDD		
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB			0			
PCFICH_RB	dB		_				
PHICH_RA	dB	(	0				
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46		
$N_{oc}^{ m Note~3}$	dBm/15 KHz			-98			
$\hat{E}_s/N_{oc}$	dB	4 4		-Infinity	4		
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94		
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94		
Propagation Condition		ETU70					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.1.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.1.3 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

### A.8.1.3.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.1.2.2.1.2.

The test parameters are given in Tables A.8.1.3.1-1, A.8.1.3.1-2, A.8.1.3.1-3 and A.8.1.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.3.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1
Active cell		Cell 1		
Neighbour cell		Ce	II 2	Cell to be identified.
E-UTRA RF Channel Number		1		One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.3.1-3
Time offset between cells		3 μs		Synchronous cells
T1	S	5		
T2	S	5	30	

Table A.8.1.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit Cell 1			Cell 2			
		T1 T2		T1 T2			
E-UTRA RF Channel		1			1		
Number							
BW <sub>channel</sub>	MHz		10		10		
Correlation Matrix and		1x2	. Low	1)	k2 Low		
Antenna Configuration							
OCNG Patterns							
defined in A.3.2.1.1		OP.	1 FDD	OF	P.2 FDD		
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB			0			
PCFICH_RB	dB		•				
PHICH_RA	dB		0				
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46		
$N_{oc}^{ m Note~2}$	dBm/15 KHz		•	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4		
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94		
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94		
Propagation Condition		ETU70					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.1.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment		
rieid	Value	Value			
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331		
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.		

### A.8.1.3.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement

reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.8.1.4 Void

## A.8.1.5 E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

#### A.8.1.5.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.3.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.5.1-1 and A.8.1.5.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.1.5.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	S	5	
T2	S	≤10	
T3	s	5	

Table A.8.1.5.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1		1		
Number							
BW <sub>channel</sub>	MHz		10		10		
OCNG Patterns defined in		OP.10	OP.10	OP.10	OP.2	OP.2	OP.2
A.3.2.1.10 (OP.10 FDD)		FDD	FDD	FDD	FDD	FDD	FDD
and in A.3.2.1.2 (OP.2							
FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB		_			_	
PHICH_RA	dB		0			0	
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB	1					
OCNG_RB <sup>Note 1</sup>	dB						

$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}^{ m Note  2}$	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.1.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test\ requirement = RRC\ Procedure\ delay +\ T_{identify\ CGI,intra} + reporting\ delay$ 

- = 15 + 150 + 2ms from the start of T3
- = 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 80 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 80 ACK/NACK number is caused by two parts. Firstly, at least 60 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.2.3.1. Secondly, given that continuous DL data allocation, additional 20 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

# A.8.1.6 E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

### A.8.1.6.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.3. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.6.1-1, A.8.1.6.1-2, A.8.1.6.1-3 and A.8.1.6.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.1.6.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.1.6.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	S	5	
T2	S	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	S	5	

Table A.8.1.6.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		1			
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2	
A.3.2.1.1 (OP.1 FDD) and		FDD	FDD	FDD	FDD	FDD	FDD	
in A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		0			0		
PHICH_PB	dB							
PDCCH_RA	dB							
PDCCH_PB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB	]						
OCNG_RA <sup>Note 1</sup>	dB	]						
OCNG_RB <sup>Note 1</sup>	dB							

$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}^{ m Note  2}$	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.6.1-3: DRX configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.1.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.1.6.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test \ requirement = RRC \ Procedure \ delay + \ T_{identify\_CGI, intra} + reporting \ delay$ 

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.8.1.7 E-UTRAN FDD-FDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.8.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (Neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.1.1 under a time domain measurement resource restriction and non-MBSFN ABS configured in the aggressor cell.

The test parameters are given in Tables A.8.1.7.1-1 and A.8.1.7.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell, and it is also the aggressor cell to Cell 2. Cell 2 is the cell to be identified. The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 2.

Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells. The UE is also configured with a time domain measurement resource restriction pattern for the PCell measurements. The information for both measurement patterns shall be provided to the UE via higher layers during T1.

Table A.8.1.7.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference	As specified in clause A.3.1.1.1
·		Measurement Channel	·
		R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference	As specified in clause A.3.1.2.1
parameters		Measurement Channel	
		R.6 FDD	
PCell		Cell 1	Also the aggressor cell. Active in T1 and T2
Neighbour cell		Cell 2	Cell to be identified. Active only in T2.
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One FDD carrier frequency is used
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	For all cells in the test
A3-Offset	dB	-11	
Event A3 measurement quantity		RSRP	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	5	
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6 !=0	Cell PCIs are selected so that the condition is met
ABS pattern			FDD ABS Pattern Info IE, as defined in TS
·		10000000100000001000	36.423 [28], clause 9.2.54. Configured in Cell 1
		00001000000010000000	during T1.
			The first/leftmost bit corresponds to the
			subframe #0 of the radio frame satisfying SFN
			mod x = 0, where x is the size of the bit string
			(40) divided by 10. No MBSFN subframes are
			cofigured in the ABS subframes.
Time domain measurement			Time domain measurement resource restriction
resource restriction pattern for		100000010000001000	pattern for neighbor cell measurement signalled
neighbour cell measurements on		00001000000010000000	to the UE in measSubframePattern-Neigh IE in
RF Channel 1			measSubframePatternConfig-Neigh, as defined
			in TS 36.331, clause 6.3.5.
		(-,	Configured during T1 for Cell 2 measurements.
Time domain measurement		'0100000010000000100	Configured during T1 for Cell 1 measurements
resource restriction pattern for		00000100000001000000	
PCell measurements			

Table A.8.1.7.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T1	T2		
E-UTRA RF Channel		1	1		1		
Number							
BW <sub>channel</sub>	MHz	1	0		10		
Correlation Matrix and		1x2	Low	1:	x2 Low		
Antenna Configuration							
OCNG Patterns							
defined in A.3.2.1.5		OP.5	FDD	OF	P.6 FDD		
(OP.5 FDD) and in							
A.3.2.1.6 (OP.6 FDD)							
PBCH_RA	dB	Non-ABS and	ABS subframe				
PBCH_RB	dB		ers defined in				
PSS_RA	dB	Table A.3	3.4.1.1-1.				
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB				0		
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}^{ m Note  3}$	dBm/15 kHz		-	98			
$(\hat{E}_s  /  N_{oc})_{meas}^{$	dB	1	1	-Infinity	-4		
$(\hat{E}_s/N_{oc})_{ABS}$	dB	1	1	N/A	N/A		
RSRP Note 4,5	dBm/15 kHz	-97	-97	-Infinity	-102		
RSRP Note 4,5 SCH_RP Note 4	dBm/15 kHz	-97	-97	-Infinity	-102		
CRS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	1	-0.5	-Infinity	-4		
SCH $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	1	-0.5	-Infinity	-7.5		
Propagation Condition	ETU30						
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted							

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled. Applies to all subframes.
- Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 5: RSPP is estimated for Cell 2 during the restricted measurement subframes for neighbour cells. RSPP is estimated for Cell 1 during the PCell restricted subframes.

### A.8.1.7.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 2, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.8 E-UTRAN FDD-FDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

### A.8.1.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.3, when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

The test parameters are given in Tables A.8.1.8.1-1 and A.8.1.8.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test, there are three synchronous cells, Cell 1, Cell 2, and Cell 3, on the same RF channel. Cell 1 is the PCell. Cell 3 is the cell to be identified. A non-MBSFN ABS pattern is configured in each of the Cell 1 and Cell 2 during the entire test. The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 3.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells, nsamely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE during T1.

Table A.8.1.8.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Para	meter	Unit	Value	Comment
PDSCH parame			DL Reference Measurement	As specified in clause A.3.1.1.1
-			Channel R.0 FDD	
PCFICH/PDCCI parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
PCell			Cell 1	Also a first interfering cell to Cell 3. Active in T1 and T2.
Neighbour cells	Neighbour cells		Cell 2 and Cell 3	Cell 2 is a second interfering cell; Cell 2 is active in T1 and T2. Cell 3 is the cell to be identified; Cell 3 is active only in T2.
ABS transmission	on configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Cha			1	One FDD carrier frequency is used
Channel Bandw	ridth (BW <sub>channel</sub> )	MHz	10	For all cells in the test
A3-Offset	, , , , , , , , , , , , , , , , , , , ,	dB	-14	
Event A3 measu	urement quantity		RSRP	
CP length			Normal	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
Time offset betv	veen cells	μs	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to Cell 1: -2.5	Three synchronous cells
T1		S	5	
T2		S	5	
Physical cell IDs	6		(PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> )mod6 != 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub>	Cell PCIs are selected so that all conditions are met
ABS pattern	ABS pattern		'100000001000000100000 001000000010000000	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 1 and Cell 2 during T1.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'1000000010000000100000 00100000001000000	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Configured during T1 for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time domain measurement resource restriction pattern for PCell measurements			'01000000100000010000 000100000001000000'	Configured during T1 for Cell 1 measurements
	physCellId		see PCI conditions above	The CRS assistance information is
CRS assistance	antennaPortsC ount		1	provided for Cell 2 only in CRS- AssistanceInfo. It includes a single
information mbsfn- SubframeCo gList			oneFrame = '000000'	MBSFN-SubframeConfig element with subframe allocation one Frame='000000'.

Table A.8.1.8.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Doromotor	l limit	00	Cell 1 Cell 2		en Z	Cell 3	
Parameter	Unit	T1	T2	T1	T2	T1	T2
E-UTRA RF Channel		1			1		Ī
Number		'		1		1	
BW <sub>channel</sub>	MHz	10	0	1	10		0
Correlation Matrix and		1x2	Low	1x2 Low		1v2	Low
Antenna Configuration		172	LOW	172	LOW	172	LOW
OCNG Patterns defined in							OP.6
A.3.2.1.5 (OP.5 FDD) and		OP.5	FDD	OP.6	S FDD	N/A	FDD
in A.3.2.1.6 (OP.6 FDD)							100
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB			Non-ABS and ABS subframe channel			
PCFICH_RB	dB	Non ADC	and ADC				
PHICH_RA	dB	Non-ABS					
PHICH_RB	dB	subframe channel powers defined in Table A.3.4.1.1-1.		powers defined in Table A.3.4.1.1-1.		N/A	0
PDCCH_RA	dB						
PDCCH_RB	dB	Table A.S	0.4.1.1-1.	Table A.S.4.1.1-1.			
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}$ Note 3	dBm/15			•	00		
$IV_{oc}$	kHz			•	.98		
$(\hat{E}_s/N_{oc})$	dB	4	4	2	2	-Infinity	-4
RSRP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102
SCH_RP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102
$CRS\hat{E}_{_{s}}/I_{_{ot}}^{\ \ Note5}$	dB	4	2.54	2	0.54	-Infinity	-9.46
SCH $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	-0.12	-0.75	-3.45	-3.92	-Infinity	-11.07
Propagation Condition		ETU	J3 <mark>0</mark>	ET	U30	ETU	J3 <mark>0</mark>

NOTE 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

NOTE 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled. Applies to all subframes.

NOTE 4: RSRP, SCH\_RP, and  $\hat{E}_s/I_{ot}$  levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

NOTE 5: Applies during the restricted measurement subframes configured for neighbour cell (Cell 3) measurements.

#### A.8.1.8.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.9 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz bandwidth

### A.8.1.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.1.1.1.

The parameters of this test are the same as defined in Subclause A.8.1.1.1 except that the values of the parameters in the Table A.8.1.9.1-1 will replace the values of the corresponding parameters in A.8.1.1.1-1, and the values of the parameters in the Table A.8.1.9.1-2 will replace the values of the corresponding parameters in A.8.1.1.1-2.

Table A.8.1.9.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz bandwidth

Parameter	Unit	Value	Comment		
		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1		
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1		
Note 1: See Table A.8.1.1.1-1 for the other parameters.  Note 2: This test is according to the principle defined in section A.3.7.2.					

Table A.8.1.9.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz

Parameter	Unit	Cell 1			Cell 2				
		T1	T2	T1	T2				
BW <sub>channel</sub>	MHz	5	;	5					
OCNG Patterns									
defined in A.3.2.1.15									
(OP.15 FDD) and		OP.15 FDD		OP.16 FDD					
A.3.2.1.16 (OP.16									
FDD)									
	Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted								
power spectra	power spectral density is achieved for all OFDM symbols.								
Note 2: See Table A.									

#### A.8.1.9.2 Test Requirements

The test requirements defined in section A.8.1.1.2 shall apply to this test case.

# A.8.1.10 E-UTRAN FDD-FDD Intra-Frequency Event Triggered Reporting under Fading Propagation Conditions in Synchronous Cells with DRX for 5 MHz Bandwidth

### A.8.1.10.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.1.2.2.1.2.

The parameters of this test are the same as defined in Section A.8.1.3.1 except that the values of the parameters in the Table A.8.1.10.1-1 will replace the values of the corresponding parameters in A.8.1.3.1-1, and the values of the parameters in the Table A.8.1.10.1-2 will replace the values of the corresponding parameters in A.8.1.3.1-2.

Table A.8.1.10.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment			
		Test 1	Test 2				
PDSCH parameters		DL Reference Measurement Channel R.5 FDD		As specified in clause A.3.1.1.1			
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD		As specified in clause A.3.1.2.1			
Channel Bandwidth	MHz	;	5				
(BW <sub>channel</sub> )							
NOTE 1: See Table A.8.1.3.1-1 for the other parameters.							
NOTE 2: This test is accord	ling to the p	orinciple defined in	Section A.3.7.2.				

Table A.8.1.10.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		(	Cell 2			
		T1 T2		T1	T2			
BW <sub>channel</sub>	MHz	5		5				
OCNG Patterns								
defined in A.3.2.1.15		OP.15 FDD		OP.16 FDD				
(OP.15 FDD) and in								
A.3.2.1.16 (OP.16								
FDD)								
NOTE 1: See Table A.8	NOTE 1: See Table A.8.1.3.1-2 for the other parameters.							

#### A.8.1.10.2 Test Requirements

The test requirements defined in Section A.8.1.3 shall apply to this test case.

# A.8.1.11 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

#### A.8.1.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.1.

The test parameters are given in Table A.8.1.11.1-1 and A.8.1.11.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.11.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.3
		Channel R.13 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel		1	One FDD carrier frequency is used.
Number			
Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	5	

Table A.8.1.11.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

Parameter	Unit	Cell 1			Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel			1	1		
Number						
BW <sub>channel</sub>	MHz	Ŷ	10		10	
Correlation Matrix and		2	x1		2x1	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	I FDD	0	P.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB		_			
PHICH_RA	dB		0	0		
PHICH_PB	dB					
PDCCH_RA	dB					
PDCCH_PB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
$N_{oc}^{ m Note~3}$	dBm/15 KHz	-98				
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
Propagation Condition			E	TU70		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.1.11.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.12 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

### A.8.1.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.1

The test parameters are given in Table A.8.1.12.1-1 and A.8.1.12.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.12.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.13 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	5	

Table A.8.1.12.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

Parameter	Unit	Ce	Cell 1		Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel		1			1	
Number						
BW <sub>channel</sub>	MHz	,	10		10	
Correlation Matrix and		2	x1		2x1	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OF	2.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB		_			
PHICH_RA	dB		0	0		
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
$N_{oc}^{ m Note  3}$	dBm/15 KHz	-98				
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
Propagation Condition				ETU70		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.1.12.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.13 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX for UE category 0

#### A.8.1.13.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. This test case is applicable to UE category 0 as defined in Section 3.1. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.5.2.1.1.2.

The test parameters are given in Tables A.8.1.13.1-1, A.8.1.13.1-2, A.8.1.13.1-3 and A.8.1.13.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.13.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used for UE category 0

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Me Channel R.13 FD		As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH		DL Reference Me	easurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDI	)	
Active cell		Cell 1		
Neighbour cell		Ce	ll 2	Cell to be identified.
E-UTRA RF Channel Number			1	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	1	0	
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.13.1-3
Time offset between cells		3 μs		Synchronous cells
T1	S	5		
T2	S	5	30	

Table A.8.1.13.11-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used for UE category 0

Parameter	Unit				Cell 2		
		T1	T2	T1	T2		
E-UTRA RF Channel		1		1			
Number							
BW <sub>channel</sub>	MHz		10		10		
Correlation Matrix and		2	2x1		2x1		
Antenna Configuration							
OCNG Patterns							
defined in A.3.2.1.1		OP.	1 FDD	OP.	.2 FDD		
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB			0			
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB		0				
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_{s}/I_{ot}$	dB	4	-1.46	-Infinity	-1.46		
$N_{oc}^{ m Note~2}$	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4		
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94		
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94		
Propagation Condition				ETU70			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.13.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells for UE category 0

Field	Test1	Test2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.13.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells for UE category 0

Field	Test1	Test2	Comment
rieiu	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

#### A.8.1.13.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.1.14 E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

#### A.8.1.14.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.2.1.

The test parameters are given in Table A.8.1.14.1-1 and A.8.1.14.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.14.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.1 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	5	

Table A.8.1.14.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

Parameter	Unit	Cell 1			Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel			1	1		
Number						
BW <sub>channel</sub>	MHz	Ŷ	10		10	
Correlation Matrix and		2	x1		2x1	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	I FDD	OI	P.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB		_			
PHICH_RA	dB		0	0		
PHICH_PB	dB					
PDCCH_RA	dB					
PDCCH_PB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
$N_{oc}^{ m Note  3}$	dBm/15 KHz	-98				
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
Propagation Condition			E	TU70		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.1.14.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.15 E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

### A.8.1.15.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.2.1

The test parameters are given in Table A.8.1.15.1-1 and A.8.1.15.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.15.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.1 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	5	

Table A.8.1.15.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

Parameter	Unit				Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel		,	1	1		
Number						
BW <sub>channel</sub>	MHz	1	0		10	
Correlation Matrix and		2	x1		2x1	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OF	P.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB		_			
PHICH_RA	dB	(	0	0		
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
$N_{oc}^{ m Note~3}$	dBm/15 KHz			-98	•	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
Propagation Condition				ETU70		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2. The resources for uplink transmission are assigned to the OE prior to the start of time period 12. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.1.15.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.16 E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX for UE category 0

#### A.8.1.16.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. This test case is applicable to UE category 0 as defined in Section 3.1. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.5.2.1.2.2.

The test parameters are given in Tables A.8.1.16.1-1, A.8.1.16.1-2, A.8.1.16.1-3 and A.8.1.16.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.16.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used for UE category 0

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Me Channel R.1 HD-		As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH		DL Reference Me	easurement	As specified in clause A.3.1.2.3
parameters		Channel R.3 HD-	FDD	
Active cell		Cell 1		
Neighbour cell		Ce	ll 2	Cell to be identified.
E-UTRA RF Channel Number		1		One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.16.1-3
Time offset between cells		3 μs		Synchronous cells
T1	S	5		
T2	S	5	30	

Table A.8.1.16.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used for UE category 0

Parameter	Unit	Ce	ell 1		Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel			1		1	
Number						
BW <sub>channel</sub>	MHz	,	10		10	
Correlation Matrix and		2	x1		2x1	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OP	.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB		_	0		
PHICH_RA	dB		0			
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
$N_{oc}^{ m Note~2}$	dBm/15 KHz			-98		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94	
Propagation Condition		-		ETU70	-	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.16.1-3: DRX-Configuration for E-UTRAN HD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells for UE category 0

Field	Test1	Test2	Comment
Field	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.16.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN HD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells for UE category 0

Field	Test1	Test2	Comment
rieid	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

#### A.8.1.16.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.1.17 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

#### A.8.1.17.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test case is applicable to UE category 0 as defined in Section 3.1. This test will partly verify the TDD intra-frequency cell search requirements in clause 8.5.2.1.3.1.

The test parameters are given in Table A.8.1.17.1-1 and A.8.1.17.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.17.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

Parameter	Unit	Value	Comment
		DL Reference Measurement	
PDSCH parameters		Channel R.12 TDD	As specified in clause A.3.1.1.5
		DL Reference Measurement	
PCFICH/PDCCH/PHICH		Channel R.6 TDD	As specified in clause A.3.1.2.2
parameters			
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
			The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
			The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	5	

Table A.8.1.17.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

Parameter	Unit	Се	II 1		Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel		1			1	
Number						
BW <sub>channel</sub>	MHz	1	0		10	
Correlation Matrix and		2:	κ1		2x1	
Antenna Configuration						
OCNG Pattern defined						
in A.3.2.2.1 (OP.1		OP.1	TDD	OP	2.2 TDD	
TDD) and in A.3.2.2.2						
(OP.2)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB			0		
PHICH_RA	dB		_			
PHICH_RB	dB	(	)			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note 3}$	dBm/15 kHz			-98		
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
Propagation Condition			E	TU70		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.1.17.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.1.18 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX for UE category 0

#### A.8.1.18.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. This test case is applicable to UE category 0 as defined in Section 3.1. The tests will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.5.2.1.3.2.

The test parameters are given in Tables A.8.1.18.1-1, A.8.1.18.1-2, A.8.1.18.1-3 and A.8.1.18.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.18.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used for UE category 0

Parameter	Unit	Value		Comment
		Test 1	Test 2	7
		DL Reference	Measurement	
PDSCH parameters		Channel R.12	TDD	As specified in clause A.3.1.1.5
		DL Reference		
PCFICH/PDCCH/PHICH		Channel R.6 T	DD	As specified in clause A.3.1.2.2
parameters				
Active cell		Cell 1		
Neighbour cell		Ce	ell 2	Cell to be identified.
E-UTRA RF Channel Number			1	One TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211.
-				The same configuration in both cells
Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211.
				The same configuration in both cells
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in
				Table A.8.1.18.1-3
Time offset between cells		3 μs		Synchronous cells
T1	S	5		
T2	s	5	30	

Table A.8.1.18.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used for UE category 0

Parameter	Unit	Ce	ell 1		Cell 2
		T1	T2	T1	T2
E-UTRA RF Channel			1		1
Number					
BW <sub>channel</sub>	MHz	1	0		10
Correlation Matrix and		2	x1		2x1
Antenna Configuration					
OCNG Pattern defined					
in A.3.2.2.1 (OP.1		OP.1	TDD	OP	.2 TDD
TDD) and in A.3.2.2.2					
(OP.2)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB		•	0	
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}^{ m Note  2}$	dBm/15 kHz			-98	
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition				TU70	•

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.18.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells for UE category 0

Field	Test1	Test2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.18.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells for UE category 0

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

#### A.8.1.18.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

## A.8.1.19 E-UTRAN FD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

#### A.8.1.19.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.4.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.19.1-1 and A.8.1.19.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.1.19.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.15 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	S	5	
T2	S	≤10	
T3	S	5	

Table A.8.1.19.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10		10		
Correlation Matrix and			2x1		2x1		
Antenna Configuration							
OCNG Patterns defined in		OP.10	OP.10	OP.10	OP.2	OP.2	OP.2
A.3.2.1.10 (OP.10 FDD)		FDD	FDD	FDD	FDD	FDD	FDD
and in A.3.2.1.2 (OP.2							
FDD)							
PBCH_RA	dB						
PBCH_RB	dB		•		1		
PSS_RA	dB		-3		-3		
SSS_RA	dB						
PCFICH_RB	dB		0		0		
PHICH_RA	dB		-3			-3	
PHICH_PB	dB						
PDCCH_RA	dB		0			0	
PDCCH_PB	dB						
PDSCH_RA	dB					_	
PDSCH_RB	dB		-3		-3		
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB		T	T			T
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}$ Note 2	dBm/15 KHz			<b>-</b> 9	8		
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition				AW			
Timing offset to Cell 1	ms	- 3					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral							

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.1.19.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

Test requirement = RRC Procedure delay +  $T_{identify CGI LC-UE, intra}$  + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 210 ms at least 112 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 112 ACK/NACK number is caused by two parts. Firstly, at least 92 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.5.2.1.4. Secondly, given that continuous DL data allocation, additional 20 ACK/NACK shall be sent from the start of T3 until 210 ms excludes 190 ms for identifying the cell global identifier of cell 2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

# A.8.1.20 E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

### A.8.1.20.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.4. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.20.1-1, A.8.1.20.1-2, A.8.1.20.1-3 and A.8.1.20.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.1.20.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Value	Comment	
PDSCH parameters		DL Reference Measurement Channel R.14 FDD	As specified in clause A.3.1.1.3	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1	
Active cell		Cell 1		
Neighbour cell		Cell 2	Cell to be identified.	
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10		
CP length		Normal		
A3-Offset	dB	-3		
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0	L3 filtering is not used	
DRX		ON	DRX related parameters are defined in Table A.8.1.6.1-3	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.	
T1	S	5		
T2	s	≤30	UE should report cell within 25.6s (20 DRX cycles)	
T3	S	5		

Table A.8.1.20.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel		1			1		
Number							
BW <sub>channel</sub>	MHz		10			10	
Correlation Matrix and			2x1		2x1		
Antenna Configuration							
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2
A.3.2.1.1 (OP.1 FDD) and		FDD	FDD	FDD	FDD	FDD	FDD
in A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB		_				
PSS_RA	dB		-3		-3		
SSS_RA	dB						
PCFICH_RB	dB		0		0		
PHICH_RA	dB		-3		-3		
PHICH_PB	dB						
PDCCH_RA	dB	0		0			
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB	-3		-3			
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB		•	1		T	T.
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}^{ m Note~2}$	dBm/15 KHz			-6	98		
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition			•	AW	'GN	•	•
Timing offset to Cell 1	ms	- 3					
Note 4: OCNC shall be used such that both calls are fully allocated and a constant total transmitted never anatysis							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.1.20.1-3: DRX configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.20.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.1.20.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

 $Test\ requirement\ = RRC\ Procedure\ delay+\ T_{identify\ CGI\ LC-UE,\ intra}+reporting\ delay$ 

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.8.1.21 E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

#### A.8.1.21.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.5.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.21.1-1 and A.8.1.21.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.1.21.1-1: General test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.2 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	S	5	
T2	S	≤10	
T3	S	5	

Table A.8.1.21.1-2: Cell specific test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
BW <sub>channel</sub>	MHz		10			10		
Correlation Matrix and			2x1			2x1		
Antenna Configuration								
OCNG Patterns defined in		OP.10	OP.10	OP.10	OP.2	OP.2	OP.2	
A.3.2.1.10 (OP.10 FDD)		FDD	FDD	FDD	FDD	FDD	FDD	
and in A.3.2.1.2 (OP.2								
FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB		-3		-3			
SSS_RA	dB							
PCFICH_RB	dB		0		0			
PHICH_RA	dB		-3		-3			
PHICH_PB	dB							
PDCCH_RA	dB		0		0			
PDCCH_PB	dB							
PDSCH_RA	dB				_			
PDSCH_RB	dB		-3		-3			
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36	
Note 2	dBm/15 KHz	-98						
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11	
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87	
SCH_RP Note3	dBm/15 KHz	-90 -90 -90 -Infin				-87	-87	
Propagation Condition		AWGN						
Timing offset to Cell 1	ms	- 3						
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral								

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectra density is achieved for all OFDM symbols.

### A.8.1.21.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

 $Test \ requirement = RRC \ Procedure \ delay + \ T_{identify} \ CGI\_LC-UE, intra} + reporting \ delay$ 

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.8.1.22 E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

#### A.8.1.22.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.5. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.22.1-1, A.8.1.22.1-2, A.8.1.22.1-3 and A.8.1.22.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.1.22.1-1: General test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.4
		Channel R.2 HD-FDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.3
		Channel R.3 HD-FDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is
			used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are
			defined in Table A.8.1.6.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in
			TS 36.331.
T1	S	5	
T2	S	≤30	UE should report cell within 25.6s
			(20 DRX cycles)
T3	S	5	

Table A.8.1.22.1-2: Cell specific test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

	T1	T2	Τ.			
		12	Т3	T1	T2	T3
		1			1	
MHz		10			10	
		2x1			2x1	
						OP.2
	FDD	FDD	FDD	FDD	FDD	FDD
<del></del>					_	
		-3		-3		
dB		0		0		
dB		-3		-3		
		0		0		
dB						
dB						
dB		-3		-3		
dB						
dB						
	8	-3.3	-3.3	-Infinity	2.36	2.36
dBm/15 KHz	-9			98		
dB	8	8	8	-Infinity	11	11
dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
	AWGN					
ms		-			3	
	dB d	DP.1 FDD  dB	OP.1   OP.1   FDD	OP.1   OP.1   OP.1   FDD	OP.1	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.22.1-3: DRX configuration for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.1.22.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

#### A.8.1.22.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + T<sub>identify CGL LC-UE, intra</sub> + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.8.2 E-UTRAN TDD Intra-frequency Measurements

# A.8.2.1 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

### A.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 8.1.2.2.2.1.

The test parameters are given in Table A.8.2.1.1-1 and A.8.2.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.2.1.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
DDCCI I regressed to re		DL Reference Measurement	As an additional and a A A A A A
PDSCH parameters		Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
			The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
			The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	5	

Table A.8.2.1.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		С	ell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel			1		1	
Number						
BW <sub>channel</sub>	MHz		10		10	
Correlation Matrix and		1x2	2 Low	1x2	2 Low	
Antenna Configuration						
OCNG Pattern defined						
in A.3.2.2.1 (OP.1		OP.	1 TDD	OP.	2 TDD	
TDD) and in A.3.2.2.2						
(OP.2)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		•			
PHICH_RB	dB		0		0	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note  3}$	dBm/15 kHz			-98		
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
Propagation Condition			E	TU70		

Note 1 OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.2.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

# A.8.2.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

### A.8.2.2.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.1.2.2.1.2.

The test parameters are given in Tables A.8.1.3.1-1, A.8.1.3.1-2, A.8.1.3.1-3 and A.8.1.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.2.2.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
		DL Reference	Measurement	
PDSCH parameters		Channel R.0 T	DD	As specified in clause A.3.1.1.2
		DL Reference	Measurement	
PCFICH/PDCCH/PHICH		Channel R.6 T	DD	As specified in clause A.3.1.2.2
parameters				
Active cell		Cell 1		
Neighbour cell		Ce	II 2	Cell to be identified.
E-UTRA RF Channel Number		1	1	One TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	1	0	
A3-Offset	dB	-6		
CP length		Normal		
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211.
				The same configuration in both cells
Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211.
				The same configuration in both cells
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in
				Table A.8.2.2.1-3
Time offset between cells		3 μs		Synchronous cells
T1	S	5		
T2	S	5	30	

Table A.8.2.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Се	II 1		Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel		1			1	
Number						
BW <sub>channel</sub>	MHz	1	0		10	
Correlation Matrix and		1x2	Low	1>	2 Low	
Antenna Configuration						
OCNG Pattern defined						
in A.3.2.2.1 (OP.1		OP.1	TDD	OP	.2 TDD	
TDD) and in A.3.2.2.2						
(OP.2)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		_			
PHICH_RB	dB	(	0		0	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-98		
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
Propagation Condition	opagation Condition ETU70					
	ate 1: OCNG shall be used such that both calls are fully allocated and a constant total transmitted nower spectral density is					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.2.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
rieid	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

#### A.8.2.2.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.2.3 E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

#### A.8.2.3.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.4.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.3.1-1 and A.8.2.3.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.2.3.1-1: General test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	s	5	
T2	S	≤10	
T3	S	5	

Table A.8.2.3.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	Т3	T1	T2	T3		
E-UTRA RF Channel			1			1			
Number									
BW <sub>channel</sub>	MHz		10			10			
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2		
A.3.2.2.1 (OP.1 TDD) and		TDD	TDD	TDD	TDD	TDD	TDD		
in A.3.2.2.2 (OP.2 TDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB		_			_			
PHICH_RA	dB		0			0			
PHICH_RB	dB								
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$\hat{E}_{s}/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36		
$N_{oc}^{ m Note  2}$	dBm/15 KHz			-9	98				
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11		
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87		
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87		
Propagation Condition		AWGN	•	•	•				
Note 1: OCNG shall be us									

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.2.3.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test\ requirement = RRC\ Procedure\ delay +\ T_{identify\ CGI,intra} + reporting\ delay$ 

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 47 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 47 ACK/NACK number is caused by two parts. Firstly, at least 35 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement for UL/DL configuration #1 in Table 8.1.2.2.4.1-1 of Clause 8.1.2.2.4.1. Secondly, given that continuous DL data allocation, additional 12 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

# A.8.2.4 E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

### A.8.2.4.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.4. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.4.1-1, A.8.2.4.1-2, A.8.2.4.1-3 and A.8.2.4.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.2.4.1-1: General test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.2.4.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	s	5	
T2	S	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	S	5	

Table A.8.2.4.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2
A.3.2.2.1 (OP.1 TDD) and		TDD	TDD	TDD	TDD	TDD	TDD
in A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB		_			_	
PHICH_RA	dB		0			0	
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_{s}/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}$ Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be us	sed such that both	cells are fully	y allocated a	nd a consta	nt total trans	mitted powe	r spectral

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.
- Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.4.1-3: DRX configuration for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.2.4.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD - TDD Intra frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

#### A.8.2.4.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test \ requirement = RRC \ Procedure \ delay + \ T_{identify \ CGI, intra} + reporting \ delay$ 

- = 15 + 150 + 2ms from the start of T3
- = 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.8.2.5 E-UTRAN TDD-TDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.8.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (Neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.2.1 under a time domain measurement resource restriction and non-MBSFN ABS configured in the aggressor cell.

The test parameters are given in Tables A.8.2.5.1-1 and A.8.2.5.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell, and it is also the aggressor cell to Cell 2. Cell 2 is the cell to be identified. The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 2.

Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells. The UE is also configured with a time domain measurement resource restriction pattern for the PCell measurements. The information for both measurement patterns shall be provided to the UE via higher layers during T1.

Table A.8.2.5.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
		DL Reference Measurement	
PDSCH parameters		Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
parameters			/ to speemed in clause / iiic : : = :=
PCell		Cell 1	Also the aggressor cell. Active in T1 and T2
Neighbour cell		Cell 2	Cell to be identified. Active only in T2.
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
A3-Offset	dB	-11	
Event A3 measurement quantity		RSRP	
CP length		Normal	
Special subframe configuration		6	As specified in Table 4.2-1 in TS 36.211. The
			same configuration in both cells
Uplink-downlink configuration		1	As specified in Table 4.2-2 in TS 36.211. The
			same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	S	0	1000
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
	S	5	
T2	S	5	
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6 != 0	Cell PCIs are selected so that the condition is met
ABS pattern		'000000001000000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1 during T1.  The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'00000000010000000001'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331, clause 6.3.5. Configured during T1 for Cell 2 measurements.
Time domain measurement resource restriction pattern for PCell measurements		'1000000001000000000'	Configured during T1 for Cell 1 measurements

Table A.8.2.5.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1		C	Cell 2		
		T1	T2	T1	T2		
E-UTRA RF Channel		•			1		
Number							
BW <sub>channel</sub>	MHz	1	0	10			
Correlation Matrix and		1x2	Low	1x	2 Low		
Antenna Configuration							
OCNG Pattern defined							
in A.3.2.2.1 (OP.1		OP.1	TDD	OP.	2 TDD		
TDD) and in A.3.2.2.2							
(OP.2)							
PBCH_RA	dB	Non-ABS and	ABS subframe				
PBCH_RB	dB		ers defined in				
PSS_RA	dB	Table A.:	3.4.1.1-1.	0			
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}^{ m Note  3}$	dBm/15 kHz			-98			
$(\hat{E}_s  /  N_{oc})_{meas}^{}$ Note 5	dB	1	1	-Infinity	-4		
$(\hat{E}_s/N_{oc})_{ABS}$	dB	1	1	N/A	N/A		
RSRP Note 4,5	dBm/15 kHz	-97	-97	-Infinity	-102		
SCH_RP Note 4	dBm/15 kHz	-97	-97	-Infinity	-102		
CRS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	1	-0.5	-Infinity	-4		
SCH $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	1	-0.5	-Infinity	-7.5		
Propagation Condition			E	TU30			
	e used such that be	oth cells are fully	allocated and a	constant total tra	ansmitted power		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSPP is estimated for Cell 2 during the restricted measurement subframes for neighbour cells. RSPP is estimated for Cell 1 during the PCell restricted subframes.

### A.8.2.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 2, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.2.6 E-UTRAN TDD-TDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.8.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.4, when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

The test parameters are given in Tables A.8.2.6.1-1 and A.8.2.6.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test, there are three synchronous cells, Cell 1, Cell 2, and Cell 3, on the same RF channel. Cell 1 is the PCell. Cell 3 is the cell to be identified. A non-MBSFN ABS pattern is configured in each of the Cell 1 and Cell 2 during the entire test. The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 3.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells, nsamely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE during T1.

Table A.8.2.6.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
PCell		Cell 1	Also a first interfering cell to Cell 3. Active in T1 and T2.
Neighbour cells		Cell 2 and Cell 3	Cell 2 is a second interfering cell; Cell 2 is active in T1 and T2. Cell 3 is the cell to be identified; Cell 3 is active only in T2.
ABS transmission configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One TDD carrier frequency is used
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	For all cells in the test
A3-Offset	dB	-14	
Event A3 measurement quantity		RSRP	
CP length		Normal	
Special subframe configuration		6	As specified in Table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in Table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells	μѕ	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to Cell 1: -2.5	Three synchronous cells
		i	
T1	S	5	
T1 T2	S S	5	
			Cell PCIs are selected so that all conditions are met
T2		5 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> )mod6 != 0	conditions are met  TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes.  Provided fto the UE for Cell 1 and Cell 2 during T1.
Physical cell IDs  ABS pattern  Time domain measurement resource restriction pattern for neighbour cell measurements or RF Channel 1	S	5 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> )mod6 != 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub>	conditions are met  TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Provided fto the UE for Cell 1 and Cell 2 during T1.  Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Provided to the UE during T1 for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Physical cell IDs  ABS pattern  Time domain measurement resource restriction pattern for neighbour cell measurements or	S	5 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> )mod6 != 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub> '000000000100000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Provided fto the UE for Cell 1 and Cell 2 during T1. Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Provided to the UE during T1 for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain
Physical cell IDs  ABS pattern  Time domain measurement resource restriction pattern for neighbour cell measurements or RF Channel 1  Time domain measurement resource restriction pattern for	S	5 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> ) mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> ) mod6 != 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub> '0000000001000000001'  '000000000100000000	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Provided fto the UE for Cell 1 and Cell 2 during T1. Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Provided to the UE during T1 for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.

mbsfn-		MBSFN-SubframeConfig element with
SubframeConfi	oneFrame = '000000'	subframe allocation one
gList		Frame='000000'.

Table A.8.2.6.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Cell 1		Ce	Cell 2		Cell 3	
Parameter	Unit	T1	T2	T1	T2	T1	T2	
E-UTRA RF Channel		1		1		1		
Number		l		<u>'</u>		ı		
BW <sub>channel</sub>	MHz	_	10		0	10		
Correlation Matrix and		1x2	Low	1x2	Low	1x2	Low	
Antenna Configuration								
OCNG Patterns defined in							OP.2	
A.3.2.2.1 (OP.1 TDD) and		OP.1	TDD	OP.2	2 TDD	N/A	TDD	
in A.3.2.2.2 (OP.2 TDD)							100	
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB						1	
PCFICH_RB	dB	Non-ABS	and ABS	Non-ABS and ABS subframe channel powers defined in		N/A	0	
PHICH_RA	dB	subframe						
PHICH_RB	dB	powers d						
PDCCH_RA	dB	Table A.3			Table A.3.4.1.1-1.			
PDCCH_RB	dB	Table A.c	). <del></del> .   .   -   .	Table A.S.4.1.1-1.				
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}^{ m Note  3}$	dBm/15				·98			
TV oc	kHz				.90			
$(\hat{E}_s/N_{oc})$	dB	4	4	2	2	-Infinity	-4	
RSRP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102	
${\sf CRS}\hat{E}_{\sf s}/I_{\sf ot}^{\sf Note5}$	dB	4	2.54	2	0.54	-Infinity	-9.46	
SCH $\hat{E}_{_{s}}/I_{_{ot}}$	dB	-0.12	-0.75	-3.45	-3.92	-Infinity	-11.07	
Propagation Condition		ETU	J30	ET	U30	ETI	J30	
NOTE 4 CONO 1 III						***		

- NOTE 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- NOTE 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- NOTE 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.
- NOTE 4: RSRP, SCH\_RP, and  $\hat{E}_{_{s}}/I_{_{ot}}$  levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- NOTE 5: Applies during the restricted measurement subframes configured for neighbour cell (Cell 3) measurements.

#### A.8.2.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.2.7 E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

#### A.8.2.7.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.6. This test case is applicable to UE category 0 as defined in Section 3.1.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.7.1-1 and A.8.2.7.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.2.7.1-1: General test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.5
·		Channel R.13 TDD	-
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.2
		Channel R.6 TDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is
			used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS
			36.211. The same configuration in
			both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS
			36.211. The same configuration in
			both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	_
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in
			TS 36.331.
T1	S	5	
T2	S	≤10	
T3	S	5	

Table A.8.2.7.1-2: Cell specific test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel		1			1			
Number								
BW <sub>channel</sub>	MHz		10			10		
Correlation Matrix and			2x1			2x1		
Antenna Configuration								
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2	
A.3.2.2.1 (OP.1 TDD) and		TDD	TDD	TDD	TDD	TDD	TDD	
in A.3.2.2.2 (OP.2 TDD)	-							
PBCH_RA	dB							
PBCH_RB	dB		_			_		
PSS_RA	dB		-3		-3			
SSS_RA	dB							
PCFICH_RB	dB		0		0			
PHICH_RA	dB		-3		-3			
PHICH_RB	dB							
PDCCH_RA	dB		0		0			
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB		-3		-3			
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB		•	1		Ī	T	
$\hat{E}_{s}/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36	
$N_{oc}$ Note 2	dBm/15 KHz			-6	98			
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11	
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87	
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87	
Propagation Condition			•	AW			•	
Timing offset to Cell 1	μs		-			3		
		that had been fully allowed and a constant total to a constant and a constant						

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.2.7.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 190 milliseconds from the start of T3.

 $Test\ requirement = RRC\ Procedure\ delay +\ T_{identify\ CGI\ LC-UE,\ intra} + reporting\ delay$ 

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 190 ms at least 66 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 66 ACK/NACK number is caused by two parts. Firstly, at least 54 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement for UL/DL configuration #1 in Table 8.1.2.2.4.1-1 of Clause 8.1.2.2.4.1. Secondly, given that continuous DL data allocation, additional 12 ACK/NACK shall be sent from the start of T3 until 210 ms excludes 190 ms for identifying the cell global identifier of cell 2.

# A.8.2.8 E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

### A.8.2.8.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.6. This test case is applicable to UE category 0 as defined in Section 3.1. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.8.1-1, A.8.2.8.1-2, A.8.2.8.1-3 and A.8.2.8.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.2.8.1-1: General test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters			As specified in clause A.3.1.1.5
PCFICH/PDCCH/PHICH parameters		Channel R.13 TDD  DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.2.4.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	S	5	
T2	S	≤30	UE should report cell within 25.6s (20 DRX cycles)
T3	S	5	

Table A.8.2.8.1-2: Cell specific test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW <sub>channel</sub>	MHz		10		10		
Correlation Matrix and		2x1				2x1	
Antenna Configuration							
OCNG Patterns defined in		OP.1 OP.1 OP.1			OP.2	OP.2	OP.2
A.3.2.2.1 (OP.1 TDD) and		TDD	TDD	TDD	TDD	TDD	TDD
in A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB		_			_	
PSS_RA	dB	-3			-3		
SSS_RA	dB						
PCFICH_RB	dB		0		0		
PHICH_RA	dB		-3		-3		
PHICH_RB	dB						
PDCCH_RA	dB		0		0		
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB		-3		-3		
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
$N_{oc}^{ m Note2}$	dBm/15 KHz	-9			98		
$\hat{E}_s/N_{oc}$	dB	8 8 8			-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	μs		-			3	
N							

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.8.1-3: DRX configuration for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.2.8.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD Intra frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.2.8.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test\ requirement = RRC\ Procedure\ delay + \ T_{identify\_CGI\_LC-UE,\ intra} + reporting\ delay$ 

- = 15 + 190 + 2ms from the start of T3
- = 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.8.3 E-UTRAN FDD - FDD Inter-frequency Measurements

# A.8.3.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

#### A.8.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.1.1-1 and A.8.3.1.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.3.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	5	

Table A.8.3.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	C	ell 1		Cell 2	
		T1	T1 T2		T2	
E-UTRA RF Channel			1		2	
Number						
BW <sub>channel</sub>	MHz		10		10	
Correlation Matrix and		1x2	Low	1>	<2 Low	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.	1 FDD	OF	2.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB			0		
PCFICH_RB	dB					
PHICH_RA	dB		•			
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~3}$	dBm/15 kHz			-98		
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{E}_{s}/I_{ot}$	dB	4	4	-Infinity	7	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition				ETU70	•	
Note 1: OCNG shall be used	d such that both calls ar	hatecolle villy a	and a constant to	tal transmitted now	er enectral deneity is	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

#### A.8.3.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

# A.8.3.2 E-UTRAN FDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

#### A.8.3.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the FDD-FDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The common test parameters are given in Tables A.8.3.2.1-1 and A.8.3.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.3.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.3.2.1-4. In this tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.3.2.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1 Test 2		Comment		
		Va	lue			
PDSCH parameters		DL Reference Measurement		As specified in clause A.3.1.1.1 Note that		
		Channel R.0 FDD		UE may only be allocated at On Duration		
PCFICH/PDCCH/PHICH		DL Reference Measurement		As specified in clause A.3.1.2.1.		
parameters		Channel R.6 FDD	)			
E-UTRA RF Channel		1,	2	Two FDD carrier frequencies are used.		
Number						
Channel Bandwidth	MHz	1	0			
(BW <sub>channel</sub> )						
Active cell		Cell 1		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2		
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.		
A3-Offset	dB	-6				
Hysteresis	dB	0				
CP length		Normal				
TimeToTrigger	S	0				
Filter coefficient		0		L3 filtering is not used		
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211		
Access Barring Information	-	Not Sent		No additional delays in random access		
				procedure.		
DRX		ON		DRX related parameters are defined in		
				Table A.8.3.2.1-3		
Time offset between cells		3 ms		Asynchronous cells		
T1	S	5				
T2	S	5	30			

Table A.8.3.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Се	II 1		Cell 2			
		T1	T2	T1	T2			
E-UTRA RF Channel		1		2				
Number								
BW <sub>channel</sub>	MHz		0		10			
Correlation Matrix and		1x2	Low	1)	<2 Low			
Antenna Configuration								
OCNG Patterns								
defined in A.3.2.1.1		OP.1	FDD	OF	2.2 FDD			
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB			0				
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		)					
PHICH_RB	dB	,	,					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-98				
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91			
$\hat{E}_{\scriptscriptstyle \mathrm{s}}/I_{\scriptscriptstyle \mathrm{ot}}$	dB	4 4		-Infinity	7			
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	-91 7			
Propagation Condition				ETU70				
Note 1: OCNG shall be used	d such that both calls a	ro fully allocated	and a constant to	tal transmitted now	or enactral dancity is			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.3.2.1-3: drx-Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
rieid	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	
Note: For further in	formation se	e clause 6.3.	2 in TS 36.331.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
riela	Value	Value	
TimeAlianmentTimer	of500	sf500	For further information see
TimeAlignmentTimer	sf500	\$1500	clause 6.3.2 in TS 36.331.
			For further information see
sr-ConfigIndex	0	0	clause 6.3.2 in TS 36.331 and
_			section10.1 in TS 36.213

#### A.8.3.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20\*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

# A.8.3.3 E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

#### A.8.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX when L3 filtering is used. This test will partly verify the FDD-FDD inter-frequency cell search in DRX requirements in clause 8.1.2.3.1.2 and the UE behaviour with the *filterCoefficent* defined in TS 36.331 [2].

The test parameters are given in Tables A.8.3.3.1-1, A.8.3.3.1-2, A.8.3.3.1-3 and A.8.3.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and the filter coefficient is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 1 as defined in Table 8.1.2.1-1 is provided.

The uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.3.3.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Neighbour A3-Offset Ofn	dB	-14	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		9	L3 filtering is used
DRX		ON	DRX related parameters are defined in Table A.8.3.3.1-3
Time offset between cells		3 ms	Asynchronous cells
T1	S	30	
T2	S	9	

Table A.8.3.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Parameter	Unit		Cell 1		Cell 2		
		T1		T2	T1	T2	
E-UTRA RF Channel			1		2		
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns							
defined in A.3.2.1.1			OP.1 FDD	1	OF	.2 FDD	
(OP.1 FDD) and in			טו וווטט			.2100	
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB				0		
PHICH_RB	dB		0				
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB					1	
${ m \hat{E}}_{ m s}/{ m I}_{ m ot}$	dB	4	4		4	24	
$N_{oc}^{ m Note~2}$	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4		4	24	
RSRP Note 3	dBm/15 KHz	-94	-94		-94	-74	
SCH_RP Note 3	dBm/15 KHz	-94	-94		-94	-74	
Propagation Condition		AWGN	•		•	•	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.3.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.3.1-4: TimeAlignmentTimer - Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS
TimeAlignmentTimer	\$1500	36.331
		For further information see
sr-ConfigIndex	0	clause 6.3.2 in TS 36.331 and
_		section10.1 in TS 36.213.

### A.8.3.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.3.4 E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

#### A.8.3.4.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.5.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.8.3.4.1-1 and A.8.3.4.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.3.4.1-1: General test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF channel number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	-
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	S	5	
T2	S	≤10	
T3	s	5	

Table A.8.3.4.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		2			
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns defined in		OP.10	OP.10	OP.10	OP.2	OP.2	OP.2	
A.3.2.1.10 (OP.10 FDD)		FDD	FDD	FDD	FDD	FDD	FDD	
and in A.3.2.1.2 (OP.2								
FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB	0			0			
PHICH_PB	dB							
PDCCH_RA	dB							
PDCCH_PB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							

$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	4	-Infinity	7	7
$N_{oc}$ Note 2	dBm/15 KHz	-98					•
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.3.4.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay +  $T_{identify CGI, inter}$  + reporting delay

- = 15 + 150 + 2ms from the start of T3
- = 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 80 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 80 ACK/NACK number is caused by two parts. Firstly, at least 60 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.3.5.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 20 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

# A.8.3.5 E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.5. The requirement is verified in a DRX configuration.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.8.3.5.1-1, A.8.3.5.1-2, A.8.3.5.1-3 and A.8.3.5.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.3.5.1-1: General test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF channel number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.3.5.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	S	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	S	5	

Table A.8.3.5.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Cell 1				Cell 2				
		T1	T2	T3	T1	T2	T3			
E-UTRA RF Channel			1		2					
Number										
BW <sub>channel</sub>	MHz		10			10				
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2			
A.3.2.1.1 (OP.1 FDD) and		FDD	FDD	FDD	FDD	FDD	FDD			
in A.3.2.1.2 (OP.2 FDD)										
PBCH_RA	dB									
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB	0			0					
PHICH_PB	dB									
PDCCH_RA	dB									
PDCCH_PB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 1</sup>	dB									
OCNG_RB <sup>Note 1</sup>	dB									

$\hat{ extsf{E}}_{ extsf{s}}/ extsf{I}_{ ext{ot}}$	dB	4	4	4	-Infinity	7	7
Noc Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.5.1-3: DRX configuration for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.3.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

#### A.8.3.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay +  $T_{identify\_CGI, inter}$  + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.8.3.6 E-UTRAN FDD-FDD Inter-frequency event triggered reporting without measurement gaps under AWGN propagation conditions in asynchronous cells

#### A.8.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event without measurement gaps. This test will partly verify the FDD-FDD inter-frequency cell search requirements in section 8.1.2.3.

The test parameters are given in Tables A.8.3.6.1-1 and A.8.3.6.1-2. In this test, there are two cells on different carrier frequencies and no gaps are configured in this test. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. PDCCH on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.3.6.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting without measurement gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active PCell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	5	

Table A.8.3.6.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting without measurement gaps

Parameter	Unit	Unit Cell 1 Cell 2			cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel			1		2	
Number						
BW <sub>channel</sub>	MHz		10		10	
OCNG Patterns						
defined in A.3.2.1.10		OP.1	0 FDD	OP	.2 FDD	
(OP.10 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB			0		
PCFICH_RB	dB					
PHICH_RA	dB		_			
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98				
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition				AWGN		
Note 1: OCNC shall b	a used such that hat	h calla ara fulli	allacated and	a constant total tra	nomitted never	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.3.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall send continuous ACK/NACK throughout the test, and from the start of T2 until Event A3 is reported, at least 85% ACK/NACK shall be detected.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously. The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.3.7 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells for Increased Carrier Monitoring without Reduced Performance Group

### A.8.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.1.1-1 and A.8.3.1.1-2. In this test, there are four cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cells 2, 3 or 4.

Table A.8.3.7.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
UE configured E-UTRA RF		1, 2,3,4,5,6,7,8,9	Serving cell and eight FDD carrier
Channel Number			frequencies are used in the UE neighbour
			cell list.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cells		Cell 2, Cell 3, Cell 4	Cells 2, 3, 4 are randomly selected to use
			different frequencies selected from
			frequencies 2,3,4,5,6,7,8,9
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
Reduced Performance	-	8	
Group Scaling factor			
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
T1	S	5	
T2	S	40	

Table A.8.3.7.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 1 and Cell # 2)

Parameter	Unit	Ce	II 1	C	Sell 2
		T1	T2	T1	T2
E-UTRA RF Channel Number			1		selected from such that cell 2 is
				in the normal p	erformance group
BW <sub>channel</sub>	MHz		$N_{RB} = 25$		: N <sub>RB,</sub> = 25
			$N_{RB} = 50$		z: N <sub>RB,</sub> = 50
Measurement			10-15		z: 10-15
bandwidth	$n_{{\it PRB}}$	10MHz	:: 22-27	10MH	lz: 22-27
PDSCH Reference		5MHz: F	R.5 FDD		-
measurement channel			R.0 FDD		
defined in A.3.1.1.					
PDSCH allocation	$n_{PRB}$		:: 7-17 :: 13-36		-
PDCCH/PCFICH/PHIC			1.11 FDD	5MHz:	R.11 FDD
H Reference			R.6 FDD		:: R.6 FDD
measurement channel					
defined in A.3.1.2.					
OCNG Patterns		5MHz: OI	P.15 FDD	5MHz: (	OP.16 FDD
defined in A.3.2.		10MHz: 0	OP.1 FDD	10MHz: OP.2 FDD	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	(	)		0
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-(	98		-98
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
Io <sup>Note 4</sup>	dBm/ BW <sub>channel</sub>	- 64.76+10log( N <sub>RB,c</sub> /50)	- 64.76+10log( N <sub>RB,c</sub> /50)	- 70.22+10log( N <sub>RB,</sub> /50)	- 62.43+10log(N <sub>R</sub> <sub>B,o</sub> /50)
Propagation Condition			J70		<sub>В,∂</sub> 30) TU70
Correlation Matrix and			Low		2 Low
Antenna Configuration		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LUW	'*	Z LUW
Timing offset to cell 1	me	1	_		3
	ms	the seller and feeller			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 4: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.7.1-3: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 3 and Cell # 4)

Parameter	Unit	Се	II 3	C	Cell 4	
		T1	T2	T1	T2	
E-UTRA RF Channel		Randomly s	elected from	Randomly	selected from	
Number		2,3,4,5,6,7,8 s	such that cell 3	2,3,4,5,6,7,8	such that cell 4 is	
		is in the norma	al performance	in the normal p	erformance group	
		gro	oup			
BW <sub>channel</sub>	MHz		$N_{RB} = 25$	5MHz	: N <sub>RB,</sub> = 25	
		10MHz:	$N_{RB} = 50$	10MHz	z: N <sub>RB,</sub> = 50	
Measurement		5MHz:	10-15	5MH	z: 10-15	
bandwidth	$n_{{\it PRB}}$	10MHz	:: 22-27	10MF	Hz: 22-27	
PDSCH Reference			-		-	
measurement channel						
defined in A.3.1.1.						
PDSCH allocation	$n_{PRB}$		-		-	
PDCCH/PCFICH/PHIC	1112	5MHz: R	1.11 FDD	5MHz:	R.11 FDD	
H Reference			R.6 FDD		z: R.6 FDD	
measurement channel						
defined in A.3.1.2.						
OCNG Patterns		5MHz: OI	P.16 FDD	5MHz: (	OP.16 FDD	
defined in A.3.2.		10MHz: 0	OP.2 FDD	10MHz: OP.2 FDD		
PBCH_RA	dB					
PBCH_RB	dB	]				
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		_		_	
PHICH_RB	dB	(	)		0	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-6	98		-98	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7	
$\hat{E}_{s}/I_{ot}$	dB	-Infinity	7	-Infinity	7	
RSRP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
SCH RP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
lo <sup>Note 4</sup>	dBm/ BW <sub>channel</sub>	- 1	-	- 1	-	
		70.22+10log(	62.43+10log(	70.22+10log(	62.43+10log(N <sub>R</sub>	
		N <sub>RB,c</sub> /50)	N <sub>RB,c</sub> /50)	N <sub>RB,c</sub> /50)	B,c/50)	
Propagation Condition		ETI	J70		TU70	
Correlation Matrix and		1x2	Low	1x	2 Low	
Antenna Configuration						
Timing offset to cell 1	ms		3		3	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power						

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 4: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.3.7.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 30.72s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.3.8 FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

### A.8.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell measurement requirements for increased UE carrier monitoring in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.8.1-1, A.8.3.8.1-2 and A.8.3.8.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.3.8.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events A3 is used. The test consists of two successive time periods for every reptitation, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.3.8.1-1: General test parameters for FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF		1,2,3,4,5,6,7,8,9	Serving cell and 8 FDD carrier frequencies
Channel Number			are used in the UE neighbour cell list.
			Frequencies 5,6,7,8 and 9 are indicated to
			have reduced performance
Test equipment		Cell 1 uses E-UTRA RF cannel	
configuration		number 1	
		Cell 2,3,4 are randomly selected	
		to use different frequencies	
		selected from frequencies	
		2,3,4,5,6,7,8,9	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor configurations		8	As specified in TS 36.133 clause
			8.1.2.1.1a
T1	S	5	
T2	S	155	

Table A.8.3.8.1-2: Cell specific test parameters for FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (cell #1, cell #2)

Parameter	Unit	Cell 1		Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel		,	1	Randomly sel	ected from 2,3,4	
Number				such that cell 2	2 is in the normal	
				performa	ance group	
BW <sub>channel</sub>		5MHz: N	$N_{RB} = 25$	5MHz:	N <sub>RB,</sub> = 25	
		10MHz:	$N_{RB} = 50$	10MHz	: N <sub>RB,</sub> = 50	
PDSCH parameters:			R.5 FDD		R.5 FDD	
DL Reference		10MHz:I	R.0 FDD	10MHz	:R.0 FDD	
Measurement Channel						
As specified in						
clause A.3.1.1.1						
PCFICH/PDCCH/PHIC		5MHz: R	.11 FDD	5MHz:	R.11 FDD	
H parameters: DL		10MHz:I	R.6 FDD	10MHz	:R.6 FDD	
Reference						
Measurement Channel						
As specified in						
clause A.3.1.2.1						
OCNG Patterns						
defined in A.3.2.1.1,		5MHz: OI	P.15 FDD	5MHz: C	P.16.FDD	
A.3.2.1.2 ,A.3.2.1.15		10MHz:C	P.1 FDD	10MHz:	OP.2 FDD	
and A.3.2.1.16						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB	1				
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	(	)		0	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB	1				
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}$ Note 3	dBm/15 kHz	-9	98		98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
$\hat{E}_{s}/I_{ot}$ Note 4	dB	4	4	-Infinity	7	
RSRP Note 4	dBm/15 kHz	0.4	0.4	Infinity	01	
SCH_RP Note 4	dBm/15 kHz	-94 -94	-94 -94	-Infinity -Infinity	-91 01	
lo Note 4		-94 -64.76			-91 62.43	
10	dBm/Ch BW		-64.76	-70.22	-62.43	
		+10log +10log		+10log	+10log	
Dropogotion Condition		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition		AWGN AWGN				
Antenna Configuration		1)	(2		lx2	
Timing offset to Cell 1	g offset to Cell 1 - 3ms  1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted nower.					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

Table A.8.3.8.1-3: Cell specific test parameters for FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (cell #3, cell #4)

Parameter	Unit	Ce	II 3	C	cell 4	
	i	T1	T2	T1	T2	
E-UTRA RF Channel			elected from		selected from	
Number	l		that cell 3 is		that cell 4 is in	
	l		educed		d performance	
	l	performa	nce group		4 RF channel is rom Cell 3 RF	
	l				annel.	
BW <sub>channel</sub>		5MHz· N	N <sub>RB</sub> = 25		: N <sub>RB.</sub> = 25	
DVV channel	İ		$N_{RB} = 50$		:: N <sub>RB,</sub> = 50	
PDSCH parameters:			R.5 FDD		R.5 FDD	
DL Reference	Ì	10MHz:l	R.0 FDD	10MHz	z:R.0 FDD	
Measurement Channel	İ					
As specified in	Ì					
clause A.3.1.1.1						
PCFICH/PDCCH/PHIC	Ì		.11 FDD		R.11 FDD	
H parameters: DL	İ	10MHz:l	R.6 FDD	10MHz	z:R.6 FDD	
Reference	İ					
Measurement Channel	İ					
As specified in clause A.3.1.2.1	Ì					
OCNG Patterns						
defined in A.3.2.1.2	Ì	5MHz: O	P.16.FDD	5MHz: (	OP.16.FDD	
and A.3.2.1.16	İ		P.2 FDD	10MHz:OP.2 FDD		
PBCH_RA	dB					
PBCH RB	dB					
PSS_RA	dB					
SSS_RA	dB	1				
PCFICH_RB	dB					
PHICH_RA	dB		0			
PHICH_RB	dB		)		0	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
	dB dBm/15 kHz		)8		-98	
$N_{oc}^{ m Note~3}$	UDIII/ IO KI IZ		00		-90	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7	
Ê <sub>s</sub> /I <sub>ot</sub> Note 4	dB	-Infinity	7	-Infinity	7	
11011	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
SCH_RP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
lo Note 4	dBm/Ch BW	-70.22	-62.43	-70.22	-62.43	
	ı	+10log	+10log	+10log	+10log	
Duna and in O 199		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition			GN		WGN	
Antenna Configuration			<u>(2</u>		1x2	
Timing offset to Cell 1 3ms 3ms  Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power.						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

### A.8.3.8.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.17s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

### A.8.3.9 FDD-FDD Inter-frequency correct reporting of measurement events with reduced performance group configured, DRX

### A.8.3.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX. This test will partly verify the FDD-FDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.9.1-1, A.8.3.9.1-2, A.8.3.9.1-3 and A.8.3.9.1-4. In this test, there are four cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle..

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells on different frequencies which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.3.9.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1, 2,3,4,5,6,7,8,9	Serving cell and eight FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test equipment configuration		Cell 1,2,3,4	Cell 1 uses E-UTRA RF channel number 1 Cells 2 are randomly selected to use different frequencies selected from E-UTRA frequencies 2, 3, 4. Cells 3, 4 are randomly selected to use different frequencies selected from E-UTRA frequencies 5, 6, 7, 8, 9.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cells		Cell 2,3,4	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-5	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.3.9.1-3
Scaling factor for reduced performance group		8	
T1	S	5	
T2	S	155	

Table A.8.3.9.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for IncMon

Parameter	Unit		II 1		II 2		II 3	Cell 4	
		T1	T2	T1	T2	T1	T2	T1	T2
E-UTRA RF Channel		,	1		Randomly selected from 2,3,4 Randomly selected from 5, 6,				cted from 5, 6,
Number					such that cell 2 is in the normal 7, 8, 9 such that cell 3 is in the				
					nce group		rmance group	reduced performance group	
Channel Bandwidth	MHz		IRB = 25		IRB,= 25		IRB = 25	5MHz: N	
(BW <sub>channel</sub> )		10MHz: I			NRB,= 50		NRB = 50		NRB,= 50
PDSCH parameters as specified in clause			R.5 FDD R.0 FDD		R.5 FDD R.0 FDD	5MHZ: I 10MHz:	R.5 FDD		R.5 FDD R.0 FDD
A.3.1.1.1		TOIVINZ.	K.0 FDD	TUIVINZ.	K.0 FDD	I UIVITZ.	K.0 FDD	I UIVIIIZ.	K.0 FDD
PCFICH/PDCCH/PHICH		5MHz· R	2.11 FDD	5MHz: R	R.11 FDD	5MHz: R	2.11 FDD	5MHz: R	11 FDD
parameters as specified			R.6 FDD		R.6 FDD	10MHz:			R.6 FDD
in clause A.3.1.2.1									
OCNG Patterns defined		5MHz: O	P.15 FDD	5MHz: O	P.16 FDD	5MHz: O	P.16 FDD	5MHz: OI	P.16 FDD
in A.3.2.1		10MHz: (	OP.1 FDD		OP.2 FDD	10MHz: (	OP.2 FDD	10MHz: 0	
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB							!	
PHICH_RA	dB								
PHICH_RB	dB	(	)		0		)	(	)
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$N_{oc}$ Note 3	dBm/15 kHz	-(	98	-(	98	-(	98	-6	98
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}^{\mathrm{Note 4}}$	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
lo Note 4	dBm/Ch BW	-64.76+10log	-64.76+10log	-70.22+10log	-64.76+10log	-70.22+10log	-64.76+10log	-70.22+10log	-64.76+10log
		(N <sub>RB,c</sub> /50) (N <sub>RB,c</sub> /50)		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
Propagation Condition		AW	'GN	AWGN		AWGN		AW	GN
Antenna Configuration		1:	x2	1:	x2	1x2		1x2	
Time offset to cell1	ms		-	;	3	;	3	3	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.9.1-3: drx-Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment		
onDurationTimer	psf1			
drx-InactivityTimer	psf1			
drx-RetransmissionTimer	psf1			
longDRX-CycleStartOffset	sf160			
shortDRX	disable			
Note: For further information see clause 6.3.2 in TS 36.331.				

Table A.8.3.9.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment
TimeAlignmentTimer	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213

#### A.8.3.9.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.2s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

Where:

When DRX cycle is 160ms, the delay requirement of cell identification and measurement period are specified in section 8.1.2.3.1.2 and Non DRX Requirements in clause 8.1.2.3.1.1 are applicable.

The requirement of inter frequency cell identification delay are specified as

$$\mathbf{T}_{\text{Identify\_Inter}} = \mathbf{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathbf{T}_{\text{Inter1}}} \cdot N_{\textit{freq},n} \cdot K_{\textit{n}} \quad \textit{ms} \, (\text{normal performance}) \, \text{and} \, \frac{1}{2} \left( \frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \sum_{i=1}^$$

$$T_{\text{Identify\_Inter}} = T_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{T_{\text{Inter}}} \cdot N_{freq,r} \cdot K_r \quad \textit{ms} \, (\text{reduced performance})$$

T<sub>Basic\_Identify\_inter</sub> 480ms, See section 8.1.2.3.1.1

T<sub>Inter1</sub> 60ms, See section 8.1.2.1

 $N_{freq,n}$  and  $N_{freq,r}$  3 and 5 set in this test case.

 $K_n$  and  $K_r$  8/7 and 8, See section 8.1.2.1.1a.

This gives 13165.7ms for cells 2 on normal carrier, and 153600ms for cell 3 and cell 4 on reduced carriers for Event A3 triggered measurement reporting delay. The test requirements allow 13.2s and 153.6s.

### A.8.4 E-UTRAN TDD - TDD Inter-frequency Measurements

## A.8.4.1 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

### A.8.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.4.1.1-1 and A.8.4.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.1.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
		DL Reference Measurement	
PDSCH parameters		Channel R.0 TDD	As specified in clause A.3.1.1.2
		DL Reference Measurement	
PCFICH/PDCCH/PHICH		Channel R.6 TDD	As specified in clause A.3.1.2.2
parameters			
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
			The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table
			4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	10	

Table A.8.4.1.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	C	ell 1	Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel		1		2		
Number						
BW <sub>channel</sub>	MHz		10	1	0	
Correlation Matrix and		1x2	2 Low	1x2	Low	
Antenna Configuration						
OCNG Pattern defined						
in A.3.2.2.1 (OP.1		OP.	1 TDD	OP.2	TDD	
TDD) and in A.3.2.2.2						
(OP.2)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		•	0		
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	
$N_{oc}^{ m Note~3}$	dBm/15 kHz			-98		
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition			·	TU70		

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.4.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.4.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in synchronous cells

### A.8.4.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the TDD-TDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The common test parameters are given in Tables A.8.4.2.1-1 and A.8.4.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.4.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.4.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignmend. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1 Test 2		Comment		
		Value				
PDSCH parameters		DL Reference Measurement		As specified in clause A.3.1.1.2. Note that		
		Channel R.0 TDD		UE may only be allocated at On Duration		
PCFICH/PDCCH/PHICH		DL Reference Me		As specified in clause A.3.1.2.2.		
parameters		Channel R.6 TDD	)			
E-UTRA RF Channel Number		1, 2		Two TDD carrier frequencies are used.		
Channel Bandwidth	MHz	1	0			
(BW <sub>channel</sub> )	1411.12	'	O			
Active cell		Cell 1		Cell 1 is on RF channel number 1		
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2		
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.		
Uplink-downlink		1		As specified in TS 36.211 clause 4.2 Table		
configuration				4.2-2		
Special subframe		6		6		As specified in table 4.2-1 in TS 36.211.
configuration				The same configuration in both cells		
A3-Offset	dB	-6				
Hysteresis	dB	0				
CP length		Normal				
TimeToTrigger	S	0				
Filter coefficient		0		L3 filtering is not used		
PRACH configuration		4		As specified in table 5.7.1-3 in TS 36.211		
Access Barring Information	-	Not Sent		No additional delays in random access		
				procedure.		
DRX		ON		DRX related parameters are defined in		
						Table A.8.4.2.1-3
Time offset between cells		3 μs		Synchronous cells		
T1	S	5				
T2	S	5 30				

Table A.8.4.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Ce	II 1		Cell 2		
		T1	T2	T1	T2		
E-UTRA RF Channel		1		2			
Number							
BW <sub>channel</sub>	MHz	1	0		10		
Correlation Matrix and		1x2	Low	1)	k2 Low		
Antenna Configuration							
OCNG Patterns							
defined in A.3.2.2.1		OP.1	TDD	OF	P.2 TDD		
(OP.1 TDD) and in							
A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB			0			
PCFICH_RB	dB						
PHICH_RA	dB		_				
PHICH_RB	dB	(	)				
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7		
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	-91 7		
Propagation Condition			l l	TU70			
Note 1: OCNG shall be used	d such that both calls ar	a fully allocated	and a constant to	tal transmitted now	or enactral dancity is		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.4.2.1-3: drx-Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
rieid	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
rieid	Value	Value	
Time Alignment Timer	ofF00	sf500	For further information see
TimeAlignmentTimer	sf500	\$1500	clause 6.3.2 in TS 36.331.
			For further information see
sr-ConfigIndex	2	2	clause 6.3.2 in TS 36.331 and 10.1
			in TS 36.213.

### A.8.4.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20\*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.4.3 E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions in synchronous cells with DRX when L3 filtering is used

#### A.8.4.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX when L3 filtering is used. This test will partly verify the TDD-TDD inter-frequency cell search in DRX requirements in clause 8.1.2.3.2.2 and the UE behaviour with the filterCoefficent defined in TS 36.331 [2].

The test parameters are given in Tables A.8.4.3.1-1, A.8.4.3.1-2, A.8.4.3.1-3 and A.8.4.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and the filter coefficient is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 1 as defined in Table 8.1.2.1-1 is provided.

The uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.4.3.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.2
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters		Channel R.6 TDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Time offset between cells	μs	3	synchronous cells
Gap Pattern Id		1	As specified in TS 36.133
			clause 8.1.2.1.
Uplink-downlink configuration		1	As specified in table 4.2.2 in TS
of cells			36.211
Special subframe configuration		6	As specified in table 4.2.1 in TS
of cells			36.211
Neighbour A3-Offset Ofn	dB	-14	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		9	L3 filtering is used
DRX		ON	DRX related parameters are defined
			in Table A.8.4.3.1-3
T1	S	30	
T2	S	9	

Table A.8.4.3.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Parameter	Unit	Ce	ell 1	Ce	Cell 2		
		T1 T2		T1	T2		
E-UTRA RF Channel Number		1		2			
BW <sub>channel</sub>	MHz		0		10		
OCNG Patterns defined in A.3.2.2.1 (OP.1		OP.1	TDD	OP.2	2 TDD		
TDD) and in A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB			0			
PHICH_RB	dB		0				
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	4	24		
$N_{oc}^{ m Note  2}$	dBm/15 KHz		-(	98			
$\hat{E}_s/N_{oc}$	dB	4	4	4	24		
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-74		
SCH_RP Note 3	dBm/15 KHz	-94	-94	-94	-74		
Propagation Condition			AW	/GN	•		
Note 1: OCNG shall be used such that bo spectral density is achieved for all		ocated and	a constant to	tal transmitt	ed power		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.3.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.4.3.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and
		section10.1 in TS 36.213.

#### A.8.4.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of

time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.8.4.4 E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

### A.8.4.4.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.7.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.8.4.4.1-1 and A.8.4.4.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.4.4.1-1: General test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF channel number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	S	5	
T2	S	≤10	
T3	S	5	

Table A.8.4.4.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3		
E-UTRA RF Channel			1		2				
Number									
BW <sub>channel</sub>	MHz		10			10			
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2		
A.3.2.2.1 (OP.1 TDD) and		TDD	TDD	TDD	TDD	TDD	TDD		
in A.3.2.2.2 (OP.2 TDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB		_			_			
PHICH_RA	dB	0 0							
PHICH_RB	dB								
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$\hat{E}_{s}/I_{ot}$	dB	4	4	4	-Infinity	7	7		
$N_{oc}^{ m Note  2}$	dBm/15 KHz			-6	98				
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7		
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91		
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91		
Propagation Condition		AWGN							
Note 1: OCNG shall be us	sed such that both	cells are fully	y allocated a	nd a consta	nt total trans	mitted powe	r spectral		
L 11 LC HOEDM LL									

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.4.4.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test\ requirement = RRC\ Procedure\ delay +\ T_{identify\ CGI,inter} + reporting\ delay$ 

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 42 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 42 ACK/NACK number is caused by two parts. Firstly, at least 30 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.3.7.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 12 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

### A.8.4.5 E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

### A.8.4.5.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.7. The requirement is verified in a DRX configuration.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.8.4.5.1-1, A.8.4.5.1-2, A.8.4.5.1-3 and A.8.4.5.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.4.5.1-1: General test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF channel number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.4.5.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	S	5	
T2	S	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	S	5	

Table A.8.4.5.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Parameter Unit Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel		1			2		
Number							
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns defined in		OP.1	OP.1	OP.1	OP.2	OP.2	OP.2
A.3.2.2.1 (OP.1 TDD) and		TDD	TDD	TDD	TDD	TDD	TDD
in A.3.2.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB		_			_	
PHICH_RA	dB		0			0	
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_{s}/I_{ot}$	dB	4	4	4	-Infinity	7	7
$N_{oc}^{ m Note~2}$	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN	•	•			
	sed such that both	cells are fully	y allocated a	nd a consta	nt total trans	mitted powe	r spectral
density is achieved for all OFDM symbols.							

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled.
- RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are Note 3: not settable parameters themselves.

Table A.8.4.5.1-3: DRX configuration for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.4.5.1-4: TimeAlignmentTimer - Configuration for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.4.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay +  $T_{identify CGI, inter}$  + reporting delay

- = 15 + 150 + 2ms from the start of T3
- = 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.8.4.6 E-UTRAN TDD-TDD Inter-frequency event triggered reporting for TDD UL/DL configuration 0

### A.8.4.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.4.6.1-1 and A.8.4.6.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.1.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for TDD UL/DL configuration 0

Parameter	Unit	Value	Comment
		DL Reference Measurement	
PDSCH parameters		Channel R.5 TDD	As specified in clause A.3.1.1.2
		DL Reference Measurement	
PCFICH/PDCCH/PHICH		Channel R.6 TDD	As specified in clause A.3.1.2.2
parameters			
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
			The same configuration in both cells
Uplink-downlink configuration		0	As specified in TS 36.211 clause 4.2 Table
			4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	10	

Table A.8.4.6.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for TDD UL/DL configuration 0

Parameter	Unit	Ce	ell 1	Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel		1		2		
Number						
BW <sub>channel</sub>	MHz		10	10	)	
Correlation Matrix and		1x2	Low	1x2 L	_OW	
Antenna Configuration						
OCNG Pattern defined						
n A.3.2.2 (TDD)		OP.	TDD	OP.2	TDD	
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		0	0		
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{E}_{s}/I_{ot}$	dB	4	4	-Infinity	7	
$N_{oc}^{ m Note~3}$	dBm/15 kHz			-98		
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition			E	TU70		

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.4.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [7920] ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.4.7 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for Increased Carrier Monitoring without Reduced Performance Group

### A.8.4.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.4.1.1-1 and A.8.4.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cells 2, 3 or 4.

Table A.8.4.7.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
UE configured E-UTRA RF		1, 2,3,4,5,6,7,8,9	Serving cell and eight TDD carrier
Channel Number			frequencies are used in the UE neighbour
			cell list.
Test equipment configuration		Cell 1 uses UTRA RF channel	
		number 1	
		Cells 2,3,4 are randomly	
		selected to use different	
		frequencies selected from	
		frequencies 2,3,4,5,6,7,8,9	
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
T1	S	5	
T2	S	80	

Table A.8.4.7.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 1 and Cell # 2)

Parameter	Unit	Се	II 1	Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number			1	Randomly selected from 2,3,4,5,6,7,8 such that cell 2 in the normal performance gro	
BW <sub>channel</sub>	MHz		N <sub>RB</sub> = 25 N <sub>RB</sub> = 50		N <sub>RB,</sub> = 25 N <sub>RB,</sub> = 50
Measurement		5MHz:	10-15		10-15
bandwidth	$n_{{\scriptscriptstyle PRB}}$	10MHz	:: 22-27	10MHz	:: 22-27
PDSCH Reference		5MHz: F	R.5 TDD	,	-
measurement channel		10MHz:	R.0 TDD		
defined in A.3.1.1.					
PDSCH allocation		5MHz	:: 7-17		-
	$n_{PRB}$	10MHz	:: 13-36		
PDCCH/PCFICH/PHIC		5MHz: R	1.11 TDD	5MHz: R	1.11 TDD
H Reference		10MHz:	R.6 TDD	10MHz:	R.6 TDD
measurement channel					
defined in A.3.1.2.					
OCNG Patterns			P.15 TDD	5MHz: OP.16 TDD	
defined in A.3.2.		10MHz: (	OP.1 TDD	10MHz: OP.2 TDD	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB		_		_
PHICH_RB	dB	(	)	(	)
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}^{$	dBm/15 kHz	-6	98	-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91
lo <sup>Note 4</sup>	dBm/ BW <sub>channel</sub>	64.76+10log( N <sub>RB,c</sub> /50) N <sub>RB,c</sub> /50)		- 70.22+10log(N <sub>RB,c</sub> /50)	- 62.43+10log(N <sub>RB,0</sub> /50)
Propagation Condition			J70		J70
Correlation Matrix and		1x2	Low		Low
Antenna Configuration					
Timing offset to cell 1	ms		-	;	3
Note 1: OCNC shall b		th calla are fully	allocated and a		:

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.7.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 3 and Cell # 4)

Parameter	Unit	Ce	II 3	Се	II 4	
		T1	T2	T1	T2	
E-UTRA RF Channel		Randomly s	elected from	Randomly s	elected from	
Number			such that cell 3		uch that cell 4 is	
			al performance		rformance group	
		gro	oup	-		
BW <sub>channel</sub>	MHz	5MHz: N	$N_{RB} = 25$	5MHz: N	N <sub>RB,</sub> = 25	
		10MHz:	$N_{RB} = 50$	10MHz:	N <sub>RB,</sub> = 50	
Correlation Matrix and		1x2	Low	1x2	Low	
Antenna Configuration						
Measurement			10-15	5MHz:	10-15	
bandwidth	$n_{{\scriptscriptstyle PRB}}$	10MHz	:: 22-27	10MHz	:: 22-27	
PDSCH Reference		,	-	,	-	
measurement channel						
defined in A.3.1.1.						
PDSCH allocation	$n_{PRB}$		-		-	
PDCCH/PCFICH/PHIC	r'kb	5MH-7· D	2.11 TDD	5MH3・D	2.11 TDD	
H Reference			R.6 TDD		R.6 TDD	
measurement channel		TOWN 12.	14.0 100	TOIVII IZ.	11.0 100	
defined in A.3.1.2.						
OCNG Patterns		5MHz: OP.16 TDD		5MHz: O	P.16 TDD	
defined in A.3.2.			DP.2 TDD	10MHz: OP.16 TDD		
PBCH_RA	dB	10111112.	J1 .2 100	10111112.	51 .E 100	
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	(	)	(	)	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
	dBm/15 kHz	-0	98	_(	98	
$N_{oc}^{ m Note~3}$	UDIII/13 KI12	-3	90	-3	90	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7	
s / T oc	JD.	16: 11	_	16. 11	-	
$\hat{E}_{s}/I_{ot}$	dB	-Infinity	7	-Infinity	7	
RSRP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
SCH_RP Note 4	dBm/15 kHz	-infinity	-91	-infinity	-91	
Io <sup>Note 4</sup>	dBm/ BW <sub>channel</sub>	-	-	-	-	
	— • Glainel	70.22+10log( 62.43+10log(		70.22+10log(N	62.43+10log(N	
		N <sub>RB,c</sub> /50)	N <sub>RB,c</sub> /50)	<sub>RB,c</sub> /50)	<sub>RB,c</sub> /50)	
Propagation Condition			J70		J70	
Correlation Matrix and			Low		Low	
Antenna Configuration		TAL LOW				
Timing offset to cell 1	ms	:	3	:	3	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

### A.8.4.7.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 61.44s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.4.8 TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

#### A.8.4.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell measurement requirements for increased UE carrier monitoring in clause 8.1.2.3.

The test parameters are given in Tables A.8.4.8.1-1, A.8.4.8.1-2 and A.8.4.8.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.4.8.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events A3 is used. The test consists of two successive time periods for every reptitation, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.4.8.1-1: General test parameters for TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF		1,2,3,4,5,6,7,8,9	Serving cell and 8 TDD carrier frequencies
Channel Number			are used in the UE neighbour cell list.
			Frequencies 5,6,7,8 and 9 are indicated to
			have reduced performance
Test equipment		Cell 1 uses E-UTRA RF cannel	
configuration		number 1	
		Cell 2,3,4 are randomly selected	
		to use different frequencies	
		selected from frequencies	
		2,3,4,5,6,7,8,9	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor configurations		8	As specified in TS 36.133 clause
			8.1.2.1.1a
T1	S	5	
T2	S	155	

Table A.8.4.8.1-2: Cell specific test parameters for TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (Cell #1 and Cell #2)

Parameter	Unit	Ce	II 1	Cell 2, Cell 3, Cell 4		
		T1	T2	T1	T2	
E-UTRA RF Channel		,		Randomly se	lected from 2,3,4	
Number					2 is in the normal	
				perform	ance group	
BW <sub>channel</sub>		5MHz: N	N <sub>RB</sub> = 25	5MHz	: N <sub>RB.</sub> = 25	
Glamo			$N_{RB} = 50$		z: N <sub>RB,</sub> = 50	
Special subframe			110	6	1,5,	
configuration Note1						
Uplink-downlink				1		
configuration Note1						
PDSCH parameters:		5MHz: I	R.4 TDD	5MHz:	R.4 TDD	
DL Reference			R.0 TDD		z:R.0 TDD	
Measurement Channel						
As specified in						
clause A.3.1.1.2						
PCFICH/PDCCH/PHIC		5MHz· R	1.11 TDD	5MHz·	R.11 TDD	
H parameters: DL			R.6 TDD		z:R.6 TDD	
Reference		1 0.0 12				
Measurement Channel						
As specified in						
clause A.3.1.2.2						
OCNG Patterns		5MHz: O	P.9 TDD	5MHz·	OP.10.TDD	
defined in A.3.2.2.1,			P.1 TDD		:OP.2 TDD	
A.3.2.2.2 ,A.3.2.2.9		10111112.0	71.11 100	1011112	.01 .2 100	
and A.3.2.2.10						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	-	)	0		
PDCCH_RA	dB	1				
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 2</sup>	dB					
OCNG_RB <sup>Note 2</sup>	dB		20		00	
$N_{oc}^{ m Note~4}$	dBm/15 kHz	-8	98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
$\hat{E}_{_{s}}/I_{_{ot}}$ Note 5	dB	4	4	-Infinity	7	
RSRP Note 5	dBm/15 kHz	-94	-94	-Infinity	-91	
SCH RP Note 5	dBm/15 kHz	-94	-94	-Infinity	-91	
lo Note 4	dBm/Ch BW	-64.76	-64.76	-70.22	-62.43	
	3D111/011 DW	+10log	+10log	+10log	+10log	
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition		AW			WGN	
Antenna Configuration			<u>(2</u>		1x2	
Timing offset to Cell 1		17	<u>.</u>			
	المالمين المالمين	- 3 μs				

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 3: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 5: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.4.8.1-3: Cell specific test parameters for TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (Cell #3, Cell #4)

Parameter	Unit	Cell 3		Cell 4		
		T1	T2	T1	T2	
E-UTRA RF Channel		Randomly s	elected from	Randomly	selected from	
Number		5,6,7,8,9 such			ch that cell 4 is in	
		the reduced			erformance group.	
			oup		annel is different	
			- 1		3 RF channel.	
BW <sub>channel</sub>		5MHz: N	: N <sub>RB,</sub> = 25			
Granner			$N_{RB} = 50$		z: N <sub>RB,</sub> = 50	
Special subframe		6				
configuration Note1						
Uplink-downlink				1		
configuration Note1						
PDSCH parameters:		5MHz: I	R.4 TDD	5MHz:	R.4 TDD	
DL Reference		10MHz:I			z:R.0 TDD	
Measurement Channel						
As specified in						
clause A.3.1.1.2						
PCFICH/PDCCH/PHIC		5MHz: R	.11 TDD	5MHz:	R.11 TDD	
H parameters: DL		10MHz:I	R.6 TDD	10MH:	z:R.6 TDD	
Reference						
Measurement Channel						
As specified in						
clause A.3.1.2.2						
OCNG Patterns		5MHz: Of	P.10.TDD	5MHz:	OP.10.TDD	
defined in A.3.2.2.2		10MHz:C	P.2 TDD	10MHz	:OP.2 TDD	
and A.3.2.2.10						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		`	0		
PHICH_RB	dB	(	)			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 2</sup>	dB					
OCNG_RB <sup>Note 2</sup>	dB					
$N_{oc}^{ m Note~4}$	dBm/15 kHz	-9	98		-98	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7	
$\hat{E}_{s}/I_{ot}$ Note 5	dB	-Infinity	7	-Infinity	7	
RSRP Note 5	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
SCH RP Note 5	dBm/15 kHz	-Infinity	-91	-Infinity	-91	
lo Note 5	dBm/Ch BW	-70.22	-62.43	-70.22	-62.43	
-		+10log +10log		+10log	+10log	
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition		AW		AWGN		
Antenna Configuration			(2	1x2		
Timing offset to Cell 1		3			3 μs	
, and the second	hframa and unlink a					

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 3: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 5: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

### A.8.4.8.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.17s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

### A.8.4.9 TDD-TDD Inter-frequency correct reporting of measurement events with reduced performance group configured, DRX

#### A.8.4.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX. This test will partly verify the TDD-TDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The test parameters are given in Tables A.8.4.9.1-1, A.8.4.9.1-2, A.8.4.9.1-3 and A.8.4.9.1-4. In this test, there are four cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle..

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells on different frequencies which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.4.9.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Value	Comment		
UE configured E-UTRA RF		1, 2,3,4,5,6,7,8,9	Serving cell and eight TDD carrier frequencies are used in		
Channel Number			the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are		
			indicated to have reduced performance		
Test equipment		Cell 1,2,3,4	Cell 1 uses E-UTRA RF channel number 1		
configuration			Cells 2 are randomly selected to use different frequencies selected from E-UTRA frequencies 2, 3, 4.		
			Cells 3, 4 are randomly selected to use different		
			frequencies selected from E-UTRA frequencies 5, 6, 7, 8,		
			9.		
Active cell		Cell 1	Cell 1 is on RF channel number 1		
Neighbour cells		Cell 2,3,4			
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.		
Special subframe		6	As specified in table 4.2-1 in TS 36.211. The same		
configuration			configuration in both cells		
Uplink-downlink		1	As specified in TS 36.211 clause 4.2 Table 4.2-2		
configuration					
A3-Offset	dB	-5			
Hysteresis	dB	0			
CP length		Normal			
TimeToTrigger	S	0			
Filter coefficient		0	L3 filtering is not used		
DRX		ON	DRX related parameters are defined in Table A.8.3.9.1-3		
Scaling factor for reduced		8			
performance group					
T1	S	5			
T2	S	155			

Table A.8.4.9.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Cell 1		Се	II 2	Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1			cted from 2,3,4		ected from 5, 6,	Randomly selected from 5, 6,	
				such that cell 2 is in the		7, 8, 9 such that cell 3 is in		7, 8, 9 such that cell 4 is in the	
				normal performance group		the reduced performance		reduced performance group	
						group			
Channel Bandwidth	MHz	5MHz: N		5MHz: NRB,= 25		5MHz: NRB = 25		5MHz: NRB,= 25	
(BW <sub>channel</sub> )		10MHz: N		10MHz: NRB,= 50		10MHz: NRB = 50		10MHz: NRB,= 50	
PDSCH parameters as		5MHz: R		5MHz: R.4 TDD		5MHz: R.4 TDD		5MHz: R.4 TDD	
specified in clause A.3.1.1.2 PCFICH/PDCCH/PHICH		10MHz: F 5MHz: R		10MHz: R.0 TDD		10MHz: R.0 TDD		10MHz: R.0 TDD	
				5MHz: R.11 TDD		5MHz: R.11 TDD		5MHz: R.11 TDD	
parameters as specified in clause A.3.1.2.2		10MHz: R.6 TDD		10MHz: R.6 TDD		10MHz: R.6 TDD		10MHz: R.6 TDD	
OCNG Patterns defined in		5MHz: O	D 0 TDD	5MHz: 0	D 10 TDD	5MHz: 0	D 10 TDD	5MH-7: O	2 10 TDD
A.3.2.2		10MHz: C		5MHz: OP.10 TDD 10MHz: OP.2 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD	
PBCH_RA	dB	10111112.	71.11100	10101112.	51 .2 100	10101112.	J1 .Z 100	10101112.	01 .2 100
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB			0		0		0	
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_RB	dB	c	)						
PDCCH_RA	dB	Š	,						
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98		-98		-98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}^{}$ Note 4	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
lo Note 4	dBm/Ch BW	-64.76+10log	-64.76+10log	-70.22+10log	-64.76+10log	-70.22+10log	-64.76+10log	-70.22+10log	-64.76+10log
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
Propagation Condition		AWGN		AWGN		AWGN		AWGN	
Antenna Configuration		1x2		1x2		1x2		1x2	
Time offset to cell1	μS	-		3		3		3	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.9.1-3: drx-Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment	
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset	sf160		
shortDRX	disable		
Note: For further information see clause 6.3.2 in TS 36.331.			

Table A.8.4.9.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment
TimeAlignmentTimer	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213

#### A.8.4.9.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.2s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

Where:

When DRX cycle is 160ms, the delay requirement of cell identification and measurement period are specified in section 8.1.2.3.1.2 and Non DRX Requirements in clause 8.1.2.3.1.1 are applicable.

The requirement of inter frequency cell identification delay are specified as

$$\mathbf{T}_{\text{Identify\_Inter}} = \mathbf{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathbf{T}_{\text{Inter1}}} \cdot N_{\text{freq},n} \cdot K_n \quad \textit{ms} \text{ (normal performance) and }$$

$$\mathbf{T}_{\text{Identify\_Inter}} = \mathbf{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathbf{T}_{\text{Interl}}} \cdot N_{\textit{freq},r} \cdot K_{r} \quad \textit{ms} \, (\text{reduced performance})$$

 $T_{Basic\_Identify\_inter}$  480ms, See section 8.1.2.3.1.1

 $T_{Inter1}$  60ms, See section 8.1.2.1

 $N_{freq,n}$  and  $N_{freq,r}$  3 and 5 set in this test case.

 $K_n$  and  $K_r$  8/7 and 8, See section 8.1.2.1.1a.

This gives 13165.7ms for cells 2 on normal carrier, and 153600ms for cell 3 and cell 4 on reduced carriers for Event A3 triggered measurement reporting delay. The test requirements allow 13.2s and 153.6s.

### A.8.5 E-UTRAN FDD - UTRAN FDD Measurements

# A.8.5.1 E-UTRAN FDD - UTRAN FDD event triggered reporting under fading propagation conditions

#### A.8.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.5.1.1-1, A.8.5.1.1-2 and A.8.5.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.1.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	S	6	

Table A.8.5.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1			
		T1 T2			
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
Correlation Matrix and		1x2 Low			
Antenna Configuration					
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1 FDD			
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4 4			
$\hat{E}_s/N_{oc}$	dB	4 4			
$N_{oc}$	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94 -94			
SCH_RP	dBm/15 kHz	-94 -94			
Propagation Condition		ETU70			
	such that both or	alls are fully allocated and a constant total transmitted nowe			

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.5.1.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2		
		T1	T2	
UTRA RF Channel Number		1		
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB	-15		
DPCH_Ec/lor	dB	N/A		
OCNS		-0.941		
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8	
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/lo	dB	-Infinity -14		
Propagation Condition		Case 5 (Note 3)		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

to I<sub>or</sub>.

Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.

### A.8.5.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.5.2 E-UTRAN FDD - UTRAN FDD SON ANR cell search reporting under AWGN propagation conditions

#### A.8.5.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of the strongest UTRAN cell for SON automatic neighbour relations. This test will partly verify the E-UTRAN FDD - UTRAN FDD cell search requirements for identification of a new UTRA FDD cell for SON given in clause 8.1.2.4.7.1.

The test parameters are given in Tables A.8.5.2.1-1, A.8.5.2.1-2 and A.8.5.2.1-3 below. In the measurement control information it is indicated to the UE that periodical reporting with the purpose 'reportStrongestCellsForSON' is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior to the start of time period T1, an interRATperiodic measurement reporting configuration with purpose reportStrongestCellsForSON is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.2.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	S	>5	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2	S	6	

Table A.8.5.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for UTRAN FDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Ce	II 1
		T1	T2
E-UTRA RF Channel Number			1
BW <sub>channel</sub>	MHz	1	0
OCNG Pattern defined in			
A.3.2.1.1 (OP.1 FDD)		OP.1	FDD
PBCH_RA	dB		
PBCH_RB	dB	]	
PSS_RA	dB		
SSS_RA	dB	]	
PCFICH_RB	dB		
PHICH_RA	dB		_
PHICH_RB	dB		0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
$N_{oc}^{ m Note  3}$	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used	such that both c	ells are fully allocated and a cou	nstant total transmitted now

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.5.2.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for UTRAN FDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-3.35		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/lo	dB	-Infinity -15			
Propagation Condition		AWGN			

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{\rm or}$ .

#### A.8.5.2.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.5.3 E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

#### A.8.5.3.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN FDD-UTRAN FDD cell search requirements when DRX is used in clause 8.1.2.4.1.2.

In these tests, there are two cells, one E-UTRAN cell and one UTRAN cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.5.3.1-1. Cell specific test parameters are given in Table A.8.5.3.1-2 for E-UTRAN and in Table A.8.5.3.1-5 for UTRAN. DRX configuration for Test1 and Test2 are given in Table A.8.5.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.5.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.3.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-		DL Reference Measurement		As specified in clause A.3.1.1.1 Note that
UTRAN FDD)		Channel R.0 FDD	)	UE may only be allocated at On Duration
PCFICH/PDCCH/PHICH		DL Reference Me	asurement	As specified in clause A.3.1.2.1.
parameters (E-UTRAN FDD)		Channel R.6 FDD	)	
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on UTRA RF channel number 1.
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10		
UTRA RF Channel Number		1		One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH	ł Ec/lo	
measurement quantity				
b1-Threshold-UTRA	dB	-18		CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	S	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in
DKX		ON		Table A.8.5.3.1-3
Monitored UTRA FDD cell		12		UTRA cells on UTRA RF channel 1
list size				provided in the cell list.
T1	S	5		
T2	S	6	30	

Table A.8.5.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) event triggered reporting of UTRAN FDD cell when DRX is used under fading propagation conditions

MHz	T1 T2			
MHz	·			
MHz	10			
	10			
	1x2 Low			
	OP.1 FDD			
dB				
dB	] 0			
dB				
dB	4 4			
dBm/15 kHz	-98			
dBm/15 kHz	-94 -94			
dBm/15 kHz	-94 -94			
dB	4 4			
	ETU70			
(	dB dB dB dB dB dB dB dB dB dB dB dB dB d			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $\frac{N_{oc}}{N_{oc}}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.5.3.1-3: drx-Configuration to be used in E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment		
rieid	Value	Value			
onDurationTimer	psf1	psf1			
drx-InactivityTimer	psf1	psf1			
drx-RetransmissionTimer	psf1	psf1			
longDRX-CycleStartOffset	sf40	sf1280			
shortDRX	Disable	Disable			
Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.8.5.3.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

Table A.8.5.3.1-5: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell when DRX is used under fading propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity -1.8			
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/lo	dB	-Infinity -14			
Propagation Condition		Case 5 (Note 3)			

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

to l<sub>or</sub>.

Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.

#### A.8.5.3.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE sends the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 20\*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report.

## A.8.5.4 E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

#### A.8.5.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct enhanced reporting of UTRAN cells. This test will partly verify the Enhanced UTRA FDD cell identification requirements in clause 8.1.2.4.1.1.1a.

The test parameters are given in Tables A.8.5.4.1-1, A.8.5.4.1-2 and A.8.5.4.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time period T1, gaps are activated and an interRAT measurement reporting configuration is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2

Table A.8.5.4.1-1: General test parameters for E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list
T1	S	5	
T2	S	2	

Table A.8.5.4.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1 FD	D		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB		ļ		
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	_			
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{E}_{s}/I_{ot}$	dB	4	4		
$N_{oc}^{ m Note 3}$	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4 4			
RSRP Note 4	dBm/15 kHz	-94 -94			
SCH_RP	dBm/15 kHz	-94 -94			
Propagation Condition		AWGN			

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be

fulfilled.
RSRP levels have been derived from other parameters for information purposes. They are not

settable parameters themselves.

Table A.8.5.4.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	-∞ 0.02			
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞ -13			
Propagation Condition		AWGN			

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

to l<sub>or</sub>.

Note 4:

Note 3: This gives an SCH Ec/lo of -15dB

#### A.8.5.4.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 960 ms from the beginning of time period T2. The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH

## A.8.5.5 E- UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

#### A.8.5.5.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of UTRA cell with autonomous gaps in clause 8.1.2.4.17.

The test parameters are given in Tables A.8.5.5.1-1, A.8.5.5.1-2 and A.8.5.5.1-3 below. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event B1. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.5.5.1-1: General test parameters for E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement	As specified in clause A.3.1.1.1.
		Channel R.0 FDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1.
(E-UTRAN FDD)		Channel R.6 FDD	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
SIB3_REP	Frames	32	Applicable for cell 2 SIB3 scheduling
SIB3 SEG_COUNT		1	Applicable for cell 2 SIB3 scheduling
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided
			in the cell list.
CSG id (of cell 2)		Set to any non-empty value	
T1	S	5	
T2	S	≤10	
T3	s	5	

Table A.8.5.5.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW <sub>channel</sub>	MHz	10		
OCNG Pattern defined in				
A.3.2.1.1 (OP.1 FDD)		OP.1 FD	D	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB	_		
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	4 4		
RSRP Note 4	dBm/15 kHz	-94 -94		
SCH_RP	dBm/15 kHz	-94	-94	
Propagation Condition		AWGN		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.5.5.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 2		
		T1	T2	
UTRA RF Channel Number		1		
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB	-15		
DPCH_Ec/lor	dB	N/A		
OCNS		-0.941		
$\hat{I}_{or}/I_{oc}$	dB	-∞ 0.02		
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞ -13		
Propagation Condition		AWGN		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .

Note 3: This gives an SCH Ec/lo of -15dB

#### A.8.5.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within [1965] milliseconds from the start of T3.

Test requirement = RRC Procedure delay + Tidentify\_CGI, UTRAN FDD + reporting delay

- = 50 + [630] + 40\*32 + 2ms from the start of T3
- = [1962] ms, allow [1965] ms.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.5.6 E-UTRAN FDD - UTRAN FDD event triggered reporting without measurement gaps under AWGN propagation conditions

#### A.8.5.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event without measurement gaps. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.5.6.1-1, A.8.5.6.1-2 and A.8.5.6.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. PDCCH on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.5.6.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting without measurement gaps under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement	As specified in clause A.3.1.1.1.
		Channel R.3 FDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1.
(E-UTRAN FDD)		Channel R.6 FDD	
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement		CPICH Ec/lo	
quantity			
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	-
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided
			in the cell list.
T1	S	5	
T2	S	6	

Table A.8.5.6.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of UTRAN FDD cell without measurement gaps under AWGN propagation conditions

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	1(	)		
OCNG Pattern defined in					
A.3.2.1.10 (OP.10 FDD)		OP.10	FDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4		
$\hat{E}_s/N_{oc}$	dB	4	4		
$N_{oc}$	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWGN			

The resources for uplink transmission are assigned to the UE prior to the start of time period T2 Note 2:

Table A.8.5.6.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell without measurement gaps under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity -1.8			
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/lo	dB	-Infinity -14			
Propagation Condition		AWGN			
Note 1: The DPCH level is controlled by the power control loop.					

The power of the OCNS channel that is added shall make the total power from the cell to be equal

A.8.5.6.2

**Test Requirements** 

to I<sub>or</sub>

Note 2:

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall send continuous ACK/NACK throughout the test, and from the start of T2 until Event B1 is reported, at least 85% ACK/NACK shall be detected.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously. The rate of correct events observed during repeated tests shall be at least 90%.

The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays NOTE: above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.8.5.7 E-UTRAN FDD - UTRAN FDD Event Triggered Reporting under Fading Propagation Conditions for 5 MHz Bandwidth

#### A.8.5.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The parameters of this test are the same as defined in Section A.8.5.1.1 except that the values of the parameters in the Table A.8.5.7.1-1 will replace the values of the corresponding parameters in A.8.5.1.1-1, and the values of the parameters in the Table A.8.5.7.1-2 will replace the values of the corresponding parameters in A.8.5.1.1-2.

Table A.8.5.7.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment		
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement	As specified in clause A.3.1.1.1.		
		Channel R.5 FDD			
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1.		
(E-UTRAN FDD)		Channel R.11 FDD			
E-UTRA Channel Bandwidth	MHz	5			
(BW <sub>channel</sub> )					
NOTE 1: See Table A.8.5.1.1-1 for the other parameters.					
NOTE 2: This test is according to the principle defined in Section A.3.7.2.					

Table A.8.5.7.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of **UTRAN FDD cell under fading propagation conditions** 

Parameter	Unit	Cell 1		
		T1	T2	
BW <sub>channel</sub>	MHz	5		
OCNG Pattern defined in		OP.15 FDD		
A.3.2.1.15	A.3.2.1.15			
NOTE: See Table A.8.1.3.1-2 for the other parameters.				

#### A.8.5.7.2 **Test Requirements**

The test requirements defined in Section A.8.5.1 shall apply to this test case.

### A.8.5.8 E-UTRA FDD InterRAT UTRA FDD correct reporting of measurement events with reduced performance group configured, non DRX

#### A.8.5.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA FDD-UTRA FDD inter-RAT cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.5.8.1-1 and A.8.5.8.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.5.8.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1	Serving cell and six UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance
UE is configured UTRA RF channel numbers		2, 3, 4, 5, 6, 7	
Test equipment configuration		Cell 1 uses E-UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7	Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group
PDSCH parameters (E- UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Correlation Matrix and Antenna Configuration		1x2 low	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Time offset with respect to cell1		0	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/lo	
b1-Threshold-UTRA	dB	-18	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor for reduced performance group		16	
T1	S	5	
T2	S	155	

Table A.8.5.8.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Ce	II 1
		T1	T2
E-UTRA RF Channel Number		1	
BW <sub>channel</sub>	MHz	5MHz: N 10MHz: I	N <sub>RB</sub> = 25 N <sub>RB</sub> = 50
Correlation Matrix and			Low
Antenna Configuration			
OCNG Pattern defined in			
A.3.2.1.1 (OP.1 FDD)		OP.1	FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	(	)
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
$N_{oc}$	dBm/15 kHz	-9	98
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU	J70

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.5.8.1-3: Cell specific test parameters for UTRAN FDD (cell # 2, 3 and 4) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2
		Cells		Cells		Cells	
		randomly		rand	omly	rand	omly
		select	ted to	selec	ted to	select	ted to
UTRA RF Channel Number		use di	fferent	use di	fferent	use di	
		freque			encies	freque	
		selecte			ed from	selecte	
		UTR		UTR		UTR	
		chai			nnel	chai	
		num		numbers		numbers	
001011 = #		2,3,4	,5,6,7		,5,6,7	2,3,4	5,6,7
CPICH_Ec/lor	dB	-10					
PCCPCH_Ec/lor	dB				2		
SCH_Ec/lor	dB				2		
PICH_Ec/lor	dB				5		
DPCH_Ec/lor	dB				/A		
OCNS				-0.9		1	
â /_		-	-1.8	-	-1.8		-1.8
$\hat{I}_{or}/I_{oc}$	dB	infinit		infinit		infinit	
	/ /	У		У		У	
$I_{oc}$	dBm/3.84	-70					
OC.	MHz						
ODIOLI F./I.	-ID	-	-14		-14		-14
CPICH_Ec/lo	dB	infinit		infinit		infinit	
Dona a satis a Constition a		У		<u>у</u>	(NI-4- 0\	У	
Propagation Conditions		Case 5 (Note 3)					
Notes TBD							

#### A.8.5.8.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 7.68s (cell 2) and 115,2s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

#### A.8.6 E-UTRAN TDD - UTRAN FDD Measurements

### A.8.6.1 E-UTRAN TDD - UTRAN FDD event triggered reporting under fading propagation conditions

#### A.8.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- UTRAN FDD cell search requirements in clause 8.1.2.4.2.

The test parameters are given in Tables A.8.6.1.1-1, A.8.6.1.1-2 and A.8.6.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.6.1.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	S	5	
T2	S	6	

Table A.8.6.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell	1		
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
Correlation Matrix and		1x2 Low			
Antenna Configuration					
OCNG Pattern defined in					
A.3.2.2.1 (OP.1 TDD)		OP.1 T	DD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB	_			
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4		
$\hat{E}_s/N_{oc}$	dB	4	4		
$N_{oc}$	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		ETU7	70		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.6.1.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.94	1		
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/lo	dB	-Infinity	-14		
Propagation Condition		Case 5 (N	ote 3)		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

to lor.

Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101

#### A.8.6.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.6.2 E- UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

#### A.8.6.2.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of UTRA cell with autonomous gaps in clause 8.1.2.4.18.

The test parameters are given in Tables A.8.6.2.1-1, A.8.6.2.1-2 and A.8.6.2.1-3 below. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event B1. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.6.2.1-1: General test parameters for E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement	As specified in clause A.3.1.1.2.
,		Channel R.0 TDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.2.
(E-UTRAN TDD)		Channel R.6 TDD	·
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
			Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
			Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
SIB3_REP	Frames	32	Applicable for cell 2 SIB3 scheduling.
SIB3 SEG_COUNT		1	Applicable for cell 2 SIB3 scheduling.
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided
			in the cell list.
CSG id (of cell 2)		Set to any non-empty value	
T1	S	5	
T2	S	≤10	
T3	S	5	

Table A.8.6.2.1-2: Cell specific test parameters for cell #1 E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BW <sub>channel</sub>	MHz	10	
OCNG Pattern defined in			
A.3.2.2.1 (OP.1 TDD)		OP.1 TD	D
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB	_	
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWĠN	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.6.2.1-3: Cell specific test parameters for cell #2 E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.94	1		
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/Io <sup>Note 3</sup>	dB	-∞	-13		
Propagation Condition		AWGI	N		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{or}$ .

Note 3: This gives an SCH Ec/lo of -15dB

#### A.8.6.2.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within [1965] milliseconds from the start of T3.

Test requirement = RRC Procedure delay + Tidentify\_CGI, UTRAN FDD + reporting delay

- = 50 + [630] + 40\*32 + 2ms from the start of T3
- = [1962] ms, allow [1965] ms.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.6.3 E-UTRA TDD InterRAT UTRA FDD correct reporting of measurement events with reduced performance group configured, non DRX

### A.8.6.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD-UTRA FDD inter-RAT cell search requirements in clause 8.1.2.4.2.

The test parameters are given in Tables A.8.6.3.1-1 and A.8.6.3.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.6.3.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF		1	Serving cell and seven UTRA FDD carrier
Channel Number			frequencies are used in the UE neighbour
			cell list. Frequencies 5,6 and 7 are indicated to have reduced performance
UE is configured UTRA RF		2, 3, 4, 5, 6, 7,8	indicated to have reduced performance
channel numbers		2, 3, 4, 3, 6, 7,6	
Test equipment		Cell 1 uses E-UTRA RF channel	Cells 2, 3 and 4 are chosen randomly,
configuration		number 1	such that one frequency belongs to the
Comigaration		Cells 2,3,4 are randomly selected	normal performance group and two
		to use different frequencies	frequencies belong to the reduced
		selected from UTRA RF channel	performance group
		numbers 2,3,4,5,6,7,8	
PDSCH parameters (E-		DL Reference Measurement	As specified in clause A.3.1.1.2.
UTRAN TDD)		Channel R.0 TDD	·
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters		Channel R.6 TDD	
(E-UTRAN TDD)			
Correlation Matrix and		1x2 low	
Antenna Configuration			
Special subframe		6	As specified in table 4.2-1 in TS 36.211.
configuration			Applicable to cell 1
Uplink-downlink		1	As specified in table 4.2-2 in TS 36.211.
configuration			Applicable to cell 1
Active cell		Cell 1	Cell 1 is on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor for reduced		16	
performance group			
T1	S	5	
T2	S	155	

Table A.8.6.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	eter Unit Cell 1		1	
		T1	T2	
E-UTRA RF Channel Number		1		
BW <sub>channel</sub>	MHz	10	)	
Correlation Matrix and		1x2 Low		
Antenna Configuration				
OCNG Pattern defined in				
A.3.2.1.1 (OP.1 FDD)		OP.1	FDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_{s}/I_{ot}$	dB	4	4	
$\hat{E}_s/N_{oc}$	dB	4	4	
$N_{oc}$	dBm/15 kHz	-98	3	
RSRP	dBm/15 kHz	-94	-94	
SCH_RP	dBm/15 kHz	-94	-94	
Propagation Condition		ETU	70	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.6.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 2, 3 and 4) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2
		Cells			3 is	Cells	
		randomly		rand	omly	rand	omly
		select	ted to	selec	ted to	select	ted to
		use di		5.55	fferent	use di	
UTRA RF Channel Number		freque			encies	freque	
			ed from		ed from	selecte	
			A RF		A RF	UTR	
			nnel		nnel	chai	
		num		-	bers	num	
ODIOLI E /I	ID	2,3,4,5,6,7 2,3,4,5,6,7 2,3,4,5,6,7				5,6,7	
CPICH_Ec/lor	dB				0		
PCCPCH_Ec/lor	dB				2		
SCH_Ec/lor	dB				12		
PICH_Ec/lor	dB				15		
DPCH_Ec/lor	dB				/A		
OCNS				-0.9		1	
÷ /*			-1.8		-1.8		-1.8
$\hat{I}_{or}/I_{oc}$	dB	infinit		infinit		infinit	
	-ID /0.04	У		у _	70	У	
$I_{oc}$	dBm/3.84 MHz	-70					
	IVII IZ	-   -14   -   -14   -   -14				-14	
CPICH_Ec/lo	dB	infinit	-14	infinit	-14	infinit	- 14
0.1017_20/10	uD.	V		V		V	
Propagation Conditions		Case 5 (Note 3)					
Notes TBD				22300	(		

#### A.8.6.3.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 7.68s (cell 2) and 115,2s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

### A.8.7 E-UTRAN TDD – UTRAN TDD Measurements

### A.8.7.1 E-UTRAN TDD to UTRAN TDD cell search under fading propagation conditions

#### A.8.7.1.1 Test Purpose and Environment

A.8.7.1.1.1 Void

#### A.8.7.1.1.2 1.28 Mcps TDD option

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD to UTRA TDD cell search requirements in clause 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 1 E-UTRA TDD PCell, and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.7.1.1.2-1, A.8.7.1.1.2-2, and A.8.7.1.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.7.1.1.2-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in
		Channel R.0 TDD	clause A.3.1.1.2
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in
parameters		Channel R.6 TDD	clause A.3.1.2.2
Active cell		Cell 1	E-UTRA TDD cell
Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Gap Pattern Id		0	As specified in TS 36.133
			clause 8.1.2.1.
Uplink-downlink configuration of		1	As specified in table 4.2.2 in
cell 1			TS 36.211
Special subframe configuration of		6	As specified in table 4.2.1 in
cell 1			TS 36.211
CP length of cell 1		normal	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
Ofn	dB	0	
Thresh	dBm	-87	
T1	S	5	
T2	S	10	

Table A.8.7.1.1.2-2: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 1)

T1   T2	nber channel relation Matrix and enna Configuration NG Pattern defined in 2.2.1 (OP.1 TDD) CH_RA CH_RB B_RA
Number         BW <sub>channel</sub> MHz         10           Correlation Matrix and Antenna Configuration         1x2 Low           OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)         OP.1 TDD           PBCH_RA         dB	nber channel relation Matrix and enna Configuration NG Pattern defined in 2.2.1 (OP.1 TDD) CH_RA CH_RB B_RA
BW <sub>channel</sub> MHz 10  Correlation Matrix and Antenna Configuration  OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)  PBCH_RA dB	channel relation Matrix and renna Configuration NG Pattern defined in 2.2.1 (OP.1 TDD) CH_RA CH_RB B_RA
Correlation Matrix and Antenna Configuration  OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)  PBCH_RA  D1x2 Low  OP.1 TDD	relation Matrix and enna Configuration NG Pattern defined in 2.2.1 (OP.1 TDD) CH_RA CH_RB B_RA
Antenna Configuration  OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)  PBCH_RA  DP.1 TDD  OP.1 TDD	enna Configuration NG Pattern defined in 2.2.1 (OP.1 TDD) CH_RA CH_RB B_RA
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) PBCH_RA dB	NG Pattern defined in 2.2.1 (OP.1 TDD) CH_RA CH_RB 3_RA
A.3.2.2.1 (OP.1 TDD)  PBCH_RA  dB	2.2.1 (OP.1 TDD) CH_RA CH_RB S_RA
A.3.2.2.1 (OP.1 TDD)  PBCH_RA  dB	CH_RA CH_RB S_RA
	CH_RB S_RA
	S_RA
PBCH_RB dB	_
PSS_RA dB	, D.
SSS_RA dB	_KA
PCFICH_RB dB	FICH_RB
PHICH_RA dB	
PHICH_RB dB 0 0	CH_RB
PDCCH_RA dB	
PDCCH_RB dB	
PDSCH_RA dB	
PDSCH_RB dB	SCH_RB
OCNG_RA <sup>Note1</sup> dB	NG_RA <sup>Note1</sup>
OCNG_RB <sup>Note1</sup> dB	NG_RB <sup>Note1</sup>
$\hat{E}_{s}/I_{ot}$ dB 9 9	
$\hat{E}_s/N_{oc}$ dB 9	$/N_{oc}$
$N_{oc}$ dBm/15kHz -98	
RSRP dBm/15kHz -89 -89	RP 9
SCH_RP dBm/15kHz -89 -89	I_RP
Propagation Condition ETU70	pagation Condition

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.7.1.1.2-3: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)				
Timeslot Number		0		Dwl	PTS	
		T1	T2	T1	T2	
UTRA RF Channel Number NOTE1		Channel 2				
PCCPCH_Ec/lor	dB	-3	-3			
DwPCH_Ec/lor	dB			0	0	
OCNS_Ec/lor <sup>NOTE2</sup>	dB	-3	-3			
$\hat{I}_{or}/I_{oc}$	dB	-inf	5	-inf	5	
$I_{oc}$	dBm/1.28 MHz	-80				
PCCPCH RSCP	dBm	-inf	-78	n.a.	n.a.	
Propagation Condition		Case 3 <sup>NOTE3</sup>				

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to  $I_{\rm or}$ .

Note 3: Case 3 propagation conditions are defined in Annex B of TS 25.102

A.8.7.1.1.3 Void

#### A.8.7.1.2 Test Requirements

A.8.7.1.2.1 Void

#### A.8.7.1.2.2 1.28 Mcps TDD option

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.7.1.2.3 Void

### A.8.7.2 E-UTRAN TDD-UTRAN TDD cell search when DRX is used under fading propagation conditions

#### A.8.7.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN TDD to UTRAN TDD inter-RAT cell search requirements when DRX is used in clause 8.1.2.4.3.2 under fading propagation conditions.

The common test parameters are given in Tables A.8.7.2.1-1, A.8.7.2.1-2 and A.8.7.2.1-3. DRX configuration for Test1 and Test2 are given in Table A.8.7.2.1-4 and time alignment timer and scheduling request related parameters in Table A.8.7.2.1-5. In these tests, there are two cells, 1 E-UTRAN TDD PCell and 1 UTRAN TDD cell to be searched, Gap pattern configuration # 0 as defined in table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignmend. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.7.2.1-1: General test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Va	lue	

PDSCH parameters		DL Reference Mea	surement	As specified in clause A.3.1.1.2. Note that		
Deer parameter		Channel R.0 TDD		UE may only be allocated at On Duration		
PCFICH/PDCCH/PHICH		DL Reference Measurement		As specified in clause A.3.1.2.2.		
parameters		Channel R.6 TDD				
Active cell		Cell 1		E-UTRAN TDD cell		
Neighbour cell		Cell 2		UTRAN 1.28Mcps TDD cell		
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.		
Uplink-downlink		1		As specified in TS 36.211 clause 4.2 Table		
configuration				4.2-2		
Special subframe		6		As specified in table 4.2-1 in TS 36.211.		
configuration				The same configuration in both cells		
PRACH configuration		4		As specified in table 5.7.1-3 in TS 36.211		
CP length of cell 1		Normal				
Ofn	dB	0				
Thresh	dBm	-83		Absolute P-CCPCH RSCP threshold for		
				event B1		
Hysteresis	dB	0				
TimeToTrigger	S	0				
Filter coefficient		0		L3 filtering is not used		
Access Barring Information	-	Not Sent		No additional delays in random access		
_				procedure.		
DRX		ON		ON		DRX related parameters are defined in
				Table A.8.4.2.1-3		
Time offset between cells		3 ms		Asynchronous cells		
T1	S	5				
T2	S	8	30			

Table A.8.7.2.1-2: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 1)

Parameter	Unit	Ce	II 1
		T1	T2
E-UTRA RF Channel		1	
Number			
BWchannel	MHz	1	0
Correlation Matrix and		1x2	Low
Antenna Configuration			
OCNG Patterns defined		OP.1	TDD
in A.3.2.2.1 (OP.1 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RANote1	dB		
OCNG_RBNote1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N <sub>oc</sub> Note 2	dBm/15kHz	-98	
I RSRP """	dBm/15kHz	-94	-94
SCH_RP Note 3	dBm/15kHz	-94	-94
Propagation Condition		ETI	J70

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power

for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7.2.1-3: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 2)

Pa	rameter	Unit	Cell 2 (UTRA)			
Timeslot I	Number		0		Dw	PTS
			T1	T2	T1	T2
UTRA RF Number N			Channel 2			
PCCPCH	_Ec/lor	dB	-3	-3		
DwPCH_		dB			0	0
OCNS_E	c/lor <sup>NO1E2</sup>	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$		dB	-inf	9	-inf	9
$I_{oc}$		dBm/1.28 MHz	-80			
PCCPCH	RSCP	dBm	-inf	-74	n.a.	n.a.
Propagati Condition			Case 3 <sup>NOTE3</sup>			
Note 1: Note 2: Note 3:	Number is the The power of total power fr	e of multi-frequency cell, the UTRA RF Channel the primary frequency's channel number. r of the OCNS channel that is added shall make the r from the cell to be equal to lor. ppagation conditions are defined in Annex B of TS				

Table A.8.7.2.1-4: drx-Configuration to be used in E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
Field	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.7.2.1-5: TimeAlignmentTimer and sr-ConfigIndex -Configuration to be used in E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Field	Test1 Test2		Comment		
rieid	Value	Value			
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.		
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and 10.1 in TS 36.213.		

#### A.8.7.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

# A.8.7.3 E-UTRAN TDD - UTRAN TDD SON ANR cell search reporting in AWGN propagation conditions

#### A.8.7.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of the strongest UTRAN TDD cell for SON automatic neighbour relations. This test will partly verify the E-UTRAN TDD - UTRAN TDD cell search requirements for identification of a new UTRA TDD cell for SON given in clause 8.1.2.4.13.

In the measurement control information it is indicated to the UE that periodical reporting with the purpose 'reportStrongestCellsForSON' is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior to the start of time period T1, an interRAT periodic measurement reporting configuration with purpose reportStrongestCellsForSON is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. During time duration T1, the UE shall not have any timing information of cell 2.

#### A.8.7.3.2 Test Parameters

The test parameters are given in Tables A.8.7.3.1-1, A.8.7.3.1-2 and A.8.7.3.1-3.

Table A.8.7.3.1-1: General test parameters for E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Parameter	Unit	Value	Comment
1 41 41110 501	Ollit	DL Reference Measurement	
PDSCH parameters (E-UTRAN TDD)		Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As appointed in alouge A 2.1.2.2
(E-UTRAN TDD)		Channel R.6 TDD	As specified in clause A.3.1.2.2
,		4	As appointed in TC 26 122 aloues 9.1.2.1
Gap Pattern Id		Call 4	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
Uplink-downlink configuration of cell		1	As specified in table 4.2.2 in TS 36.211
1			·
Special subframe configuration of cell		6	As specified in table 4.2.1 in TS 36.211
1			
Inter-RAT (UTRA TDD)		P-CCPCH RSCP	
measurement quantity			
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		None	No explicit neighbour list is provided to the UE
T1	S	>5	During T1, cell 2 shall be powered off, and
			during the off time the primary scrambling
			code shall be changed, The intention is to
			ensure that cell 2 has not been detected by
			the UE prior to the start of period T2.
T2	S	14	

Table A.8.7.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for UTRAN TDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Ce	ell 1	
		T1	T2	
E-UTRA RF Channel Number			1	
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in		OP.1 TDD		
A.3.2.2.1 (OP.1 TDD)		UP.1	טטו	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB		•	
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	4	4	
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	4	4	
RSRP Note 4	dBm/15 kHz	-94	-94	
SCH_RP	dBm/15 kHz	-94	-94	
Propagation Condition		AWGN		
Note 1: OCNG shall be used total transmitted power	er spectral densi	ity is achieved for all (	OFDM symbols.	
Note 2: The resources for upl	ink transmission	are assigned to the l	JE prior to the start	
of time period T2.				
Note 3: Interference from other	er cells and nois	e sources not specifie	nd in the test is	

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant—over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7.3.1-3: Cell specific test parameters for UTRAN TDD (cell # 2) for UTRAN TDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 2				
		T1 T2				
UTRA RF Channel number Note2		Channel 2				
DL timeslot number		0	DwPTS	0	DwPTS	
PCCPCH_Ec/lor	dB	-3		-3		
DwPCH_Ec/lor	dB	0			0	
OCNS_Ec/lor	dB	-3		-3		
Îor/loc	dB	-Infinity 5		5		
PCCPCH RSCP Note1	dBm	-Infinity	n.a.	-73	n.a.	
lo Note1	dBm/1.28MHz	-Infinity -70.88			0.88	
loc	dBm/1.28MHz	-75				
Propagation condition		AWGN				

Note 1: PCCPCH RSCP and lo levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.

Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.

#### A.8.7.3.3 Test Requirements

The UE shall send the first measurement report containing the physical cell identity of cell 2, with a measurement reporting delay less than 12800 ms from the beginning of time period T2.

The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.7.4 E-UTRAN TDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

#### A.8.7.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct enhanced reporting of UTRAN TDD cells. This test will partly verify the Enhanced UTRA TDD cell identification requirements in clause 8.1.2.4.3.1.1a under AWGN propagation conditions.

The test parameters are given in Tables A.8.7.4.1-1, A.8.7.4.1-2 and A.8.7.4.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods of T1 and T2 respectively. During time period T1, measurement gaps are activated and an inter-RAT measurement reporting configuration is configured with linkage to a UTRA measurement object corresponding to UARFCN channel number 1. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of T2.

Table A.8.7.4.1-1: General test parameters for E-UTRAN TDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CP length		Normal	Applicable to cell 1
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Inter-RAT (UTRA TDD) measurement quantity		P-CCPCH RSCP	
Thresh	dBm	-83	Absolute P-CCPCH RSCP threshold for event B1
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list
T1	S	5	
T2	S	2	

Table A.8.7.4.1-2: Cell specific test parameters for cell 1 in E-UTRAN TDD - UTRAN TDD enhanced cell identification test under AWGN propagation conditions

Parameter	Unit	Cell 1				
		T1	T2			
E-UTRA RF Channel Number		1				
BW <sub>channel</sub>	MHz	10				
OCNG Pattern defined in						
A.3.2.2.1 (OP.1 TDD)		OP.1 T	TDD			
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB	_				
PHICH_RB	dB	0				
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$\hat{E}_{\scriptscriptstyle \mathrm{s}}/I_{\scriptscriptstyle \mathrm{ot}}$	dB	4	4			
$N_{oc}^{ m Note  3}$	dBm/15 kHz	-98	3			
$\hat{E}_s/N_{oc}$	dB	4	4			
RSRP Note 4	dBm/15 kHz	-94	-94			
SCH_RP	dBm/15 kHz	-94	-94			
Propagation Condition		AWGN				

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7.4.1-3: Cell specific test parameters for cell 2 in E-UTRAN TDD - UTRAN TDD enhanced cell identification test under AWGN propagation conditions

Parameter	Unit	Cell 2 (UTRA TDD)		ra TDD)	
Timeslot Number		(	0	Dw	PTS
		T1	T2	T1	T2
UTRA RF Channel Number Note1			Char	nel 1	
P-CCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/lor <sup>Note2</sup>	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
$I_{oc}$	dBm/1.28 MHz		3-	30	
P-CCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
P-CCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I<sub>or</sub>.

Note 3: P-CCPCH RSRP, PCCPCH\_Ec/Io and DwPCH\_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.7.4.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 1120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct measurement reports observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH

## A.8.7.5 E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

#### A.8.7.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- UTRAN TDD measurement requirements for increased UE carrier monitoring in clause 8.1.2.4.3.

The test parameters are given in Tables A.8.7.5.1-1, A.8.7.5.1-2 and A.8.7.5.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.7.5.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events B1 is used. The test consists of two successive time periods for every reptitation, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 7 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.7.5.1-1: General test parameters for E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-		1	Serving cell
UTRA RF Channel			
Number			
UE is configured		2, 3, 4, 5, 6, 7, 8	7 UTRA TDD carrier frequencies are used
UTRA RF channel			in the UE neighbour cell list. Frequencies
numbers			5,6, 7,and 8 are indicated to have reduced
			performance
Test equipment		Cell 1 uses E-UTRA RF cannel	
configuration		number 1	
		Cell 2,3,4 are randomly selected	
		to use different frequencies	
		selected from frequencies	
A (' 11		2,3,4,5,6,7, 8	E LITO A TOD
Active cell		Cell 1	E-UTRA TDD cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
CP length of cell 1		normal	
Inter-RAT		UTRA TDD PCCPCH RSCP	
measurement			
quantity B1 Threshold	alD.aa	-75	LITEA TED DOODOLL DOOD throughold for
Bi infeshold	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1
Hysteresis	dB	0	
Ofn	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Scaling factor		8	
configurations	<u> </u>		
T1	S	5	
T2	S	205	

Table A.8.7.5.1-2: Cell specific test parameters for E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #1)

Parameter	Unit	Cell 1				
		T1 T2				
E-UTRA RF Channel Number		,	1			
BW <sub>channel</sub>		5MHz: N	N <sub>RB</sub> = 25			
		10MHz:	$N_{RB} = 50$			
Uplink-downlink configuration		,	1			
of cell 1 as specified in table						
4.2.2 in TS 36.211						
Special subframe configuration		(	3			
of cell 1 as specified in table						
4.2.1 in TS 36.211						
PDSCH parameters: DL		5MHz: F	R.4 TDD			
Reference Measurement		10MHz:	R.0 TDD			
Channel as specified in						
clause A.3.1.1.2						
PCFICH/PDCCH/PHICH		5MHz: R	11 TDD			
parameters: DL Reference			R.6 TDD			
Measurement Channel as						
specified in clause A.3.1.2.2						
OCNG Pattern defined in		5MHz: O	P.9 TDD			
A.3.2.2.1 and A.3.2.2.9			P.1 TDD			
PBCH_RA	dB					
PBCH_RB	dB					
PSS RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	(	)			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG RB <sup>Note 1</sup>	dB					
<del>-</del>	dBm/15 kHz	_C	98			
$N_{oc}$	UDITI/ TO KITZ	-5	,0			
$\hat{E}_s/N_{oc}$	dB	4	4			
$E_s/W_{oc}$						
$\hat{E}_{_s}/I_{_{ot}}$ Note 3	dB	4	4			
L <sub>s</sub> /L <sub>ot</sub>						
RSRP Note 3	dBm/15 kHz	-94	-94			
SCH_RP Note 3	dBm/15 kHz	-94	-94			
lo Note 3	dBm/Ch BW	-64.70	-64.70			
		+10log	+10log			
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)			
Propagation Condition			J70			
Correlation Matrix and		1x2 Low				
			-			
Antenna Configuration		and fully allocated and a sou				

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes.

They are not settable parameters themselves.

Table A.8.7.5.1-3: Cell specific test parameters for E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #2, cell #3 and cell #4)

Parameter	Unit	Cell 2				Cell 3			Cell 4				
			T1		T2		T1		T2		T1		T2
Timeslot Number		0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS
UTRA RF		Rai	ndomly se	elected fr	om 2,3,4	Ra	andomly se	lected fro	om 5,6,7,8	Ra	andomly se	ected fro	m 5,6,7,8
Channel Number		suc	h that cell	2 is in the	ne normal	su	ch that cell	3 is in th	ne reduced	su	ch that cell	4 is in the	e reduced
(NOTE1)			perform	nance gr	oup		perforn	nance gr	oup		erformance		
										cł	nannel is di	fferent fro	om Cell 3
											RF	channel.	
PCCPCH_Ec/lor	dB	-1	nfinity	-3			-Infinity	-3			-Infinity	-3	
DwPCH_Ec/lor	dB	-11	nfinity		0		-Infinity		0		-Infinity		0
OCNS_Ec/lor		-	nfinity	-3			-Infinity	-3			-Infinity	-3	
$\hat{I}_{or}/I_{oc}$	dB	-I	nfinity	9			-Infinity	9			-Infinity	9	
$I_{oc}$	dBm/1.28 MHz			-70		-70			-70				
PCCPCH_RSCP	dB	-lı	nfinity	-64			-Infinity	-64		,	-Infinity	-64	
lo Note 3	dBm/1.28	-7	70.00	-			-70.00	-			-70.00	-	
	MHz			60.49				60.49				60.49	
Propagation Condition		Case 3 (NOTE2)		Case 3 (NOTE2)		Case 3 (NOTE2)							

NOTE1: The DPCH of the cell is located in a timeslot other than 0.

NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B

NOTE3: PCCPCH\_RSRP and lo levels have been derived from other parameters for information purposes. They are not settable

parameters themselves

### A.8.7.5.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 21.95s (cell 2) and 204.8s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

### A.8.7A TBD

## A.8.7A.1 E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

#### A.8.7A.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN TDD measurement requirements for increased UE carrier monitoring in clause 8.1.2.4.4.

The test parameters are given in Tables A.8.7A.1.1-1, A.8.7A.1.1-2 and A.8.7A.1.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.7A.1.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events B1 is used. The test consists of two successive time periods for every reptitation, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 7 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.7A.1.1-1: General test parameters for E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-		1	Serving cell
UTRA RF Channel			
Number			
UE is configured		2, 3, 4, 5, 6, 7, 8	7 UTRA TDD carrier frequencies are used
UTRA RF channel			in the UE neighbour cell list. Frequencies
numbers			5,6, 7,and 8 are indicated to have reduced
<u> </u>			performance
Test equipment		Cell 1 uses E-UTRA RF cannel	
configuration		number 1	
		Cell 2,3,4 are randomly selected	
		to use different frequencies	
		selected from frequencies	
A .: II		2,3,4,5,6,7, 8	E LITO A EDD.
Active cell		Cell 1	E-UTRA FDD cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
CP length of cell 1		normal	
Inter-RAT		UTRA TDD PCCPCH RSCP	
measurement			
quantity			
B1 Threshold	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Scaling factor		8	
configurations			
T1	S	5	
T2	S	205	

Table A.8.7A.1.1-2: Cell specific test parameters for E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #1)

Parameter	Unit	Cell	11			
		T1	T2			
E-UTRA RF Channel Number		1				
BW <sub>channel</sub>		5MHz: N <sub>RB</sub> = 25				
		$10MHz: N_{RB} = 50$				
PDSCH parameters: DL		5MHz: R	.5 FDD			
Reference Measurement		10MHz: F	R.0 FDD			
Channel as specified in						
clause A.3.1.1.1						
PCFICH/PDCCH/PHICH		5MHz: R.	11 FDD			
parameters: DL Reference		10MHz:R	1.6 FDD			
Measurement Channel as						
specified in clause A.3.1.2.1						
OCNG Pattern defined in		5MHz: OP	1.15 FDD			
A.3.2.1.1 and A.3.2.1.15		10MHz:OI	P.1 FDD			
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	0				
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}$	dBm/15 kHz	-98	3			
$\hat{E}_s/N_{oc}$	dB	4	4			
$\hat{E}_{_{s}}/I_{_{ot}}$ Note 3	dB	4	4			
RSRP Note 3	dBm/15 kHz	-94	-94			
SCH_RP Note 3	dBm/15 kHz	-94	-94			
lo Note 3	dBm/Ch BW	-64.76	-64.76			
		+10log	+10log			
		(N <sub>RB,c</sub> /50) (N <sub>RB,c</sub> /50)				
Propagation Condition		ETU				
Correlation Matrix and		1x2 Low				
Antenna Configuration						

The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. Note 3:

They are not settable parameters themselves.

Table A.8.7A.1.1-3: Cell specific test parameters for E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #2, cell #3 and cell #4)

Parameter	Unit	Cell 2			Cell 3			Cell 4		
		T1		T2	T1	T2		T1		T2
Timeslot Number		0 DwPTS	0	DwPTS	0 DwPTS	0	DwPTS	0 DwPTS	0	DwPTS
UTRA RF		Randomly se	elected fr	om 2,3,4	Randomly s	selected from	5,6,7,8	Randomly se	lected fro	m 5,6,7,8
Channel Number		such that cell	l 2 is in th	ne normal	such that ce	ell 3 is in the i	educed	such that cell	4 is in the	e reduced
(NOTE1)		perforn	nance gro	oup	perfo	rmance grou	p	performance	group. (	Cell 4 RF
								channel is di	fferent fro	om Cell 3
								RF	channel.	
PCCPCH_Ec/lor	dB	-Infinity	-3		-Infinity	-3		-Infinity	-3	
DwPCH_Ec/lor	dB	-Infinity		0	-Infinity		0	-Infinity		0
OCNS_Ec/lor		-Infinity	-3		-Infinity	-3		-Infinity	-3	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	9		-Infinity	9		-Infinity	9	
$I_{oc}$	dBm/1.28 MHz		-70			-70			-70	
PCCPCH_RSCP	dB	-Infinity	-64		-Infinity	-64		-Infinity	-64	
lo Note 3	dBm/1.28	-70.00	-		-70.00	-60.49		-70.00	-	
	MHz		60.49						60.49	
Propagation Condition		Case	e 3 (NOTE2)		Case 3 (NOTE2)		Case 3 (NOTE2)			

NOTE1: The DPCH of the cell is located in a timeslot other than 0.

NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B

NOTE3: PCCPCH\_RSRP and lo levels have been derived from other parameters for information purposes. They are not settable

parameters themselves

### A.8.7A.1.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 21.95s (cell 2) and 204.8s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

## A.8.8 E-UTRAN FDD – GSM Measurements

### A.8.8.1 E-UTRAN FDD – GSM event triggered reporting in AWGN

#### A.8.8.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements. This test will partly verify the E-UTRAN FDD - GSM cell search requirements in clause 8.1.2.4.5.

The test parameters are given in Tables A.8.8.1.1-1, A.8.8.1.1-2 and A.8.8.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.8.1.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in clause A.3.1.2.1.
(E-UTRAN FDD)		Channel R.6 FDD	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	S	5	
T2	S	5	

Table A.8.8.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Ce	ell 1
		T1	T2
E-UTRA RF Channel Number			1
BW <sub>channel</sub>	MHz	•	10
OCNG Pattern defined in			
A.3.2.1.1 (OP.1 FDD)		OP.	1 FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{E}_{s}/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

## Table A.8.8.1.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		AF	RFNC 1	
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

### A.8.8.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.
- NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 3120 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = 2\*T<sub>Measurement Period, GSM</sub> = 2\* 480ms = 960ms.

Initial BSIC identification delay = 2160 ms.

## A.8.8.2 E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

### A.8.8.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN FDD-GSM cell search requirements when DRX is used in clause 8.1.2.4.5.2.

In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.8.2.1-1. Cell specific test parameters are given in Table A.8.8.2.1-2 for E-UTRAN and in Table A.8.8.2.1-5 for GSM. DRX configuration for Test1 and Test2 are given in Table A.8.8.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.8.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.8.2.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Parameter	Unit	Test 1 Test 2		Comment		
		Value				
PDSCH parameters (E-		DL Reference Measurement		As specified in clause A.3.1.1.1.		
UTRAN FDD)		Channel R.0 FDD				
PCFICH/PDCCH/PHICH		DL Reference Me		As specified in clause A.3.1.2.1.		
parameters (E-UTRAN FDD)		Channel R.6 FDD	)			
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.		
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.		
Neighbour cell		Cell 2		Cell 2 is on Absolute RF Channel Number		
				1 (GSM cell)		
CP length		Normal		Applicable to cell 1		
E-UTRA RF Channel		1		One E-UTRA FDD carrier frequency is		
Number				used.		
E-UTRA Channel Bandwidth	MHz	1	0			
(BW <sub>channel</sub> )						
Inter-RAT (GSM)		GSM Car	rier RSSI			
measurement quantity	in.			00140 : 50014 - 114		
B1-Threshold-GERAN	dBm	-80		GSM Carrier RSSI threshold for event B1.		
Hysteresis	dB	0				
TimeToTrigger	S	0				
Filter coefficient		0		L3 filtering is not used		
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211		
Access Barring Information	-	Not Sent		No additional delays in random access procedure.		
DRX		ON		ON		DRX related parameters are defined in Table A.8.8.2.1-3
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1				List of GSM cells provided before T2 starts.
T1	S	5				
T2	S	5	45			

Table A.8.8.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 1
		T1 T2
E-UTRA RF Channel Number		1
BW <sub>channel</sub>	MHz	10
OCNG Pattern defined in		
A.3.2.1.1 (OP.1 FDD)		OP.1 FDD
PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA <sup>Note 1</sup>	dB	
OCNG_RB <sup>Note 1</sup>	dB	

$\hat{E}_{s}/I_{ot}$	dB	4	4
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		AWGN	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $^{N_{oc}}$  to be fulfilled

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.8.2.1-3: drx-Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment			
rieiu	Value	Value				
onDurationTimer	psf1	psf1				
drx-InactivityTimer	psf1	psf1				
drx-RetransmissionTimer	psf1	psf1				
longDRX-CycleStartOffset	sf40	sf1280				
shortDRX	Disable	Disable				
Note: For further in	Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.8.8.2.1-4: TimeAlignmentTimer and sr-ConfigIndex -Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
rieid	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

Table A.8.8.2.1-5: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		ARFNC 1		
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

#### A.8.8.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 42.8 seconds from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

## A.8.8.3 E-UTRAN FDD – GSM event triggered reporting in AWGN with enhanced BSIC identification

### A.8.8.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements with enhanced BSIC identification. This test will partly verify the E-UTRAN FDD - GSM cell search requirements in clause 8.1.2.4.5.1.2a

The test parameters are given in Tables A.8.8.3.1-1, A.8.8.1.1-2 and A.8.8.3.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior time duration T1, the UE shall not have any timing information of cell 2. During time period T1, gaps are activated and an interRAT measurement reporting configuration is configured, and linked to a GSM measurement object including channel ARFCN 1. Cell 2 is powered up at the beginning of T2.

Table A.8.8.3.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting in AWGN with enhanced BSIC identification

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	S	5	T1 ends at the end of the last TTI where the measurement configuration is given
T2	S	3	

Table A.8.8.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of GSM cell in AWGN with enhanced BSIC identification

Parameter	Unit	Cel	l 1		
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10	)		
OCNG Pattern defined in					
A.3.2.1.1 (OP.1 FDD)		OP.1	FDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	] 0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	4	4		
$\hat{E}_s/N_{oc}$	dB	4	4		
$N_{oc}$	dBm/15 kHz	-98	8		
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWO	GN		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.8.3.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN with enhanced BSIC identification

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		ARFCN 1		
RXLEV	dBm	-∞	-75	
GSM BSIC		N/A	Valid	

#### A.8.8.3.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 2280 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 2280 ms, which is the sum of the event triggered measurement reporting delay and the enhanced initial BSIC identification delay.

The event triggered measurement reporting delay =  $2*T_{Measurement\ Period,\ GSM}$  = 2\*480ms = 960ms.

Initial BSIC identification delay = 1320 ms.

## A.8.9 E-UTRAN FDD - UTRAN TDD measurements

# A.8.9.1 E-UTRAN FDD - UTRAN TDD event triggered reporting in fading propagation conditions

### A.8.9.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. The test will partly verify the E-UTRAN FDD - UTRAN TDD cell search requirements in clause 8.1.2.4.4 in fading environment.

The test parameters are given in Table A.8.9.1.1-1, A.8.9.1.1-2 and A.8.9.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.9.1.1-1: General test parameters for Event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	E-UTRA FDD Cell 1
Neighbour cell		Cell 2	UTRA TDD Cell 2 is to be identified.
Gap Pattern Id		1	As specified in TS 36.133 section8.1.2.1.  Measurement Gap Repetition Period = 80ms
Inter-RAT measurement quantity		UTRA TDD PCCPCH RSCP	
Threshold other system	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1.
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
T1	S	5	
T2	S	15	

Table A.8.9.1.1-2: Cell specific test parameters for Event triggered reporting of UTRA TDD neighbours in fading propagation conditions (cell1)

Parameter	Unit	Cel	l 1	
		T1	T2	
E-UTRA RF Channel		1		
Number				
BW <sub>channel</sub>	MHz	10	)	
Correlation Matrix and		1x2 l	_OW	
Antenna Configuration				
OCNG Patterns defined		OP.1	FDD	
in A.3.2.1.1 (OP.1 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB	_		
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$N_{oc}$	dBm/15KH	-9	8	
1 voc	Z			
RSRP	dBm	-94	-94	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	
P-SCH_RP	dBm	-9	4	
S-SCH_RP	dBm	-9	4	
Propagation Condition		ETU70		
Note 1: OCNG shall be used such that cell 1 is fully allocated and a				

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.9.1.1-3: Cell specific test parameters for Event triggered reporting of UTRA TDD neighbours in fading propagation conditions (cell2)

Parameter	Unit	С		Cell 2		
		T1		•	Т2	
Timeslot Number		0	DwPTS	0	DwPTS	
UTRA RF Channel			Cha	annel1		
Number (NOTE1)						
PCCPCH_Ec/lor	dB	-In	finity	-3		
DwPCH_Ec/lor	dB	-In	finity		0	
OCNS_Ec/lor		-Infinity		-3		
$\hat{I}_{or}/I_{oc}$	dB	-Infinity		9		
$I_{oc}$	dBm/1.28 MHz	-70				
PCCPCH_RSCP Note 3	dB	-In	finity	-64		
lo Note 3	dBm/1.28 MHz	-70.00		-60.49		
Propagation		Case 3 (NOTE2)			•	
Condition						
NOTE1: The DPCH of the cell is located in a timeslot other than 0						

NOTE1: The DPCH of the cell is located in a timeslot other than 0.

NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B

NOTE3: PCCPCH\_RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves

#### A.8.9.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 12800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.9.2 E-UTRAN FDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

#### A.8.9.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct enhanced reporting of UTRAN cells. This test will partly verify the enhanced UTRA TDD cell identification requirements in clause 8.1.2.4.4 under AWGN propagation conditions.

This test scenario comprised of 1 E-UTRA FDD serving cell, and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.9.2.1-1, A.8.9.2.1-2, and A.8.9.2.1-3. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time period T1, gaps are activated and an interRAT measurement reporting configuration is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.8.9.2.1-1: General test parameters for E-UTRAN FDD- UTRAN TDD enhanced cell search in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Inter-RAT (UTRA TDD) measurement quantity		P-CCPCH RSCP	
Thresh	dBm	-83	Absolute P-CCPCH RSCP threshold for event B1
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list
Time offset between cells	ms	3	
T1	S	5	
T2	S	2	

Table A.8.9.2.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cel	l 1
		T1	T2
E-UTRA RF Channel Number		1	
BW <sub>channel</sub>	MHz	10	)
OCNG Patterns defined in		OP.1	EDD
A.3.2.1.1 (OP.1 FDD)		OF.1	FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-9	8
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AW	GN
Note 1: OCNG shall be used	such that both c	ells are fully allocated	and a constant
		ty is achieved for all O	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves

Table A.8.9.2.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		Dw	PTS
		T1	T2	T1	T2
UTRA RF Channel Number Note1			Char	nnel 1	
P-CCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/lor <sup>Note2</sup>	dB	-1.76 -1.76			
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
$I_{oc}$	dBm/1.28 MHz	-80			
P-CCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
P-CCPCH_Ec/Io Note3	dB	-inf -5.41		n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a. n.ainf		-0.64	
Propagation Condition			AW	/GN	

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I<sub>or</sub>. Note 3: P-CCPCH RSRP, PCCPCH\_Ec/lo and DwPCH\_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.9.2.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 1120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.10 E-UTRAN TDD – GSM Measurements

## A.8.10.1 E-UTRAN TDD – GSM event triggered reporting in AWGN

## A.8.10.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements. This test will partly verify the E-UTRAN TDD - GSM cell search requirements in clause 8.1.2.4.6.

The test parameters are given in Tables A.8.10.1.1-1, A.8.8.1.1-2 and A.8.10.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.10.1.1-1: General test parameters for E-UTRAN TDD-GSM event triggered reporting in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	S	5	
T2	S	5	

Table A.8.10.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of **GSM cell in AWGN** 

Parameter	Unit	Ce	ell 1
		T1	T2
E-UTRA RF Channel Number			1
$BW_{channel}$	MHz	1	10
OCNG Pattern defined in			
A.3.2.2.1 (OP.1 TDD)		OP.1	TDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used	such that both c	ells are fully allocated and a co	nstant total transmitted power
Propagation Condition	such that both c	AWGN ells are fully allocated and a co	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{
m ac}$  to be

RSRP levels have been derived from other parameters for information purposes. They are not Note 4: settable parameters themselves

Table A.8.10.1.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		ARFNC 1		
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	
Propagation Condition		AWGN		

#### A.8.10.1.2 **Test Requirements**

The UE shall send one Event B1 triggered measurement report including the valid BSIC of cell #2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 3120 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = 2\*T<sub>Measurement Period, GSM</sub> = 2\* 480ms = 960ms.

Initial BSIC identification delay = 2160 ms.

## A.8.10.2 E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

#### A.8.10.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN TDD-GSM cell search requirements when DRX is used in clause 8.1.2.4.6.

In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.10.2.1-1. Cell specific test parameters are given in Table A.8.10.2.1-2 for E-UTRAN and in Table A.8.10.2.1-5 for GSM. DRX configuration for Test1 and Test2 are given in Table A.8.10.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.10.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.10.2.1-1: General test parameters for E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Parameter	Unit	Test 1	Test 2	Comment
		Va	ue	
PDSCH parameters (E-		DL Reference Me	asurement	As specified in clause A.3.1.1.2. Note that
UTRAN TDD)		Channel R.0 TDD	)	UE may only be allocated at On Duration
PCFICH/PDCCH/PHICH		DL Reference Me	asurement	As specified in clause A.3.1.2.2.
parameters (E-UTRAN TDD)		Channel R.6 TDD	)	
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211.
Uplink-downlink		1		As specified in TS 36.211 clause 4.2 Table
configuration				4.2-2
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel		1		One E-UTRA TDD carrier frequency is
Number				used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	1	0	
Inter-RAT (GSM)		GSM Car	rier RSSI	
measurement quantity				
B1-Threshold-GERAN	dBm	-80		GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	S	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access
-				procedure.
DRX	_	ON		DRX related parameters are defined in
				Table A.8.10.2.1-3
Monitored GSM cell list size		6 GSM neighbours including		List of GSM cells provided before T2
		ARFCN 1		starts.
T1	S	5		
T2	S	5	45	

Table A.8.10.2.1-2: Cell specific test parameters for E-UTRAN TDD (cell #1) event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Ce	ell 1
		T1	T2
E-UTRA RF Channel Number			1
$BW_{channel}$	MHz	1	10
OCNG Patterns defined in			
A.3.2.2.1 (OP.1 TDD)		OP.1	TDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		_
PHICH_RB	dB		0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		AWGN	•

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.10.2.1-3: drx-Configuration to be used in E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
Field	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	
Note: For further information see clause	6.3.2 in TS 3	6.331.	

Table A.8.10.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
Field	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see
TimeAlignmentTime	31300	31300	clause 6.3.2 in TS 36.331.
			For further information see
sr-ConfigIndex	2	2	clause 6.3.2 in TS 36.331 and
			clause 10.1 in TS 36.213.

Table A.8.10.2.1-5: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 2			
		T1	T2		
Absolute RF Channel Number		ARFNC 1			
RXLEV	dBm	-Infinity -75			
GSM BSIC		N/A	Valid		

## A.8.10.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report including BSIC of cell #2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 42.8 seconds from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

## A.8.11 Monitoring of Multiple Layers

## A.8.11.1 Multiple E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions

#### A.8.11.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.11.1.1.1-1 and A.8.11.1.1.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 or cell 3.

Table A. 8.11.1.1-1: General test parameters for Inter-frequency E-UTRA FDD – E-UTRA FDD and E-UTRA FDD cell search under fading

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number		1, 2, 3	Three FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2 and cell 3	Cell 2 is on RF channel number 2 and cell 3 is on RF channel number 3
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E- UTRAN FDD cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	10	

Table A.8.11.1.1-2: Cell specific test parameters for Inter-frequency E-UTRA FDD – E-UTRA FDD and E-UTRA FDD cell search under fading

Parameter	Unit	C	ell 1	Cell	2	Cell 3	Cell 3	
		T1	T2	T1	T2	T1	T2	
E-UTRA RF Channel			1	2		3		
Number								
BW <sub>channel</sub>	MHz		10	10	)	10		
Correlation Matrix and		1	1x2	1x2 L	-ow	1x2 Low		
Antenna								
Configuration								
OCNG Patterns								
defined in A.3.2.1.1		OP.	1 FDD	OP.2	FDD	OP.2 FDD		
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		_	0		0		
PHICH_RB	dB		0					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}^{ m Note  3}$	dBm/15				-98			
	kHz							
RSRP Note 4	dBm/15	-98	-98	-Infinity	-95	-Infinity	-95	
	kHz							
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	0	0	-Infinity	3	-Infinity	3	
SCH_RP Note 4	dBm/15	-98	-98	-Infinity	-95	-Infinity	-95	
	kHz							
$\hat{E}_s/N_{oc}$	dB	0	0	-Infinity	3	-Infinity	3	
Propagation Condition			VGN	ETU		ETU70		
	be used suc				ed and a co	nstant total transm	itted	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.11.1.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for both cell 2 and cell 3, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.11.2 E-UTRAN TDD – E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions

### A.8.11.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of two events. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.11.2.1-1 and A.8.11.2.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.2.1-1: General test parameters for E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Interfrequency event triggered reporting under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
E-UTRA RF Channel Number		1, 2, 3	Three TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbor cells		Cell 2 and Cell 3	Cell 2 and 3 are on RF channel numbers 2 and 3 respectively
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 μs	Synchronous cells
T1	S	5	
T2	S	10	

Table A.8.11.2.1-2: Cell specific test parameters for E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Interfrequency event triggered reporting under fading propagation conditions cells

Downwater	l lm:4	Cell 1		Cell	2	Cell 3	
Parameter	Unit	T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number			1		2		
BW <sub>channel</sub>	MHz	•	10	10		10	)
Correlation Matrix and		1	x2	1x2 L	.OW	1x2 l	.OW
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD		OP.2	TDD
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0	0		0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}$ Note 3	dBm/15 kHz			-9	8		
RSRP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	0	0	-inf	3	-inf	3
SCH_RP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{E}_s/N_{oc}$	dB	0	0	-inf	3	-inf	3
Propagation Condition	_	AV	/GN	ETU	70	ETU	70

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.11.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2 with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event A3 triggered measurement report for cell 3 with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.11.3 E-UTRAN FDD-FDD Inter-frequency and UTRAN FDD event triggered reporting under fading propagation conditions

### A.8.11.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency and UTRAN FDD measurements. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3 and the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.11.3.1-1, A.8.11.3.1-2 and A.8.11.3.1-3. In this test, there are two cells on different carrier frequencies and one cell on UTRAN carrier frequency and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.3.1-1: General test parameters for Combined inter-frequency and UTRAN event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2. Cell 3 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
E-UTRAN FDD measurement		RSRP	
quantity			
Inter-RAT (UTRA FDD)		CPICH Ec/N0	
measurement quantity			
A3-Offset	dB	-6	
b2-Threshold-E-UTRA	dB	-86	RSRP threshold for event B2.
b2-Threshold-UTRA	dB	-18	CPICH Ec/N0 threshold for event B2.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	8	

Table A.8.11.3.1-2: Cell specific test parameters for Combined inter-frequency and UTRAN event triggered reporting in fading propagation conditions

E-UTRA RF Channel		T1			ell 2	
E LITEA DE Channol		11	T2	T1	T2	
E-UTRA NE CHAHITEI		-	1		2	
Number						
BW <sub>channel</sub>	MHz	1	0	1	10	
Correlation Matrix and		1)	x2	1x2	Low	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OP.2	? FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB			0		
PCFICH_RB	dB					
PHICH_RA	dB		_			
PHICH_RB	dB	(	)			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98				
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition AWGN ETU70					U70	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $^{N_{oc}}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 3) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell	3		
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/lo	dB	-Infinity	-14		
Propagation Condition		Case 5 (N	ote 3)		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

to l<sub>or</sub>.

Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.

## A.8.11.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.11.4 InterRAT E-UTRA TDD to E-UTRA TDD and UTRA TDD cell search test case

#### A.8.11.4.1 Test Purpose and Environment

This test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements and UTRA TDD measurements. The test will partly verify the requirements in clause 8.1.2.3.2 combined 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 2 E-UTRA TDD cells operating on different frequency, and 1 UTRA TDD cell. Test parameters are given in table A.8.11.4.1-1, A.8.11.4.1-2, and A.8.11.4.1-3. Gap pattern configuration #0 as defined in clause 8.1.2.1 is provided.

The test consists of 2 successive time periods, with time duration T1 and T2. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 and B2 shall be used.

Table A.8.11.4.1-1: General test parameters for combined E-UTRA TDD inter-frequency and UTRA TDD cells search under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference	As specified in clause A.3.1.1.2
		Measurement	
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH		DL Reference	As specified in clause A.3.1.2.2
parameters		Measurement	
		Channel R.6 TDD	
Active cell		Cell 1	E-UTRA TDD cell is on RF channel number 1
Neighbour cell		Cell 2	E-UTRA TDD cell is on RF channel number 2
		Cell 3	1.28Mcps TDD cell
CP length of cell1 and cell2		Normal	
Uplink-downlink configuration		1	As specified in Table 4.2-2 in TS 36.211. The
of cell1 and cell2			same configuration in both cells
Special subframe		6	As specified in table 4.2-1 in TS 36.211. The
configuration of cell1 and			same configuration in both cells
cell2			
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
E-UTRAN TDD		RSRP	
measurement quantity			
UTRAN TDD measurement		RSCP	
quantity			
DRX		OFF	
Ofn	dB	0	Parameter for A3 and B2 event
Ocn	dB	0	Parameter for A3 event
Hysteresis	dB	0	Parameter for A3 and B2 event
Ofs	dB	0	Parameter for A3 event
Ocs	dB	0	Parameter for A3 event
A3-Offset	dB	-6	Parameter for A3 event
Thresh1	dBm	-86	Absolute E-UTRAN RSRP threshold for event
			B2
Thresh2	dBm	-84	Absolute UTRAN RSCP threshold for event B2
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
Time offset between E-	μs	3	Synchronous cells
UTRAN TDD cells	·		
T1	S	>5	During T1, cell 2 and cell 3 shall be powered off.
			During the off time the physical layer cell identity
			of cell 2 shall be changed, and the primary
			scrambling code of cell 3 shall be changed.
T2	S	15	

Table A.8.11.4.1-2: Cell specific test parameters for combined E-UTRAN TDD inter-frequency and UTRA TDD cell search under fading propagation conditions(cell1 and cell2)

Parameter	Unit	Ce	ell 1	Cel	II 2	
		T1 T2		T1	T2	
E-UTRA RF Channel		1		2	)	
Number						
BWchannel	MHz	1	0	1	-	
Correlation Matrix and		1	x2	1x2	Low	
Antenna Configuration						
OCNG Pattern defined						
in A.3.2.2.1 (OP.1		OP.1	TDD	OP.2	TDD	
TDD) and in A.3.2.2.2						
(OP.2)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		•	9		
PHICH_RB	dB	1	0	0		
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RANote 1	dB					
OCNG_RBNote 1	dB					
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7	
$\hat{E}_s/N_{oc}$	dB	4 4		-Infinity	7	
$N_{oc}$	dBm/15 kHz	-98				
RSRP	dBm/15 kHz	-94	-94	-Infinity	-91	
SCH_RP	dBm/15 kHz	-94	-94	-infinity	-91	
Propagation Condition		AW	/GN	ETU	J70	
11 1 1 00110 1 111						

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.4.1-3: Cell specific test parameters for combined E-UTRA TDD inter-frequency and UTRA TDD cell search under fading propagation conditions(cell3)

Parameter	Unit	Cell 3 (UTRA)			
Timeslot Number		0		DwF	PTS
		T1 T2		T1	T2
UTRA RF Channel			Char	inel 3	
Number*					
PCCPCH_Ec/lor	dB	-3			
DwPCH_Ec/lor	dB			0	
OCNS_Ec/lor	dB	-3			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	9	-Infinity	9
$I_{oc}$	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-Infinity -74 n.a.		a.	
Propagation Condition		Case 3			

Note1: The DPCH of all cells are located in a timeslot other than 0.

Note2: In the case of multi-frequency network, the UTRA RF Channel Number

can be set for the primary frequency in this test.

Note3: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.11.4.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 12.8s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.11.5 Combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

#### A.8.11.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events when doing inter frequency and GSM measurements. This test will partly verify the E-UTRAN FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.1 and simultaneously the E-UTRAN FDD- GSM cell search requirements in clause 8.1.2.4.5.

The test parameters are given in Tables A.8.11.5.1-1, A.8.11.5.1-2 and A.8.11.5.1-3. In this test, there are two cells on different carrier frequencies and one GSM cell. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.5.1-1: General test parameters for combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-		DL Reference Measurement	As specified in clause A.3.1.1.1.
UTRAN FDD)		Channel R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1.
parameters		Channel R.6 FDD	
(E-UTRAN FDD)			
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2.
			Cell 3 is on Absolute RF Channel Number 3
			(GSM cell).
CP length		Normal	Applicable to cell 1 and cell 2
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
E-UTRAN FDD measurement		RSRP	
quantity			
Hysteresis	dB	0	Parameter for A3 and B2 event
A3-Offset	dB	-6	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E- UTRAN FDD cells	ms	3 ms	Asynchronous cells
Inter-RAT (GSM)		GSM Carrier RSSI	
measurement quantity			
b2-Threshold-E-UTRA	dBm	-83	RSRP threshold for event B2. This is the threshold for E-UTRA in the B2 configuration. E-UTRA PCell RSRP is below this throughout the test to account for measurement accuracy and fading
b2-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B2.
Monitored GSM cell list size		6 GSM neighbours including ARFCN 3	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	10	

Table A.8.11.5.1-2: Cell specific test parameters for E-UTRAN FDD cells for combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

T1	Parameter	Unit	Ce	ell 1	Ce	ell 2	
Number   BW <sub>channel</sub>	ļ.		T1	T2	T1	T2	
BWchannel	E-UTRA RF Channel		1		2		
Correlation Matrix and Antenna Configuration	Number						
Antenna Configuration  OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)  PBCH_RA  PBCH_RB  PSS_RA  GB  PSS_RA  GB  PCFICH_RB  PHICH_RA  PHICH_RB  PDCCH_RA  PDCCH_RB  PDCCH_RB  DCCH_RB	BW <sub>channel</sub>	MHz	1	10	1	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)         OP.1 FDD         OP.2 FDD           PBCH_RA PBCH_RB PBCH_RB PBCH_RB PSS_RA dB PCFICH_RB PHICH_RA PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB DCCH_RB DCNG_RA PDSCH_RB DCNG_RB DC	Correlation Matrix and		1x2	Low	1x2	Low	
defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)         OP.1 FDD         OP.2 FDD           PBCH_RA PBCH_RA PBCH_RB PSS_RA BSS_RA BPCFICH_RB BPICH_RB BPICH_RA BPDCCH_RA BPDCCH_RA BPDCCH_RA BPDCCH_RA BPDCCH_RB BBB BDCNG_RA BDCNG_RB BBB BDCNG_RB BBB BDCNG_RB BBB BBB BDCNG_RB BBB BBB BBB BBB BBB BBB BBB BBB BBB	Antenna Configuration						
(OP.1 FDD) and in       A.3.2.1.2 (OP.2 FDD)         PBCH_RA       dB         PBCH_RB       dB         PSS_RA       dB         PSS_RA       dB         PCFICH_RB       dB         PHICH_RA       dB         PHICH_RB       dB         PDCCH_RB       dB         PDSCH_RB       dB         PDSCH_RB       dB         OCNG_RANote 1       dB         OCNG_RBNote 1       dB         OCNG_RBNote 3       dBm/15 kHz         RSRP Note 4       dBm/15 kHz         -94       -Infinity       -91         SCH_RP Note 4       dBm/15 kHz       -94       -Infinity       -91							
A.3.2.1.2 (OP.2 FDD)			OP.1	FDD	OP.2	P FDD	
PBCH_RA         dB           PBCH_RB         dB           PSS_RA         dB           SSS_RA         dB           PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RANOTET         dB           OCNG_RBNOTET         dB           Noc         Note 3           RSRP Note 4         dBm/15 kHz           RSRP Note 4         dBm/15 kHz           PS         -94           -Infinity         7           SCH_RP Note 4         dBm/15 kHz           -94         -Infinity         -91							
PBCH_RB	A.3.2.1.2 (OP.2 FDD)						
PSS_RA         dB           SSS_RA         dB           PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RB         dB           PDSCH_RB         dB           OCNG_RANOTET         dB           OCNG_RBNOTET         dB           RSRP Note 4         dBm/15 kHz           RSRP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz           PSCH_RP Note 4         dBm/15 kHz <td>PBCH_RA</td> <td>dB</td> <td></td> <td></td> <td></td> <td></td>	PBCH_RA	dB					
SSS_RA		dB					
PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RANote 1         dB           OCNG_RBNote 1         dB           Noc Note 3         dBm/15 kHz           RSRP Note 4         dBm/15 kHz           B         4           4         -Infinity           7           SCH_RP Note 4         dBm/15 kHz           -94         -Infinity           -91           -94         -Infinity           -91	PSS_RA	dB					
PHICH_RA         dB           PHICH_RB         dB           PDCCH_RA         dB           PDCCH_RB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RANote 1         dB           OCNG_RBNote 1         dB           Noc Note 3         dBm/15 kHz           RSRP Note 4         dBm/15 kHz           -94         -Infinity         -91           \$\hat{E}_s/\I_{ot}\$         dBm/15 kHz         -94         -Infinity         -91           SCH_RP Note 4         dBm/15 kHz         -94         -Infinity         -91	SSS_RA	dB					
PHICH_RB         dB         0         0           PDCCH_RA         dB         0         0           PDCCH_RB         dB         0         0           PDSCH_RA         dB         0         0           PDSCH_RB         dB         0         0           OCNG_RANOTE 1         dB         0         0           OCNG_RBNOTE 1         dB         0         -98           RSRP Note 3         dBm/15 kHz         -94         -94         -Infinity         -91           Ê <sub>s</sub> /I <sub>ot</sub> dB         4         4         -Infinity         7           SCH_RP Note 4         dBm/15 kHz         -94         -94         -Infinity         -91	PCFICH_RB	dB					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PHICH_RA	dB		_			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PHICH_RB	dB		0	0		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH_RA	dB					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH_RB	dB					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDSCH_RA	dB					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		dB					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG_RA <sup>Note 1</sup>	dB					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG_RB <sup>Note 1</sup>	dB					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$N_{oc}^{ m Note  3}$	dBm/15 kHz	-98				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity		
		dB	4	4	-Infinity	7	
	SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\left  \hat{E}_s/N_{oc} \right $ dB $\left  4 \right $ 4 -Infinity $\left  7 \right $	$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition ETU70 ETU70	Propagation Condition		ET	U70	ET	U70	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.5.1-3: Cell specific test parameters for GSM (cell # 3) for combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	(	Cell 3	
		T1	T2	
Absolute RF Channel Number		ARFCN3		
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

### A.8.11.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report including BSIC of cell 3, with a measurement reporting delay less than 7200 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.
- NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 7200 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay =  $2*T_{Measurement\ Period,\ GSM} = 2*N_{freq}*480ms = 1920ms$ .

Initial BSIC identification delay = 5280 ms, when one carrier frequency other than GSM is monitored in the gaps.

# A.8.11.6 Combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

## A.8.11.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events when doing inter frequency and GSM measurements. This test will partly verify the E-UTRAN TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.2 and simultaneously the E-UTRAN TDD- GSM cell search requirements in clause 8.1.2.4.6.

The test parameters are given in Tables A.8.11.6.1-1, A.8.11.6.1-2 and A.8.11.6.1-3. In this test, there are two cells on different carrier frequencies and one GSM cell. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.6.1-1: General test parameters for combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-		DL Reference Measurement	As specified in clause A.3.1.1.2.
UTRAN TDD)		Channel R.0 TDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2.
parameters		Channel R.6 TDD	
(E-UTRAN TDD)			
Special subframe		6	As specified in table 4.2-1 in TS 36.211. The
configuration of cell1 and			same configuration in both cells
cell2			
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
of cell1 and cell2			
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2. Cell 3 is on Absolute RF Channel Number 3
			(GSM cell).
CP length		Normal	Applicable to cell 1 and cell 2
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
E-UTRAN TDD measurement		RSRP	
quantity			
Hysteresis	dB	0	Parameter for A3 and B2 event
A3-Offset	dB	-6	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E-	μs	3	Synchronous cells
UTRAN TDD cells			
Inter-RAT (GSM)		GSM Carrier RSSI	
measurement quantity			
b2-Threshold-E-UTRA	dBm	-83	RSRP threshold for event B2. This is the threshold for E-UTRA in the B2 configuration. E-
			UTRA PCell RSRP is below this throughout the
			test to account for measurement accuracy and
			fading
b2-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B2.
Monitored GSM cell list size		6 GSM neighbours including ARFCN 3	List of GSM cells provided before T2 starts.
T1	S	5	
T2	S	10	

Table A.8.11.6.1-2: Cell specific test parameters for E-UTRAN TDD cells for combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Ce	ell 1	Ce	II 2	
		T1	T2	T1	T2	
E-UTRA RF Channel			1	2	2	
Number						
BW <sub>channel</sub>	MHz	•	10	1	0	
Correlation Matrix and		1x2	Low	1x2	Low	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.2.1		OP.	I TDD	OP.2	TDD	
(OP.1 TDD) and in						
A.3.2.2.2 (OP.2 TDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		_			
PHICH_RB	dB		0	0		
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note  3}$	dBm/15 kHz			-98		
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition ETU70 ETU70						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.6.1-3: Cell specific test parameters for GSM (cell # 3) for combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Cell 3	
		T1	T2
Absolute RF Channel Number		AF	RFCN3
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

#### A.8.11.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report including BSIC of cell 3, with a measurement reporting delay less than 7200 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.
- NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 7200 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay =  $2*T_{Measurement\ Period,\ GSM} = 2*N_{freq}*480ms = 1920ms$ .

Initial BSIC identification delay = 5280 ms, when one carrier frequency other than GSM is monitored in the gaps.

## A.8.12 RSTD Intra-frequency Measurements

## A.8.12.1 E-UTRAN FDD intra-frequency RSTD measurement reporting delay test case

#### A.8.12.1.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 8.1.2.5.1 in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All cells are on the same RF channel.

The test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.12.1.1-1, Table A.8.12.1.1-2, Table A.8.12.1.1-3 and Table A.8.12.1.1-4.

Table A.8.12.1.1-1: General test parameters for E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference cell is the cell in the OTDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4] and TS 36.355 [24]. The reference cell is the PCell in this test case.
Neighbor cells		Cell 2 and Cell 3	Cell 2 and Cell 3 appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
PRS Transmission Bandwidth	RB	50	PRS are transmitted over the system bandwidth
PRS configuration index $I_{\mathrm{PRS}}$		171	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ –160 DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes $N_{\mathrm{PRS}}$		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
CP length		Normal	DRX parameters are further
DRX		ON	specified in Table A.8.12.1.1-3
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	μs	Cell 2: 3 Cell 3: 3 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	Including the reference cell
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	S	1.28	The length of the time interval that follows immediately after time interval T1
Т3	S	1.28	The length of the time interval that follows immediately after time interval T2

Table A.8.12.1.1-2: Cell-specific test parameters for E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3	
E-UTRA RF Channel Number		1	1	1	
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low	
OCNG patterns defined in A.3.2.1		OP.5 FDD	N/A	N/A	
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA	dB	0	N/A	N/A	
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA <sup>Note 1</sup>					
OCNG_RB <sup>Note 1</sup>					
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-95			
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-Infinity	-Infinity	-Infinity	
Io Note 4	dBm/ 9 MHz	-67.22	N/A	N/A	
$\hat{\mathbf{E}}_{\mathrm{s}}/N_{oc}$	dB	0	-Infinity	-Infinity	
Propagation Condition		ETU30			
Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total					

- transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period
- Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- lo levels have been derived from other parameters and are given for information purpose. Note 4: These are not settable test parameters.

Table A.8.12.1.1-3: Cell-specific test parameters for E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions during T2 and T3

Parameter	Unit	C	ell 1	Cell 1 Cell :		Ce	ell 3
		T2	T3	T2	Т3	T2	T3
E-UTRA RF Channel			1	1			1
Number						•	
Correlation Matrix and		1x2	2 Low	1x2	Low	1x2	Low
Antenna Configuration							,
OCNG patterns		OP.	5 FDD	OP.6	FDD	OP.6	N/A
defined in A.3.2.1				0.10		FDD	
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB			_	_		_	
PHICH_RA	dB		0	C	1	0	N/A
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA <sup>Note 1</sup>							
OCNG_RB <sup>Note 1</sup>	i.		L 51/6	<b>.</b>	1 .		
PRS_RA	dB	-3	N/A	N/A	3	3	N/A
$N_{oc}$ Note 3	dBm/ 15 kHz	-98	-95	-98	-95	-98	-95
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-1	-Infinity	-Infinity	-7	-7	-Infinity
PRS $\hat{E}_{_{s}}/I_{_{ot}}^{}$ Note 4	dB	-1.79	-Infinity	-Infinity	-7	-9.54	-Infinity
lo Note 4	dBm/ 9 MHz	-69.55	-67.08	-69.55	-67.08	-69.55	N/A
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-105	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-93	-105	-105	-108	-Infinity
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-10	-10	-Infinity
Propagation Condition		ETU30					

- Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period
- Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.12.1.1-4: DRX parameters for the test of E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	
Drx-InactivityTimer	psf1	As appoiling in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2
longDRX-CycleStartOffset	sf320	13 30.331 [2], Clause 6.3.2
shortDRX	Disable	

#### A.8.12.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.5.1.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the OTDOA assistance data, Cell 1, within 2560 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD 0000 and RSTD 12711.

NOTE: The RSTD measurement time in the test is derived from the following expression,  $T_{PRS}(M-1)+160\left|\frac{n}{M}\right|$ , where

M=8 and n=16 are the parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1. This gives the total RSTD measurement time of 2560 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

## A.8.12.2 E-UTRAN TDD intra-frequency RSTD measurement reporting delay test case

### A.8.12.2.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 8.1.2.5.2 in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All cells are on the same RF channel.

The test consists of three consecutive time intervals, with duration of T1 and T2. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.12.2.1-1, Table A.8.12.2.1-2, Table A.8.12.2.1-3, and Table A.8.12.2.1-4.

Table A.8.12.2.1-1: General test parameters for E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell	Jiii	Cell 1	Reference is the cell in the OTDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4] and TS 36.355
			[24]. The reference cell is the PCell in this test case.  Cell 2 and Cell 3 appear at random
Neighbor cells		Cell 2 and Cell 3	places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
PRS Transmission Bandwidth	RB	50	PRS are transmitted over the system bandwidth
PRS configuration index $I_{\mathrm{PRS}}$		174	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ $-160$ DL subframes, as defined in TS 36.211
Number of consecutive downlink positioning subframes $N_{\mathrm{PRS}}$		1	[16], Table 6.10.4.3-1  As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
TDD uplink-downlink configuration		1	As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes
TDD special subframe configuration		6	As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_{\rm s}$ and UpPTS of $4384 \cdot T_{\rm s}$
CP length		Normal	The same CP length applies for DL and UL
DRX		ON	DRX parameters are further specified in Table A.8.12.2.1-3
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	μs	Cell 2: 3 Cell 3: 3 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	Including the reference cell
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	S	1.28	The length of the time interval that follows immediately after time interval T1
Т3	s	1.28	The length of the time interval that follows immediately after time interval T2

Table A.8.12.2.1-2: Cell-specific test parameters for E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3	
E-UTRA RF Channel		1	1	1	
Number		•	•	·	
Correlation Matrix and		1x2 Low	1x2 Low	1x2 Low	
Antenna Configuration					
OCNG patterns		OP.1 TDD	N/A	N/A	
defined in A.3.2.2		OP.1 100	IN/A	IN/A	
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA	dB	0	N/A	N/A	
PHICH_RB					
PDCCH_RA					
PDCCH RB					
OCNG RA Note 1					
OCNG_RB Note 1					
	dBm/		0.5	•	
$N_{oc}^{ m Note  3}$	15 kHz		-95		
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	-Infinity	-Infinity	-Infinity	
		ппппу	ii ii ii ii ii y	ii ii ii ii y	
lo Note 4	dBm/	-67.22	N/A	N/A	
	9 MHz	01.22	14//1	14// (	
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	0	-Infinity	-Infinity	
Propagation Condition		ETU30			

- Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.12.2.1-3: Cell-specific test parameters for E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	Т3	T2	T3
E-UTRA RF Channel			1	1			1
Number				•			
Correlation Matrix and		1x2	Low	1x2 L	-OW	1x2	Low
Antenna Configuration							,
OCNG patterns		OP.1	TDD	OP.2	TDD	OP.2	N/A
defined in A.3.2.2		0				TDD	,, .
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA	dB	(	)	0		0	N/A
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA Note 1							
OCNG_RB Note 1			1		1		
PRS_RA	dB	-3	N/A	N/A	3	3	N/A
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-98	-95	-98	-95	-98	-95
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-1	-Infinity	-Infinity	-7	-7	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-1.79	-Infinity	-Infinity	-7	-9.54	-Infinity
lo Note 4	dBm/ 9 MHz	-69.55	-67.08	-69.55	-67.08	-69.55	N/A
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-105	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-93	-105	-105	-108	-Infinity
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-10	-10	-Infinity
Propagation Condition	<u> </u>	ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period

Note 3: Interference from other cells and noise sources not specified in the test and assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.12.2.1-4: DRX parameters for the test of E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	
drx-InactivityTimer	psf1	As appointed in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2.
longDRX-CycleStartOffset	sf320	13 36.331 [2], Clause 6.3.2.
shortDRX	disable	

## A.8.12.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.5.2.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the OTDOA assistance data, Cell 1, within 2560 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD 0000 and RSTD 12711.

NOTE: The RSTD measurement time in the test is derived from the following expression,  $T_{PRS}(M-1)+160\left[\frac{n}{M}\right]$ ,

where M =8 and n =16 are the parameters specified for this test case in Clause 8.1.2.5.2, Table 8.1.2.5.2-1, under Note 1. This gives the total RSTD measurement time of 2560 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

## A.8.13 RSTD Inter-frequency Measurements

# A.8.13.1 E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency

### A.8.13.1.1 Test Purpose and Environment

The purpose of the test is to verify that the FDD-FDD inter-frequency RSTD measurement meets the requirements specified in Clause 8.1.2.6.1, specifically for Note 2 in Table 8.1.2.6.1-1, in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. Cell 1 is on FDD RF channel 1. Cell 2 and Cell 3 are on a FDD RF channel 2.

The UE requires measurement gaps to perform inter-frequency measurements. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided and configured to not overlap with PRS subframes of Cell 1.

The test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the Cell 3, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 and Cell 3 transmit PRS only in T2. Cell 2 transmits PRS only in T3. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE at the start of T1. DRX is configured before T2.

The test parameters are as given in Table A.8.13.1.1-1, Table A.8.13.1.1-2, Table A.8.13.1.1-3 and Table A.8.13.1.1-4.

Table A.8.13.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference cell is the cell with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4]. The reference cell is the PCell on RF channel 1 in this test case.
Neighbor cells		Cell 2 and Cell 3	Cells on RF channel 2. The cells appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
PRS Bandwidth	RB	50	PRS bandwidth is as indicated in prs-Bandwidth in the OTDOA assistance data defined in [24]. Here, PRS are transmitted over the system bandwidth
Gap pattern ld		0	As specified in Table 8.1.2.1-1. Applies for measurements on Cell 2 and Cell 3
Gap offset		9	As specified in TS 36.331 [2], Clause 6.3.5
PRS configuration index $I_{\mathrm{PRS}}$		Cell 1: 181, Cell 2, Cell 3: 171	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ $-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes $N_{\mathrm{PRS}}$		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
CP length		Normal	
DRX		ON	DRX parameters are further specified in Table A.8.13.1.1-3.
prs-SubframeOffset		310	Number of subframes rounded to the closest integer. The corresponding parameter in the OTDOA assistance data is prs- SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell specified in TS 36.355 [24]
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	μs	Cell 2: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator

Expected RSTD uncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	The list includes the reference cell (received in <i>OTDOA-ReferenceCellInfo</i> [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in <i>OTDOA-ProvideAssistanceData</i> [24].
PRS muting info		Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	ø	3	The length of the time interval from the beginning of each test
T2	Ø	2.48	The length of the time interval that follows immediately after time interval T1
ТЗ	s	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.13.1.1-2: Cell-specific test parameters for E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel		1	N/A	N/A
Number		Į.	IN/A	IN/A
Correlation Matrix and		1x2 Low	1x2 Low	1x2 Low
Antenna Configuration				
OCNG patterns		OP.5 FDD	N/A	N/A
defined in A.3.2.1		OI .51 DD	IN/A	IN/A
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA	dB	0	N/A	N/A
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA <sup>Note 1</sup>				
OCNG_RB <sup>Note 1</sup>				
$N_{oc}^{ m Note 3}$	dBm/	-95	N/A	N/A
oc	15 kHz		. ,, .	
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
lo Note 4	dBm/	-67.22	N/A	N/A
	9 MHz	01.22	14// (	14//
$\hat{E}_{s}/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition			ETU30	<u> </u>

- Note 1: OCNG shall be used such that the active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: lo levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.13.1.1-3: Cell-specific test parameters for E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions during T2 and T3

Parameter	Unit	Cell 1 Cell 2		I 2	Cel	Cell 3		
		T2	T3	T2	T2 T3		T3	
E-UTRA RF Channel			1	2		2	N/A	
Number			I					
Correlation Matrix and		1x2	2 Low	1x2 l	Low	1x2	Low	
Antenna Configuration								
OCNG patterns		OP	5 FDD	OP.6	FDD	OP.6 FDD	N/A	
defined in A.3.2.1		01.	0100	01.0		01 .0 1 00	14//	
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA	dB		0	0		0	N/A	
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
OCNG_RA <sup>Note 1</sup>								
OCNG_RB <sup>Note 1</sup>								
PRS_RA	dB	-3	N/A	N/A	3	3	N/A	
$N_{oc}^{ m Note~3}$	dBm/ 15 kHz	-98	-98	-98	-95	-98	N/A	
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity	
PRS $\hat{E}_{s}/I_{ot}^{Note 4}$	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity	
lo Note 4	dBm/ 9 MHz	-69.68	-70.22	-70.11	-67.08	-70.11	N/A	
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-106	-Infinity	
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-105	-109	-Infinity	
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-10	-11	-Infinity	
Propagation Condition			<u>-</u>	ETU	30	<del></del>		

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes

Table A.8.13.1.1-4: DRX parameters for the test of E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	
Drx-InactivityTimer	psf1	As appoiling in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2
longDRX-CycleStartOffset	sf320	13 30.331 [2], Clause 6.3.2
shortDRX	Disable	

#### A.8.13.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.6.1.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell Cell 1 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD 0000 and RSTD 12711.

NOTE: The RSTD measurement time in the test is derived from the following expression,  $T_{PRS}(M-1)+160\left[\frac{n}{M}\right]$ ,

where M = 16 and n = 16 are the parameters specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 2. This gives the total RSTD measurement time of 4960 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

# A.8.13.2 E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency

### A.8.13.2.1 Test Purpose and Environment

The purpose of the test is to verify that the TDD-TDD inter-frequency RSTD measurement meets the requirements specified in Clause 8.1.2.6.3, specifically for Note 2 in Table 8.1.2.6.3-1, in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. Cell 1 is on TDD RF channel 1. Cell 2 and Cell 3 are on TDD RF channel 2.

The UE requires measurement gaps to perform inter-frequency measurements. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided and configured to not overlap with PRS subframes of Cell 1.

The test consists of three consecutive time intervals, with duration of T1 and T2. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the Cell 3, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 and Cell 3 transmit PRS only in T2. Cell 2 transmits PRS only in T3. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE at the start of T1. DRX is configured before T2.

The test parameters are as given in Table A.8.13.2.1-1, Table A.8.13.2.1-2, Table A.8.13.2.1-3, and Table A.8.13.2.1-4.

Table A.8.13.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference cell is the cell with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4]. The reference cell is the PCell on RF channel 1 in this test case.
Neighbor cells		Cell 2 and Cell 3	Cells on RF channel 2. The cells appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
PRS Bandwidth	RB	50	PRS bandwidth is as indicated in prs- Bandwidth in the OTDOA assistance data defined in [24]. Here, PRS are transmitted over the system bandwidth
Gap pattern Id		0	As specified in Table 8.1.2.1-1. Applies for measurements on Cell 2 and Cell 3
Gap offset		12	As specified in TS 36.331 [2], Clause 6.3.5
PRS configuration index $I_{\mathrm{PRS}}$		Cell 1: 184, Cell 2, Cell 3: 174	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes $N_{\mathrm{PRS}}$		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
TDD uplink-downlink configuration		1	As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes
TDD special subframe configuration		6	As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_{\rm s}$ and UpPTS of $4384 \cdot T_{\rm s}$
CP length		Normal	The same CP length for DL and UL
DRX		ON	DRX parameters are further specified in Table A.8.13.2.1-3.
prs-SubframeOffset		310	Number of subframes rounded to the closest integer. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell specified in TS 36.355 [24]
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	μs	Cell 2: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator

Expected RSTD uncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	The list includes the reference cell (received in <i>OTDOA-ReferenceCellInfo</i> [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in <i>OTDOA-ProvideAssistanceData</i> [24].
PRS muting info		Cell 1: '1111111100000000' Cell 2: '000000011111111' Cell 3: '1111111100000000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	S	2.48	The length of the time interval that follows immediately after time interval T1
Т3	s	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.13.2.1-2: Cell-specific test parameters for E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3			
E-UTRA RF Channel		1	N/A	N/A			
Number		I	IN/A	IN/A			
Correlation Matrix and		1x2 Low	1x2 Low	1x2 Low			
Antenna Configuration							
OCNG patterns		OP.1 TDD	N/A	N/A			
defined in A.3.2.2		01.1100	IN/A	IN/A			
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA	dB	0	N/A	N/A			
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA <sup>Note 1</sup>							
OCNG_RB <sup>Note 1</sup>							
Note 3	dBm/	-95	N/A	N/A			
1 v oc	15 kHz	-90	IN/A	IN/A			
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-Infinity	-Infinity	-Infinity			
lo Note 4	dBm/	-67.22	N/A	N/A			
^	9 MHz						
$\hat{\mathbf{E}}_{\mathrm{s}}/N_{oc}$	dB	0	-Infinity	-Infinity			
Propagation Condition		ETU30					

- Note 1: OCNG shall be used such that the active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2
- Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.13.2.1-3: Cell-specific test parameters for E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Cell 1		Ce	Cell 2		Cell 3	
		T2	T3	T2	Т3	T2	Т3	
E-UTRA RF Channel			1	2		2	N/A	
Number								
Correlation Matrix and		1x2	2 Low	1x2	Low	1x2	Low	
Antenna Configuration						ļ.,		
OCNG patterns		OP.	1 TDD	OP.2	TDD	OP.2 TDD	N/A	
defined in A.3.2.2								
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB			_		_			
PHICH_RA	dB		0	0		0	N/A	
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
OCNG_RA <sup>Note 1</sup>								
OCNG_RB <sup>Note 1</sup>	-ID	0	NI/A	NI/A			NI/A	
PRS_RA	dB	-3	N/A	N/A	3	3	N/A	
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-98	-98	-98	-95	-98	N/A	
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity	
PRS $\hat{E}_{s}/I_{ot}^{Note 4}$	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity	
lo Note 4	dBm/ 9 MHz	-69.68	-70.22	-70.11	-67.08	-70.11	N/A	
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-106	-Infinity	
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-105	-109	-Infinity	
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-10	-11	-Infinity	
Propagation Condition			ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test and assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\rm ac}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.13.2.1-4: DRX parameters for the test of E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	
drx-InactivityTimer	psf1	A a an a sifinal in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2.
longDRX-CycleStartOffset	sf320	13 30.331 [2], Clause 6.3.2.
shortDRX	disable	

### A.8.13.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.6.3.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell Cell 1 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD 0000 and RSTD 12711.

NOTE: The RSTD measurement time in the test is derived from the following expression,  $T_{PRS}(M-1)+160\left[\frac{n}{M}\right]$ ,

where M = 16 and n = 16 are the parameters specified in Clause 8.1.2.6.3, Table 8.1.2.6.3-1, under Note 2. This gives the total RSTD measurement time of 4960 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

## A.8.14 E-UTRAN TDD - FDD Inter-frequency Measurements

## A.8.14.1 E-UTRAN TDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

### A.8.14.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-FDD interfrequency cell search requirements in clause 8.1.2.3.3.

The test parameters are given in Tables A.8.14.1.1-1 and A.8.14.1.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.14.1.1-1: General test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
Cell 1 PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
Cell 1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Cell1 Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
Cell1 Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2.
Cell 2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell 1 E-UTRA TDD RF Channel Number		1	One TDD carrier frequency is used.
Cell 2 E-UTRA FDD RF Channel Number		2	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	S	5	
T2	S	5	

Table A.8.14.1.1-2: Cell specific test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		С	ell 2		
		T1	T2	T1	T2		
E-UTRA RF Channel		1			2		
Number							
BW <sub>channel</sub>	MHz	10	0		10		
Correlation Matrix and		1x2	Low	1x2	2 Low		
Antenna Configuration							
OCNG Patterns							
defined in A.3.2.2.1		OP.1	TDD	OP.	2 FDD		
(OP.1 TDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB			0			
PHICH_RB	dB	C					
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}^{$	dBm/15 kHz			-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7		
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7		
Propagation Condition ETU70							
spectral densi	e used such that bot ty is achieved for all	OFDM symbols			•		

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.14.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.14.2 E-UTRAN TDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

## A.8.14.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the TDD-FDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The common test parameters are given in Tables A.8.14.2.1-1 and A.8.14.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.14.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.14.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignmend. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.14.2.1-1: General test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Val		
Cell1 PDSCH parameters		DL Reference Me	asurement	As specified in clause A.3.1.1.2. Note that
		Channel R.0 TDD		UE may only be allocated at On Duration
Cell1PCFICH/PDCCH/PHIC		DL Reference Me	asurement	As specified in clause A.3.1.2.2.
H parameters		Channel R.6 TDD		
Cell2 PDSCH parameters		DL Reference Me	asurement	As specified in clause A.3.1.1.1. Note that
		Channel R.0 FDD	)	UE may only be allocated at On Duration
Cell2PCFICH/PDCCH/PHIC		DL Reference Me	asurement	As specified in clause A.3.1.2.1.
H parameters		Channel R.6 FDD	)	
E-UTRA RF Channel		1		one TDD carrier frequencies is used.
Number				
E-UTRA RF Channel		2	2	one FDD carrier frequencies is used.
Number				
Channel Bandwidth	MHz	1	0	
(BW <sub>channel</sub> )				
Active cell		Ce		Cell 1 is on RF channel number 1
Neighbour cell		Ce	II 2	Cell 2 is on RF channel number 2
Gap Pattern Id		(	)	As specified in TS 36.133 clause 8.1.2.1.
Cell1 Uplink-downlink		1		As specified in TS 36.211 clause 4.2 Table
configuration				4.2-2
Cell1 Special subframe		(	6	As specified in table 4.2-1 in TS 36.211.
configuration				The same configuration in both cells
A3-Offset	dB	-(	6	
Hysteresis	dB	(	)	
CP length		Nor	mal	
TimeToTrigger	S	(	)	
Filter coefficient		(	)	L3 filtering is not used
PRACH configuration		4	•	As specified in table 5.7.1-3 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access
				procedure.
DRX		ON		DRX related parameters are defined in
				Table A.8.14.2.1-3
Time offset between cells		3 r	ns	Asynchronous cells
T1	S	5		
T2	S	5	30	

Table A.8.14.2.1-2: Cell specific test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Unit Cell 1			Cell 2			
		T1	T2	T1	T2			
E-UTRA RF Channel			1	2				
Number								
BW <sub>channel</sub>	MHz	,	10		10			
Correlation Matrix and		1x2	Low	1x	2 Low			
Antenna Configuration								
OCNG Patterns								
defined in A.3.2.2.1		OP.1	TDD	OP	.2 FDD			
(OP.1 TDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB			0				
PCFICH_RB	dB							
PHICH_RA	dB		_					
PHICH_RB	dB		0					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-98				
RSRP Note 3	dBm/15 kHz	-94 -94		-Infinity	-91			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7			
SCH_RP Note 3	dBm/15 kHz	-94 -94		-Infinity	-91			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7			
Propagation Condition ETU70								

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table A.8.14.2.1-3: drx-Configuration to be used in E-UTRAN TDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
rieid	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.14.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and 10.1 in TS 36.213.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.14.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20\*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

## A.8.14.3 E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

## A.8.14.3.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.6.

The test scenario comprises of one E-UTRA FDD carriers and one cell on each carrier as given in tables A.8.14.3.1-1 and A.8.14.3.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.14.3.1-1: General test parameters for E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
Cell1PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.2
		Channel R.0 TDD	
Cell1 PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters		Channel R.6 TDD	
Cell2 PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.1
		Channel R.0 FDD	
Cell2 PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
Cell1 E-UTRA RF channel number		1	One TDD carrier is used
Cell2 E-UTRA RF channel number		2	One FDD carrier is used
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Cell1 special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
Cell1 Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	-
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	S	5	
T2	s	≤10	
T3	s	5	

Table A.8.14.3.1-2: Cell specific test parameters for E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	T3	T1	T2	Т3		
E-UTRA RF Channel Number			1			2			
BW <sub>channel</sub>	MHz		10			10			
OCNG Patterns defined in		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2	OP.2 FDD	OP.2 FDD		
A.3.2.2.1 (OP.1 TDD) and in					FDD				
A.3.2.1.2 (OP.2 FDD)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB		0			0			
PHICH_PB	dB								
PDCCH_RA	dB								
PDCCH_PB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$\hat{E}_{s}/I_{ot}$	dB	4	4	4	-Infinity	7	7		
Noc Note 2	dBm/15 KHz	-98							
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7		
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91		
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91		
Propagation Condition			•	AW		•			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.14.3.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test \ requirement = RRC \ Procedure \ delay + \ T_{identify\_CGI, inter} + reporting \ delay$ 

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 42 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 42 ACK/NACK number is caused by two parts. Firstly, at least 30 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.3.7.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 12 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

## A.8.15 E-UTRAN FDD - TDD Inter-frequency Measurements

# A.8.15.1 E-UTRAN FDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

## A.8.15.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-TDD interfrequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.15.1.1-1 and A.8.15.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.15.1.1-1: General test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
		DL Reference Measurement	
Cell 1 PDSCH parameters		Channel R.0 FDD	As specified in clause A.3.1.1.1
Cell 1 PCFICH/PDCCH/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
parameters			
Cell 2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Cell2 Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to Cell 2.
Cell2 Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2. Applicable to Cell 2.
CP length		Normal	
Cell 1 E-UTRA FDD RF Channel Number		1	One TDD carrier frequency is used.
Cell 2 E-UTRA TDD RF Channel Number		2	One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	S	10	

Table A.8.15.1.1-2: Cell specific test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell	2			
		T1	T2	T1	T2			
E-UTRA RF Channel		1		2				
Number								
BW <sub>channel</sub>	MHz	1	0	10				
Correlation Matrix and		1x2	Low	1x2 L	ow			
Antenna Configuration								
OCNG Pattern defined								
in A.3.2.1.1 (OP.1		OP.1	FDD	OP.2	ΓDD			
FDD) and in A.3.2.2.2								
(OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB	(	)	0				
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7			
$N_{oc}^{ m Note~3}$	dBm/15 kHz			-98				
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91			
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91			
$\hat{E}_s/N_{oc}$	dB	4 4 -Infinity 7						
Propagation Condition				ETU70				
				a constant total trans	mitted power			
spectral density is achieved for all OFDM symbols.								

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\rm ac}$  to be

fulfilled.

Note 4: RSRP and SCH RP levels have been derived from other parameters for information purposes.

They are not settable parameters themselves

#### A.8.15.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCC

## A.8.15.2 E-UTRAN FDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

#### A.8.15.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the FDD-TDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.4.

The common test parameters are given in Tables A.8.15.2.1-1 and A.8.15.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.15.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.15.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.15.2.1-1: General test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Parameter	Unit	Test 1	Test 2	Comment
		Va		
Cell 1 PDSCH parameters		DL Reference Me		As specified in clause A.3.1.1.1 Note that
		Channel R.0 FDD	)	UE may only be allocated at On Duration
Cell 1		DL Reference Measurement		As specified in clause A.3.1.2.1.
PCFICH/PDCCH/PHICH		Channel R.6 FDD	)	
parameters				
Cell 2 PDSCH parameters		DL Reference Me		As specified in clause A.3.1.1.2 Note that
		Channel R.0 TDD	)	UE may only be allocated at On Duration
Cell 2		DL Reference Me	asurement	As specified in clause A.3.1.2.2.
PCFICH/PDCCH/PHICH		Channel R.6 TDD	)	
parameters				
Cell 1 E-UTRA FDD RF		1		One FDD carrier frequency is used.
Channel Number				
Cell 2 E-UTRA TDD RF		2	2	One TDD carrier frequency is used.
Channel Number				
Channel Bandwidth	MHz	1	0	
(BW <sub>channel</sub> )				
Active cell		Ce		Cell 1 is on RF channel number 1
Neighbour cell		Ce	II 2	Cell 2 is on RF channel number 2
Gap Pattern Id		(	)	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-	6	
Hysteresis	dB	(	)	
CP length		Nor	mal	
TimeToTrigger	S	(	)	
Filter coefficient		(	)	L3 filtering is not used
E-UTRA FDD PRACH		4	1	As specified in table 5.7.1-2 in TS 36.211
configuration				·
Cell 2 Special subframe		(	3	As specified in table 4.2-1 in TS 36.211
configuration				
Cell 2 Uplink-downlink		,		As specified in table 4.2-2 in TS 36.211
configuration				·
E-UTRA TDD Access	-	Not	Sent	No additional delays in random access
Barring Information				procedure.
DRX		ON		DRX related parameters are defined in
				Table A.8.15.2.1-3
Time offset between cells	ms	3		Asynchronous cells
T1	S		5	
T2	s	5	30	

Table A.8.15.2.1-2: Cell specific test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Parameter	Unit	Ce	II 1		Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel		,	1		2	
Number						
BW <sub>channel</sub>	MHz	1	0		10	
Correlation Matrix and		1x2	Low	1>	(2 Low	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OP	2.2 TDD	
(OP.1 FDD) and in						
A.3.2.2.2 (OP.2 TDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB			0		
PCFICH_RB	dB					
PHICH_RA	dB		2			
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~2}$	dBm/15 kHz			-98		
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
Propagation Condition			E	TU70		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.15.2.1-3: drx-Configuration to be used in E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Field	Test1	Test2	Comment
Fleid	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	
Note: For further information se	e clause 6.3.2 in	TS 36.331.	

Table A.8.15.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Field	Test1	Test2	Comment
Field	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

## A.8.15.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20\*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

## A.8.15.3 E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

#### A.8.15.3.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.8.

The test scenario comprises of one E-UTRA FDD carrier and one E-UTRA TDD carrier and one cell on each carrier as given in tables A.8.15.3-1 and A.8.15.3-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.15.3-1: General test parameters for E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
Cell1 PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
Cell1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF channel number		1, 2	One FDD and one TDD carrier frequency are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Cell 2 Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
Cell 2 Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	_
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.15.3-2: Cell specific test parameters for E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel Number			1			2	
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns defined in		OP.10	OP.10	OP.10	OP.2	OP.2 TDD	OP.2 TDD
A.3.2.1.10 (OP.10 FDD) and		FDD	FDD	FDD	TDD		
in A.3.2.2.1 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB		_			_	
PHICH_RA	dB		0			0	
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_{s}/I_{ot}$	dB	4	4	4	-Infinity	7	7
N <sub>oc</sub> Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition				AW		•	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.15.3.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

 $Test\ requirement = RRC\ Procedure\ delay +\ T_{identify\_CGI,inter} + reporting\ delay$ 

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 60 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 80 ACK/NACK number is caused by two parts. Firstly, at least 60 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.3.5.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 20 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

## A.8.16 E-UTRAN Carrier Aggregation Measurements

## A.8.16.1 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX

### A.8.16.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.1.1-1 and A.8.16.1.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.16.1.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter		Unit	Value	Comment				
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1				
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1				
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test				
Active PCell			Cell 1	Primary cell on RF channel number 1.				
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.				
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.				
	Channel Bandwidth (BW <sub>channel</sub> )		10	Channel bandwidth for cells on primary and secondary component carriers				
	CP length		Normal					
	DRX		OFF	Continuous monitoring of primary cell				
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.				
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.				
	Time To Trigger	S	0					
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.				
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.				
	Report on leave		False					
	Time To Trigger	S	0					
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.				
	Cell-individual offset for cells on RF channel number 2		0	Individual offset for cells on secondary component carrier.				
Filter coefficient			0	L3 filtering is not used				
SCell measurement cycle (measCycleSCell)		ms	320					
Cell2 timing offset to cell1 µs		μs	0					
Time alignment error between cell2 and cell1		μs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.				
Cell3	Cell3 timing offset to cell1 μs		3	Synchronous cells				
T1			5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.				
T2	T2		≤12	UE shall report Event A6 within 6.4s (20xscellMeasCycle)				
T3		S	5	UE shall report Event A2 within 200 ms and 1.6s for cells 1 and 2, respectively. channel bandwidth and is performed according				

NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.1.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit	Cell 1			Cell 2			Cell 3					
		T1	T2	T3	T1	T2	T3	T1	T2	T3			
E-UTRA RF Channel		1			2			2					
Number		ı			2			2					
BW <sub>channel</sub>	MHz	10		10			10						
Correlation Matrix and			1x2 Low		1x2 Low			1x2 Low					
Antenna Configuration													
OCNG Patterns		OP.1 FDD			OP.2 FDD			OP.2 FDD					
defined in A.3.2.1.1													
(OP.1 FDD) and in													
A.3.2.1.2 (OP.2 FDD)													
PBCH_RA	dB												
PBCH_RB	dB	_											
PSS_RA	dB												
SSS_RA	dB												
PCFICH_RB	dB							,					
PHICH_RA	dB	0			0			0					
PHICH_RB	dB												
PDCCH_RA	dB												
PDCCH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA <sup>Note 1</sup>	dB												
OCNG_RB <sup>Note 1</sup>	dB												
N <sub>oc</sub> Note 2	dBm/15 kHz	-101			-10			v1					
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104			
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76			
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3			
Propagation Condition		ETU70											
N													

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

### A.8.16.1.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.16.2 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX

### A.8.16.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.2.1-1 and A.8.16.2.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.16.2.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

	Parameter	Unit	Value	Comment		
PDS	CH parameters		DL Reference Measurement	As specified in clause A.3.1.1.2		
	·		Channel R.0 TDD	·		
PCFI	CH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2		
parai	neters		Channel R.6 TDD			
E-UT	RA RF Channel		1.0	Two radio channels are used for this test		
Num	oer		1, 2			
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.		
Conf	gured deactivated		Cell 2	Configured deactivated secondary cell on		
SCel	SCell		Cell 2	RF channel number 2.		
Neigl	nbour cell		Cell 3	Neighbor cell to be identified on RF		
			Cell 3	channel number 2.		
Char	nel Bandwidth	MHz	10	Channel bandwidth for cells on primary		
(BW <sub>c</sub>	hannel)		10	and secondary component carriers		
CP le	ength		Normal			
Spec	ial subframe		6	As specified in table 4.2.1 in TS 36.211.		
confi	guration		6	The same configuration applies to all cells.		
Uplin	k-downlink		1	-		
confi	guration		1			
DRX			OFF	Continuous monitoring of primary cell		
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.		
	Threshold RSRP	dBm		Actual RSRP threshold for event A2.		
			00	Needs to take absolute accuracy tolerance		
			-93	in clause 9.1.11.1 into account plus		
				margin.		
	Time To Trigger	S	0			
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.		
	Offset	dB		Offset parameter for evaluation of event		
				A6. Needs to take relative accuracy		
			-6	tolerance in clause 9.1.11.2 into account		
				plus margin.		
	Report on leave		False			
	Time To Trigger	S	0			
Cell-i	ndividual offset for cells	dB	0	Individual offset for cells on primary		
on R	F channel number 1		0	component carrier.		
Cell-i	ndividual offset for cells	dB	0	Individual offset for cells on secondary		
on R	F channel number 2		0	component carrier.		
Filter	coefficient		0	L3 filtering is not used		
SCel	measurement cycle	ms	320			
(mea	sCycleSCell)		320			
Cell2	timing offset to cell1	μs	0			
Time	alignment error	μs	≤ Time alignment error as	The value of time alignment error depends		
	een cell2 and cell1		specified in TS 36.104 [30]	upon the type of carrier aggregation.		
			clause 6.5.3.1.			
Cell3	timing offset to cell1	μs	3	Synchronous cells		
T1	<del>-</del>	S	_	During this time the UE shall be aware of		
			5	cells 1 and 2 but not cell 3.		
T2		S	-40	UE shall report Event A6 within 6.4s		
			≤12	(20xscellMeasCycle)		
T3		S	_	UE shall report Event A2 within 200 ms		
			5	and 1.6s for cells 1 and 2, respectively.		
NOT	E: This test verifies the	e RRM re	equirement which is independent of	channel bandwidth and is performed according		
ı						

Table A.8.16.2.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit		Cell 1			Cell 2			Cell 3	
		T1	T2	T3	T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel			1			2		2		
Number		•					2			
BW <sub>channel</sub>	MHz		10		10				10	
Correlation Matrix and			1x2 Low			1x2 Low		·	1x2 Low	
Antenna Configuration										
OCNG Patterns								_		
defined in A.3.2.2.1		OP.1 TDD		(	OP.2 TDD		0	P.2 TDD		
(OP.1 TDD) and in										
A.3.2.2.2 (OP.2 TDD)										
PBCH_RA	dB									
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB				0			0		
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB		0							
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 1</sup>	dB									
OCNG_RB <sup>Note 1</sup>	dB									
Noc Note 2	dBm/15 kHz		-101				-10	)1		
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19 19 -3			19 19 -3			-infinity	19	-3
Propagation Condition						ETU70	1			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

## A.8.16.2.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.4s ( $20 \times$  measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.16.3 E-UTRAN FDD-FDD Event triggered reporting on deactivated SCell with PCell interruption in non-DRX

## A.8.16.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.3.1-1 and A.8.16.3.1-2 below. In the test there are three synchronous cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is deactivated SCell, and Cell3 is the neighbour cell. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.16.3.1-1: General test parameters for E-UTRAN FDD-FDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

	Parameter	Unit	Value	Comment
PDS	CH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
	CH/PDCCH/PHICH meters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UT Num	RA RF Channel ber		1, 2	Two radio channels are used for this test
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.
Conf SCel	igured deactivated I		Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neig	hbour cell		Cell 3	Neighbor cell to be identified on RF channel number 2.
	nnel Bandwidth	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP I			Normal	·
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	ndividual offset for cells F channel number 1	dB	0	Individual offset for cells on primary component carrier.
on R	ndividual offset for cells F channel number 2	dB	0	Individual offset for cells on secondary component carrier.
	coefficient		0	L3 filtering is not used
	I measurement cycle	ms	1280	
	timing offset to cell1	μs	0	
	alignment error een cell2 and cell1	μs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3	timing offset to cell1	μs	3	Synchronous cells
T1		S	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		S	≤30	UE shall report Event A6 within 25.6s (20xscellMeasCycle)
NOT	E: This test verifies the	e RRM red	quirement which is independent of o	channel bandwidth and is performed according

Table A.8.16.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

Parameter	Unit	Ce	II 1	Ce	ell 2	Ce	II 3		
		T1	T2	T1	T2	T1	T2		
E-UTRA RF Channel		•	1		2	2			
Number									
BW <sub>channel</sub>	MHz	1	0	,	10	1	0		
OCNG Pattern defined									
in A.3.2.1.10 (OP.10		OP.10	) FDD	OP.2	2 FDD	OP.2 FDD			
FDD) and in A.3.2.1.2									
(OP.2)									
PBCH_RA	dB								
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_RB	dB	(	0		0		)		
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH RB	dB								
OCNG RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$N_{oc}$ Note 3	dBm/15 kHz			-	98				
RSRP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82		
$\hat{E}_{s}/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11		
SCH_RP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82		
$\hat{E}_s/N_{oc}$	dB	16	16				16		
Propagation Condition			•	AV	/GN	•	•		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.16.3.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.16.4 E-UTRAN TDD-TDD Event triggered reporting on deactivated SCell with PCell interruption in non-DRX

#### A.8.16.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.4.1-1 and A.8.16.4.1-2 below. In the test there are three synchronous cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is deactivated SCell, and Cell3 is the neighbour cell. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.16.4.1-1: General test parameters for E-UTRAN TDD-TDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

	Parameter	Unit	Value	Comment
PDS	CH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
	CH/PDCCH/PHICH meters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
	RA RF Channel		1, 2	Two radio channels are used for this test
	e PCell		Cell 1	Primary cell on RF channel number 1.
	igured deactivated		Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neigl	hbour cell		Cell 3	Neighbor cell to be identified on RF channel number 2.
	nnel Bandwidth	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP le	ength		Normal	
confi	cial subframe guration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
	ık-downlink guration		1	
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	processing
	Time To Trigger	s	0	
	individual offset for cells F channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-i	individual offset for cells F channel number 2	dB	0	Individual offset for cells on secondary component carrier.
Filter	coefficient		0	L3 filtering is not used
SCel	I measurement cycle	ms	1280	
Cell2	timing offset to cell1	μs	0	
	alignment error een cell2 and cell1	μs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3	timing offset to cell1	μs	3	Synchronous cells
T1		S	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		S	≤30	UE shall report Event A6 within 25.6s (20xscellMeasCycle)
NOT	E: This test verifies the			channel bandwidth and is performed according

to the principle defined in section A.3.6.1.

Table A.8.16.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

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Parameter	Unit	Ce	II 1	Ce	ell 2	Ce	II 3	
		T1	T2	T1	T2	T1	T2	
E-UTRA RF Channel		•	1		2	2	2	
Number								
BW <sub>channel</sub>	MHz	1	0	•	10	1	0	
OCNG Pattern defined								
in A.3.2.2.1 (OP.1		OP.1	TDD	OP.2	2 TDD	OP.2 TDD		
TDD) and in A.3.2.2.2								
(OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB	(	0		0		)	
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}$ Note 3	dBm/15 kHz			-	98			
RSRP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82	
$\hat{E}_{s}/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11	
SCH_RP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82	
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16	
Propagation Condition				AV	VGN	•		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.16.4.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.16.5 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX for 20 MHz bandwidth

## A.8.16.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.5.1-1 and A.8.16.5.1-2 will replace the values of corresponding parameters in Tables A.8.16.1.1-1 and A.8.16.1.1-2.

Table A.8.16.5.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

_	Parameter	Unit	Value	Comment		
PDSCI	PDSCH parameters		DL Reference Measurement Channel R.4 FDD	As specified in section A.3.1.1.1		
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.10 FDD	As specified in section A.3.1.2.1		
	Channel Bandwidth (BW <sub>channel</sub> )		20	Channel bandwidth for cells on primary and secondary component carriers		
		dBm	-96	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.		

Note 1: See Table A.8.16.1.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.5.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Parameter	Unit		Cell 1		Cell 2				Cell 3	
		T1	T2	T3	T1	T2	Т3	T1	T2	T3
BW <sub>channel</sub>	MHz		20		20			20		
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and in A.3.2.1.12 (OP.12 FDD)		0	P.11 FDI	0	•	OP.12 FDI	D	0	P.12 FDD	
N <sub>oc</sub> Note 2	dBm/15 kHz		-104				-1	04		
RSRP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3
	_									
Note: See Ta	ble A.8.16.1.1	-2 for othe	r cell-spe	cific test p	arameter	S.				

## A.8.16.5.2 Test Requirements

The test requirements defined in section A.8.16.1.2 shall apply to this test case.

## A.8.16.6 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20 MHz bandwidth

## A.8.16.6.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.6.1-1 and A.8.16.6.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.6.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Para	meter	Unit	Value	Comment		
PDSCH parameters			DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2		
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2		
Channel Band (BW <sub>channel</sub> )	Channel Bandwidth (BW <sub>channel</sub> )		20	Channel bandwidth for cells on primary and secondary component carriers		
A2			-96	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.		

Note 1: See Table A.8.16.2.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.6.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Parameter	Unit		Cell 1			Cell 2		Cell 3			
		T1	T2	T3	T1	T2	Т3	T1	T2	T3	
BW <sub>channel</sub>	MHz		20			20			20		
OCNG											
Patterns		OP.7 TDD				OP.8 TDD	)	OI	P.8 TDD		
defined in											
A.3.2.2.7											
(OP.7 TDD)											
and in											
A.3.2.2.8											
(OP.8 TDD)											
N <sub>oc</sub> Note 2	dBm/15 kHz		-104				-1	04			
RSRP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107	
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76	
SCH_RP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107	
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3	

## A.8.16.6.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

# A.8.16.7 E-UTRA FDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 20 MHz bandwidth

### A.8.16.7.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.3. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.7.1-1 and A.8.16.7.1-2 will replace the values of corresponding parameters in Tables A.8.16.3.1-1 and A.8.16.3.1-2.

Table A.8.16.7.1-1: General test parameters for E-UTRAN FDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Value	Comment					
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.1					
		Channel R.6 FDD						
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.3.1.2.1					
parameters		Channel R.10 FDD						
Channel Bandwidth	MHz	20	Channel bandwidth for cells on primary					
(BW <sub>channel</sub> )		20	and secondary component carriers					
Note 1: See Table A.8.16.3	.1-1 for o	ther general test parameters.						
Note 2: This test verifies the								
to the principle defi	ned in se	ction A.3.6.1.						

Table A.8.16.7.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Ce	ell 1	Се	II 2	Cel	I 3	
		T1	T2	T1	T2	T1	T2	
BW <sub>channel</sub>	MHz	2	20	2	0	20		
OCNG Patterns defined in A.3.2.1.17 (OP.17 FDD) and in A.3.2.1.12 (OP.12 FDD)		OP.1	7 FDD	OP.12	OP.12 FDD OP.12 FDD			
$N_{oc}^{ m Note  3}$	dBm/15 kHz	-1	01		-1	01		
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85	
$\hat{E}_{s}/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11	
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85	
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16	
Note: See Table A.8.1	16.3.1-2 for oth	er cell-spe	cific test pa	arameters				

## A.8.16.7.2 Test Requirements

The test requirements defined in section A.8.16.3.2 shall apply to this test case.

# A.8.16.8 E-UTRA TDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 20 MHz bandwidth

### A.8.16.8.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.8.1-1 and A.8.16.8.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.8.1-1: General test parameters for E-UTRAN TDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	Channel bandwidth for cells on primary and secondary component carriers

Note 1: See Table A.8.16.4.1-1 for other general test parameters.

Table A.8.16.8.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Ce	II 1	Ce	ell 2	Cel	I 3		
		T1	T2	T1	T2	T1	T2		
BW <sub>channel</sub>	MHz	2	0	2	20	20	)		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.8 (OP.8 TDD)		OP.7	TDD	OP.8	3 TDD	OP.8 TDD			
$N_{oc}^{$	dBm/15 kHz	-1	01		-1	01			
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85		
$\hat{E}_{s}/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11		
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85		
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16		
Note: See Table A.8.16.4	.1-2 for oth	er cell-spe	cific test pa	arameters					

## A.8.16.8.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

## A.8.16.9 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX for 10MHz+5MHz

#### A.8.16.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.1.1.

The test parameters are the same as defined in Subclause A.8.16.1.1 except those described in the following section. The listed parameter values in Tables A.8.16.9.1-1 and A.8.16.9.1-2 will replace the values of corresponding parameters in Tables A.8.16.1.1-1 and A.8.16.1.1-2.

Table A.8.16.9.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit	Value	Comment
Channel bandwidth for cells			Channel bandwidth for cells on primary
on primary carriers	MHz	10	carriers
(BW <sub>channel</sub> )			
Channel bandwidth for cells			Channel bandwidth for cells on secondary
on secondary carriers	MHz	5	carriers
(BW <sub>channel</sub> )			

Note 1: See Table A.8.16.1.1-1 for the other general parameters.

Table A.8.16.9.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2			Cell 3	
		T1	T2	T3	T1	T2	T3	T1	T2	T3
BW <sub>channel</sub>	MHz		10			5			5	
PDSCH Reference		R.0 FDD			N/A				N/A	
measurement channel					ļ					
defined in A.3.1.1.1										
PDSCH allocation	$n_{PRB}$	13—36			N/A			N/A		
PCFICH/PDCCH/PHIC		R.6 FDD		R.11 FDD			R.11 FDD			
H parameters defined										
in A.3.1.2.1										
OCNG Patterns										
defined in A.3.2.1.1			P.1 FDD		OP.16 FDD		OP.16 FDD		)	
(OP.1 FDD) and in										
A.3.2.1.16 (OP.16										
FDD)										
Note 1: See Table A.8.16	6.1.1-2 for the	other spe	ecific para	meters	S					

## A.8.16.9.2 Test Requirements

The test requirements defined in section A.8.16.1.2 shall apply to this test case.

## A.8.16.10 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 10MHz+5MHz

## A.8.16.10.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2.1.

The test parameters are the same as defined in Subclause A.8.16.2.1 except those described in the following section. The listed parameter values in Tables A.8.16.10.1-1 and A.8.16.10.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.10.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carriers (BW <sub>channel</sub> )	MHz	10	Channel bandwidth for cells on primary carriers
Channel bandwidth for cells on secondary carriers (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on secondary carriers

Note 1: See Table A.8.16.2.1-1 for the other general parameters.

Table A.8.16.10.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2			Cell 3	
		T1	T2	T3	T1	T2	Т3	T1	T2	Т3
BW <sub>channel</sub>	MHz		10			5			5	
PDSCH Reference			R.0 TDD		N/A				N/A	
measurement channel										
defined in A.3.1.1.2										
PDSCH allocation	$n_{PRB}$		13—36		N/A			N/A		
PCFICH/PDCCH/PHIC		R.6 TDD			R.12 TDD			R.12 TDD		
H parameters defined										
in A.3.1.2.2										
OCNG Patterns										
defined in A.3.2.2.1		(	OP.1 TDE	)	OP.10 TDD			OP.10 TDD		
(OP.1 TDD) and in										
A.3.2.2.10 (OP.10										
TDD)										
Note 1: See Table A.8	.16.2.1-2 for	the othe	r specific	paramet	ers.					

## A.8.16.10.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

# A.8.16.11 E-UTRAN FDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

## A.8.16.11.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.3. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.11.1-1 and A.8.16.11.1-2 will replace the values of corresponding parameters in Tables A.8.16.3.1-1 and A.8.16.3.1-2.

Table A.8.16.11.1-1: General test parameters for E-UTRAN FDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Value	Comment				
Channel bandwidth for cells on primary carrier (BW <sub>channel</sub> )	MHz	10	Channel bandwidth for cells on primary component carrier				
PDSCH parameters for cells on primary carriers		DL Reference Measurement Channel R.3 FDD	As specified in section A.3.1.1.1				
PCFICH/PDCCH/PHICH parameters for cells on primary carriers		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1				
Channel bandwidth for cells on secondary carriers (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on secondary component carrier				
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1				
Note 1: See Table A.8.16.3.1-1 for other general test parameters.  Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is							

Table A.8.16.11.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Cell 1		C	ell 2	Cell 3			
		T1 T2		T1 T2		T1	T2		
BW <sub>channel</sub>	MHz	10		5		5			
OCNG Patterns defined in A.3.2.1		OP.1	0 FDD	OP.16 FDD		OP.16 FDD			
Note: See Table A.8.16.3.1-2 for other cell-specific test parameters.									

## A.8.16.11.2 Test Requirements

The test requirements defined in section A.8.16.3.2 shall apply to this test case.

# A.8.16.12 E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

## A.8.16.12.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.12.1-1 and A.8.16.12.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.12.1-1: General test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carrier (BW <sub>channel</sub> )	MHz	10	Channel bandwidth for cells on primary component carrier
PDSCH parameters for cells on primary carriers		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on primary carriers		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Channel bandwidth for cells on secondary carriers (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on secondary component carrier
PDSCH parameters for cells on secondary carrier		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2

Note 1: See Table A.8.16.4.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.12.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Cell 1		C	ell 2	Cell 3			
		T1	T1 T2		T1 T2		T2		
BW <sub>channel</sub>	MHz	10		5		5			
OCNG Patterns defined in A.3.2.2		OP.1 TDD OP.10 TDD				OP.10	TDD		
Note: See Table A.8.16.4.1-2 for other cell-specific test parameters.									

#### A.8.16.12.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

## A.8.16.13 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX for 5MHz +5 MHz bandwidth

## A.8.16.13.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.13.1-1 and A.8.16.13.1-2 will replace the values of corresponding parameters in Tables A.8.16.1.1-1 and A.8.16.1.1-2.

Table A.8.16.13.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 5MHz +5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on primary component carrier
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on secondary component carrier

Note 1: See Table A.8.16.1.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.13.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 5MHz +5 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2			Cell 3			
		T1	T2	T3	T1	T2	T3	T1	T2	T3
BW <sub>channel</sub>	MHz		10		3			3		
OCNG Patterns										
defined in A.3.2.1.15		0	P.15 FDI	)	OP.16 FDD			OP.16 FDD		
(OP.15.FDD) and in										
A.3.2.1.16 (OP.16										
FDD)										
Note: See Table A.	.8.16.1.1-2 for o	other cell-	specific t	est parai	neters.					

## A.8.16.13.2 Test Requirements

The test requirements defined in section A.8.16.1.2 shall apply to this test case.

## A.8.16.14 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 5 MHz +5 MHz bandwidth

#### A.8.16.14.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.14.1-1 and A.8.16.14.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.14.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 10 MHz +5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4.TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on primary component carrier
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on secondary component carrier

Note 1: See Table A.8.16.2.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.14.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 10 MHz +5 MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		Cell 3			
		T1	T1 T2 T3		T1 T2 T3		T1	T2	T3	
BW <sub>channel</sub>	MHz		10		3		3			
OCNG Patterns										
defined in A.3.2.2.9		(	OP.9 TDD		OP.10 TDD		OP10 TDD		)	
(OP.9 TDD) and in										
A.3.2.2.10 (OP.10										
TDD)										
Note: See Table A.8.16.2.1-2 for other cell-specific test parameters.										

## A.8.16.14.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

# A.8.16.15 E-UTRA FDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 5 +5 MHz bandwidth

### A.8.16.15.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.3. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.15.1-1 and A.8.16.14.1-2 will replace the values of corresponding parameters in Tables A.8.16.3.1-1 and A.8.16.3.1-2.

Table A.8.16.15.1-1: General test parameters for E-UTRAN FDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5 + 5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.7 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on primary and secondary component carriers

Note 1: See Table A.8.16.3.1-1 for other general test parameters.

Table A.8.16.15.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5+5 MHz bandwidth

Parameter	Unit	Cell 1		Cell 1 Cell 2		Cel	I 3	
		T1 T2		T1 T2		T1	T2	
BW <sub>channel</sub>	MHz	5		5		5		
OCNG Patterns defined								
in A.3.2.1.20 (OP.20		OP.20 FDD		OD 1	6 FDD	OP.16	EDD	
FDD) and in A.3.2.1.16		UP.20	טטאנ	UP.1	6 FDD	OP.16	רטט	
(OP.16 FDD)								
Note: See Table A.8.16.3.1-2 for other cell-specific test parameters.								

## A.8.16.7.2 Test Requirements

The test requirements defined in section A.8.16.3.2 shall apply to this test case.

# A.8.16.16 E-UTRA TDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 5+5 MHz bandwidth

## A.8.16.16.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.16.1-1 and A.8.16.16.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.16.1-1: General test parameters for E-UTRAN TDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5+5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	Channel bandwidth for cells on primary and secondary component carriers

Note 1: See Table A.8.16.4.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.16.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5+5 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1 T2		T1 T2		T1	T2
BW <sub>channel</sub>	MHz	5		5		5	
OCNG Patterns defined in							
A.3.2.2.9 (OP.9 TDD) and in		OP.9 TDD		OP.10 TDD		OP.10	TDD
A.3.2.2.10 (OP.10 TDD)							
Note: See Table A.8.16.4.1-2 for other cell-specific test parameters.							

### A.8.16.16.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

## A.8.16.17 E-UTRAN FDD activation and deactivation of known SCell in non-DRX

#### A.8.16.17.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.17.1-1 and cell-specific parameters in A.8.16.17.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). The UE now starts monitoring also the SCC. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+24). The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than COI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.8.16.17.1-1: General test parameters for known SCell activation case

Parameter			Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	μs	0	
Time alignment error between cell2 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	S	7	During this time the PCell shall be known and the SCell configured and detected.
T2	S	1	During this time the UE shall activate the SCell.
Т3	S	1	During this time the UE shall deactivate the SCell.

Table A.8.16.17.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation

Parameter	Unit	Cell 1				Cell 2		
		T1 T2 T3			T1	T2	T3	
E-UTRA RF Channel			1			2		
Number			ı					
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns								
defined in A.3.2.1.1		(	OP.10 FDD			OP.2 FDD		
(OP.1 FDD) and in								
A.3.2.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB				0			
PHICH_RA	dB							
PHICH_RB	dB		0					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Noc Note 2	dBm/15 kHz		-104			-104		
RSRP Note 3	dBm/15 kHz		-87			-87		
Ês/lot	dB	17			dB 17		17	
SCH_RP Note 3	dBm/15 kHz	-87			-87 -87		-87	
Ê <sub>s</sub> /N <sub>oc</sub>	dB		17			17		
Propagation Condition		AWGN						
Note 1: OCNG shall b	e used such that	all cells a	re fully allo	cated an	d a constai	nt total tran	smitted	
power spectra	al density is achie	eved for al	I OFDM svr	mbols.				

- power spectral density is achieved for all OFDM symbols.
- Interference from other cells and noise sources not specified in the test is assumed to be Note 2: constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Es/lot, RSRP and SCH\_RP levels have been derived from other parameters for Note 3: information purposes. They are not settable parameters themselves.
- The uplink resources for CSI reporting are assigned to the UE prior to the start of time Note 4: period T2.

#### A.8.16.17.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+10) if the suframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+24).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+24) then the UE shall use the NOTE: next available uplink resource for reporting the corresponding valid CSI.

## A.8.16.17A E-UTRAN FDD activation and deactivation of known SCell in non-DRX for 20MHz

## A.8.16.17A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.17. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.17A.1-1 and A.8.16.17A.1-2 will replace the values of corresponding parameters in Tables A.8.16.17.1-1 and A.8.16.17.1-2.

Table A.8.16.17A.1-1: General test parameters for known SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 FDD	As specified in section A.3.1.2.1

Table A.8.16.17A.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation, 20MHz bandwidth

Parameter	Unit		Cell 1			Cell 2			
		T1 T2 T3			T1	T2	T3		
BW <sub>channel</sub>	MHz		20		20				
OCNG Patterns									
defined in A.3.2.1.17		OP.17 FDD OP.12.FDD							
(OP.17 FDD) and in									
A.3.2.1.12 (OP.12									
FDD)									

## A.8.16.17A.2Test Requirements

The test requirements defined in section A.8.16.17.2 shall apply to this test case.

## A.8.16.17B E-UTRAN FDD activation and deactivation of known SCell in non-DRX for 10MHz + 5MHz

### A.8.16.17B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.17. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.17B.1-1 and A.8.16.17B.1-2 will replace the values of corresponding parameters in Tables A.8.16.17.1-1 and A.8.16.17.1-2.

Table A.8.16.17B.1-1: General test parameters for known SCell activation case, 10+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.1
		Channel R.3 FDD (Cell 1)	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.3.1.2.1
parameters		Channel R.6 FDD (Cell 1)	
		DL Reference Measurement	
		Channel R.11 FDD (Cell 2)	

Table A.8.16.17B.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation, 10+5MHz bandwidth

Parameter	Unit	Cell 1					
		T1 T2 T3			T1	T2	T3
BW <sub>channel</sub>	MHz	10			5		
OCNG Patterns							
defined in A.3.2.1.11			P.10 FDD		OP.16.FDD		
(OP.11 FDD) and in							
A.3.2.1.16 (OP.16							
FDD)							

## A.8.16.17B.2Test Requirements

The test requirements defined in section A.8.16.17.2 shall apply to this test case.

## A.8.16.17C E-UTRAN FDD activation and deactivation of known SCell in non-DRX for 5MHz + 5MHz

## A.8.16.17C.1Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.17. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.17C.1-1 and A.8.16.17C.1-2 will replace the values of corresponding parameters in Tables A.8.16.17.1-1 and A.8.16.17.1-2.

Table A.8.16.17C.1-1: General test parameters for known SCell activation case, 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH		Channel R.7 FDD (Cell 1)  DL Reference Measurement	As specified in section A.3.1.2.1
parameters		Channel R.11 FDD	

Table A.8.16.17C.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation, 5+5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3		
BW <sub>channel</sub>	MHz		5			5			
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and in A.3.2.1.16 (OP.16 FDD)		(	OP.20 FDD		(	P.16.FDD			

### A.8.16.17C.2Test Requirements

The test requirements defined in section A.8.16.17.2 shall apply to this test case.

### A.8.16.18 E-UTRAN TDD activation and deactivation of known SCell in non-DRX

#### A.8.16.18.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.18.1-1 and cell-specific parameters in A.8.16.18.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC)

but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). The UE now starts monitoring also the SCC. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m where m is 4 or 9, defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+24). The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+11).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a subframe # denoted n where n is 4 or 9, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+11).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.8.16.18.1-1: General test parameters for known SCell activation case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every UL subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	μs	0	
Time alignment error between cell2 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1	μs	3	Synchronous cells
T1	s	7	During this time the PCell shall be known and the SCell configured and detected.
T2	S	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.

Table A.8.16.18.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation

Parameter	Unit		Cell 1			Cell 2		
		T1 T2 T3			T1	T2	Т3	
E-UTRA RF Channel			1			2		
Number								
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns								
defined in A.3.2.2.1			OP.1 TDD		(	OP.2 TDD		
(OP.1 TDD) and in								
A.3.2.2.2 (OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB				0			
PHICH_RB	dB		0					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Noc Note 2	dBm/15 kHz		-104			-104		
RSRP Note 3	dBm/15 kHz		-87			-87		
Ê <sub>s</sub> /I <sub>ot</sub>	dB		17			17		
SCH_RP Note 3	dBm/15 kHz		-87			-87		
Ê <sub>s</sub> /N <sub>oc</sub>	dB		17			17		
Propagation Condition					'GN			
Note 1: OCNG shall b	e used such that	t all cells a	re fully allo	cated an	d a constar	nt total tran	smitted	
nower enactro	donaity ia aabia	wad for al	I OEDM over	mhala				

power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Es/lot, RSRP and SCH\_RP levels have been derived from other parameters for Note 3: information purposes. They are not settable parameters themselves.

The uplink resources for CSI reporting are assigned to the UE prior to the start of time Note 4: period T2.

#### A.8.16.18.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruptin, or in a subframe (m+13) if the subframes (m+8) and (m+9) were subject to interruption when an intra-band SCell is activated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+24).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+11).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+11).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+24) then the UE shall use the NOTE: next available uplink resource for reporting the corresponding valid CSI.

## A.8.16.18A E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 20MHz

## A.8.16.18A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18A.1-1 and A.8.16.18A.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18A.1-1: General test parameters for known SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2

Table A.8.16.18A.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 20MHz bandwidth

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	Т3	T1	T2	Т3		
BW <sub>channel</sub>	MHz	20			20				
OCNG Patterns									
defined in A.3.2.2.7			OP.7 TDD			OP.2.TDD			
(OP.7 TDD) and in									
À.3.2.2.2 (ÓP.2 TDD)									

### A.8.16.18A.2 Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

## A.8.16.18B E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 10MHz + 5MHz

#### A.8.16.18B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18B.1-1 and A.8.16.18B.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18B.1-1: General test parameters for known SCell activation case, 10 + 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD (cell 1) DL Reference Measurement Channel R.12 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.18B.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 10 + 5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	Т3	
BW <sub>channel</sub>	MHz		10		5			
OCNG Patterns								
defined in A.3.2.2.1		OP.1 TDD				P.10.TDD		
(OP.1 TDD) and in								
A.3.2.2.10 (OP.10								
TDD)								

## A.8.16.18B.2 Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

## A.8.16.18C E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 5MHz + 5MHz

## A.8.16.18C.1Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18C.1-1 and A.8.16.18C.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18C.1-1: General test parameters for known SCell activation case, 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2

Table A.8.16.18C.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
BW <sub>channel</sub>	MHz	5			5			
OCNG Patterns								
defined in A.3.2.2.9		OP.9 TDD			OP.10.TDD			
(OP.9 TDD) and in								
A.3.2.2.10 (OP.10								
TDD)								

## A.8.16.18C.2Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

# A.8.16.18D E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 20MHz + 10MHz

## A.8.16.18D.1Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18D.1-1 and A.8.16.18D.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18D.1-1: General test parameters for known SCell activation case, 20 + 10MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD (cell 1) DL Reference Measurement Channel R.6 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.18D.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 10 + 5MHz bandwidth

Parameter	Unit		Cell 1		Cell 2				
		T1	T2	T3	T1	T2	T3		
BW <sub>channel</sub>	MHz		20			10			
OCNG Patterns									
defined in A.3.2.2.7			OP.7 TDD		(	OP.2.TDD			
(OP.7 TDD) and in									
À.3.2.2.2 (ÓP.2 TDD)									

## A.8.16.18D.2Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

## A.8.16.19 E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX

## A.8.16.19.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.19.1-1 and cell-specific parameters in A.8.16.19.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Cell 1 has constant signal level throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (cell2) becomes configured on radio channel 2 (SCC). During T1 the SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 2 is increased to same level as for cell 1. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+34) provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell at latest in a subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.19.1-1: General test parameters for unknown SCell activation case

DL Reference Measurement Channel R.0 FDD  DL Reference Measurement Channel R.6 FDD  1, 2  Cell 1  Cell 2  Normal  OFF	As specified in section A.3.1.1.1  As specified in section A.3.1.2.1  Two radio channels are used for this test  Primary cell on RF channel number 1.  Configured deactivated secondary cell on RF channel number 2.  Continuous monitoring of primary cell  CQI reporting for SCell every second subframe
Channel R.6 FDD  1, 2  Cell 1  Cell 2  Normal  OFF  0	Two radio channels are used for this test  Primary cell on RF channel number 1.  Configured deactivated secondary cell on RF channel number 2.  Continuous monitoring of primary cell  CQI reporting for SCell every second
1, 2 Cell 1 Cell 2 Normal OFF	Primary cell on RF channel number 1. Configured deactivated secondary cell on RF channel number 2. Continuous monitoring of primary cell CQI reporting for SCell every second
Cell 2  Normal  OFF  0	Configured deactivated secondary cell on RF channel number 2.  Continuous monitoring of primary cell CQI reporting for SCell every second
Normal OFF 0	RF channel number 2.  Continuous monitoring of primary cell CQI reporting for SCell every second
OFF 0	CQI reporting for SCell every second
0	CQI reporting for SCell every second
-	
320	
0	
≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
100	During this time the PCell shall be known and the SCell configured, but not dectected.
1	During this time the UE shall activate the SCell.
1	During this time the UE shall deactivate the SCell.
	specified in 3GPP TS 36.104 [30] clause 6.5.3.1.  100

Table A.8.16.19.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel			1		2		
Number			ı				
BW <sub>channel</sub>	MHz		10			10	
OCNG Patterns							
defined in A.3.2.1.1		(	OP.1 FDD		(	OP.2 FDD	
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB	0 0					
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						

N <sub>oc</sub> Note 2	dBm/15 kHz	-104		-104		
RSRP Note 3	dBm/15 kHz	-87	-infinity	-87		
Ê <sub>s</sub> /I <sub>ot</sub>	dB	17	-infinity	17		
SCH_RP Note 3	dBm/15 kHz	-87	-infinity	-87		
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	-infinity	17		
Propagation Condition		AWGN				

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Nos to be fulfilled.
- Note 3: Es/lot, RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

## A.8.16.19.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell1 deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay to be counted as correct. The rate of correct observed SCell activation and deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+34) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

## A.8.16.19A E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX for 20MHz

#### A.8.16.19A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.19. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.19A.1-1 and A.8.16.19A.1-2 will replace the values of corresponding parameters in Tables A.8.16.19.1-1 and A.8.16.19.1-2.

Table A.8.16.19A.1-1: General test parameters for unknown SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.1
		Channel R.6 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.3.1.2.1
parameters		Channel R.10 FDD	

Table A.8.16.19A.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation, 20MHz bandwidth

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	Т3	T1	T2	Т3	
BW <sub>channel</sub>	MHz	20			20			
OCNG Patterns defined in A.3.2.1.17 (OP.17 FDD) and in A.3.2.1.12 (OP.12		(	OP.17 FDD		OP.12.FDD			
FDD)								

## A.8.16.19A.2 Test Requirements

The test requirements defined in section A.8.16.19.2 shall apply to this test case.

# A.8.16.19B E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX for 10MHz + 5MHz

## A.8.16.19B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.19. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.19B.1-1 and A.8.16.19B.1-2 will replace the values of corresponding parameters in Tables A.8.16.19.1-1 and A.8.16.19.1-2.

Table A.8.16.19B.1-1: General test parameters for unknown SCell activation case, 10+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.1
		Channel R.3 FDD (Cell 1)	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.3.1.2.1
parameters		Channel R.6 FDD (Cell 1)	
		DL Reference Measurement	
		Channel R.11 FDD (Cell 2)	

Table A.8.16.19B.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation, 10+5MHz bandwidth

Parameter	Unit		Cell 1			Cell 2			
		T1	T2	T3	T1	T2	T3		
BW <sub>channel</sub>	MHz	10			5				
OCNG Patterns									
defined in A.3.2.1.11		OP.10 FDD			OP.16.FDD				
(OP.11 FDD) and in									
A.3.2.1.16 (OP.16									
FDD)									

### A.8.16.19B.2 Test Requirements

The test requirements defined in section A.8.16.19.2 shall apply to this test case.

# A.8.16.19C E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX for 5MHz + 5MHz

## A.8.16.19C.1Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.19. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.19C.1-1 and A.8.16.19C.1-2 will replace the values of corresponding parameters in Tables A.8.16.19.1-1 and A.8.16.19.1-2.

Table A.8.16.19C.1-1: General test parameters for unknown SCell activation case, 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.1
		Channel R.7 FDD (Cell 1)	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.3.1.2.1
parameters		Channel R.11 FDD	

Table A.8.16.19C.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation, 5+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	Т3	T1	T2	T3
BW <sub>channel</sub>	MHz	5			5		
OCNG Patterns							
defined in A.3.2.1.15		OP.20 FDD			OP.16.FDD		
(OP.15 FDD) and in							
A.3.2.1.16 (OP.16							
FDD)							

## A.8.16.19C.2Test Requirements

The test requirements defined in section A.8.16.19.2 shall apply to this test case.

## A.8.16.20 E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX

## A.8.16.20.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.20.1-1 and cell-specific parameters in A.8.16.20.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Cell 1 has constant signal level throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (cell2) becomes configured on radio channel 2 (SCC). During T1 the signal level of SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m, where m is 4 or 9. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 2 is increased to same level as for cell 1. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+34) provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+11).

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+11).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.20.1-1: General test parameters for unknown SCell activation case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every UL subframe
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	μs	0	
Time alignment error between cell2 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1	μs	3	Synchronous cells
T1	ms	100	During this time the PCell shall be known and the SCell configured, but not dectected.
T2	S	1	During this time the UE shall activate the SCell.
T3	S	1	During this time the UE shall deactivate the SCell.

to the principle defined in section A.3.6.1.

Table A.8.16.20.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation

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Parameter	Unit	Cell 1				Cell 2		
		T1 T2 T3			T1	T2	T3	
E-UTRA RF Channel			1		2			
Number			·					
BW <sub>channel</sub>	MHz		10			10		
OCNG Patterns								
defined in A.3.2.2.1		(	OP.1 TDD		(	OP.2 TDD		
(OP.1 TDD) and in								
A.3.2.2.2 (OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB				0			
PHICH_RA	dB							
PHICH_RB	dB		0					
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Noc Note 2	dBm/15 kHz	-104				-104		
RSRP Note 3	dBm/15 kHz		-87		-infinity	-8	7	
Ê <sub>s</sub> /I <sub>ot</sub>	dB		17		-infinity	17	7	
SCH_RP Note 3	dBm/15 kHz		-87		-infinity	-8	7	
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17			-infinity	17	7	
Propagation Condition		AWGN						

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Interference from other cells and noise sources not specified in the test is assumed to be Note 2: constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Es/lot, RSRP and SCH\_RP levels have been derived from other parameters for Note 3: information purposes. They are not settable parameters themselves.
- Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

#### A.8.16.20.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframes (m+8) and (m+9) were subject to interruption when an intra-band SCell is activated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+11).

During T3 interruption of PCell during SCell1 deactivation shall not happen outside the subframes (n+5) to (n+11).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay to be counted as correct. The rate of correct observed SCell activation and deactivation delay during repeated tests shall be at least 90%.

During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+34) then the UE shall use the NOTE: next available uplink resource for reporting the corresponding valid CSI.

## A.8.16.20A E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 20MHz

## A.8.16.20A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20A.1-1 and A.8.16.20A.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20A.1-1: General test parameters for unknown SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2

Table A.8.16.20A.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 20MHz bandwidth

Parameter	Unit	Cell 1 Cell 2					
		T1	T2	T3	T1	T2	T3
BW <sub>channel</sub>	MHz		20 20				
OCNG Patterns							
defined in A.3.2.2.7			OP.7 TDD			OP.2.TDD	
(OP.7 TDD) and in							
A.3.2.2.2 (OP.2 TDD)							

## A.8.16.20A.2 Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

# A.8.16.20B E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 10MHz + 5MHz

## A.8.16.20B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20B.1-1 and A.8.16.20B.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20B.1-1: General test parameters for unknown SCell activation case, 10 + 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.3.1.1.2
, and the second		Channel R.0 TDD	As specified in section A.S. 1.1.2
PCFICH/PDCCH/PHICH		DL Reference Measurement	
parameters		Channel R.6 TDD (cell 1)	As specified in section A.3.1.2.2
		DL Reference Measurement	As specified in section A.S. 1.2.2
		Channel R.12 TDD (cell 2)	

Table A.8.16.20B.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 10 + 5MHz bandwidth

Parameter	Unit		Cell 1		Cell 2				
		T1	T2	T3	T1	T2	T3		
BW <sub>channel</sub>	MHz		10		5				
OCNG Patterns									
defined in A.3.2.2.1			OP.1 TDD			P.10.TDD			
(OP.1 TDD) and in									
A.3.2.2.10 (OP.10									
TDD)									

## A.8.16.20B.2 Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

## A.8.16.20C E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 5MHz + 5MHz

## A.8.16.20C.1Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20C.1-1 and A.8.16.20C.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20C.1-1: General test parameters for unknown SCell activation case, 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2

Table A.8.16.20C.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2			
		T1	T2	T1	T2	T3		
BW <sub>channel</sub>	MHz		5		5			
OCNG Patterns defined in A.3.2.2.9		OP.9 TDD			OP.10.TDD			
(OP.9 TDD) and in A.3.2.2.10 (OP.10								
TDD)								

### A.8.16.20C.2Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

## A.8.16.20D E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 20MHz + 10MHz

#### A.8.16.20D.1Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20D.1-1 and A.8.16.20D.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20D.1-1: General test parameters for unknown SCell activation case, 20 + 10MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD (cell 1) DL Reference Measurement Channel R.6 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.20D.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 10 + 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2			
		T1 T2 T3 T1 T2				T2	T3	
BW <sub>channel</sub>	MHz		20		10			
OCNG Patterns								
defined in A.3.2.2.7			OP.7 TDD		(	OP.2.TDD		
(OP.7 TDD) and in								
À.3.2.2.2 (ÓP.2 TDD)								

## A.8.16.20D.2Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

## A.8.16.21 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz

## A.8.16.21.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.21.1-1 and A.8.16.21.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.21.1-1: E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz

	Parameter	Unit	Value	Comment
	nel bandwidth for cells imary carrier (BW <sub>channel</sub> )	MHz	20	Channel bandwidth for cells on primary component carrier
	CH parameters for cells imary carriers		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
parar	neters for cells on		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
on se	condary carriers	MHz	10	Channel bandwidth for cells on secondary component carrier
			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
parar	neters for cells on		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
A2	CFICH/PDCCH/PHICH arameters for cells on imary carriers hannel bandwidth for cells in secondary carriers When by the parameters for cells in secondary carrier CFICH/PDCCH/PHICH arameters for cells on econdary carrier Hysteresis  Threshold RSRP  MHENDER MARINE M	dBm	-96	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	S	0	

Note 1: See Table A.8.16.2.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.21.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz

Parameter	Unit		Cell 1		Cell 2			Cell 3		
		T1	T2	Т3	T1	T2	Т3	T1	T2	Т3
BW <sub>channel</sub>	MHz		20			10		10		
OCNG Patterns										
defined in A.3.2.2.7		(	OP.7 TDD		(	OP.2 TDD		О	P.2 TDD	
(OP.7 TDD) and in										
A.3.2.2.2 (OP.2 TDD)										
N <sub>oc</sub> Note 2	dBm/15 kHz		-104				-10	)4		
RSRP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19.00	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3
Note: See Table A.8	3.16.2.1-2 for oth	er cell-spe	cific test pa	arameters	S.	•	·			

#### A.8.16.21.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

# A.8.16.22 E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz

## A.8.16.22.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.22.1-1 and A.8.16.22.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.22.1-1: General test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carrier (BW <sub>channel</sub> )	MHz	20	Channel bandwidth for cells on primary component carrier
PDSCH parameters for cells on primary carriers		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on primary carriers		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Channel bandwidth for cells on secondary carriers (BW <sub>channel</sub> )	MHz	10	Channel bandwidth for cells on secondary component carrier
PDSCH parameters for cells on secondary carrier		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2

Note 1: See Table A.8.16.4.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according

to the principle defined in section A.3.6.1.

Table A.8.16.22.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz

Parameter	Unit	Cell 1		С	ell 2	Cell 3	
		T1	T2	T1 T2		T1 T	
BW <sub>channel</sub>	MHz	20		10		10	
OCNG Patterns defined in A.3.2.2		OP.	7 TDD	OP.	2 TDD	OP.2	TDD
Note: See Table A.8.1	6.4.1-2 for oth	er cell-spe	ecific test pa	arameter	S.		

### A.8.16.22.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

## A.8.16.23 E-UTRAN TDD-FDD CA Event Triggered Reporting Under Deactivated SCell in Non-DRX with PCell in FDD

### A.8.16.23.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in FDD the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements for SCell stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2.

In this test case there are 3 cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the PCell on the FDD primary component carrier, Cell 2 is the configured and deactivated SCell on the TDD secondary component carrier, and Cell 3 is the neighbor cell on the TDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At the beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

The test parameters are given in Table A.8.16.23.1-1 and A.8.16.23.1-2 below.

Table A.8.16.23.1-1: General test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in FDD

	Parameter	Unit	Value	Comment
E-UT	RA RF Channel		1, 2	Two radio channels are used for this test
Num	ber		·	
	e PCell		Cell 1	Primary cell on RF channel number 1.
Conf	igured deactivated		Cell 2	Configured deactivated secondary cell on
	SCell		Cell 2	RF channel number 2.
Neig	hbour cell		Cell 3	Neighbor cell to be identified on RF
			Cell 3	channel number 2.
	ength		Normal	
	cial subframe		6	As specified in table 4.2-1 in TS 36.211.
	guration		<u> </u>	The same configuration in TDD cells
	k-downlink		1	As specified in table 4.2-2 in TS 36.211.
	guration		•	The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm		Actual RSRP threshold for event A2.
			-98	Needs to take absolute accuracy tolerance
			-90	in clause 9.1.11.1 into account plus
				margin.
	Time To Trigger	S	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB		Offset parameter for evaluation of event
			-6	A6. Needs to take relative accuracy
			-0	tolerance in clause 9.1.11.2 into account
				plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	individual offset for cells	dB	0	Individual offset for cells on primary
	F channel number 1		O .	component carrier.
Cell-	individual offset for cells	dB	0	Individual offset for cells on secondary
on R	F channel number 2		O	component carrier.
Filter	coefficient		0	L3 filtering is not used
SCel	SCell measurement cycle		220	
	sCycleSCell)		320	
T1	,	S	E	During this time the UE shall be aware of
			5	cells 1 and 2 but not cell 3.
T2		S	z10	UE shall report Event A6 within 6.4s
			≤12	(20xscellMeasCycle)
T3		S	E	UE shall report Event A2 within 200 ms
			5	and 1.6s for cells 1 and 2, respectively.

Table A.8.16.23.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in FDD

Parameter	Unit		Cell 1			Cell 2			Cell	3	
		T1	T2	T3	T1	T2	Т3	T1	T2	T3	
E-UTRA RF											
Channel			1					2			
Number					5181 11 25						
BW <sub>channel</sub>			Hz: N <sub>RB,c</sub> =		5MHz: N <sub>RB,c</sub> = 25						
			1Hz: N <sub>RB,c</sub> =					$N_{RB,c} = 50$			
77.0011			Hz: N <sub>RB,c</sub> =				20MHz:	$N_{RB,c} = 10$	0		
PDSCH		_	1Hz: R.5 FI								
parameters: DL Reference			ИHz: R.0 F ИHz: R.4 F								
Measurement		201	VINZ. N.4 F	טט		-			-		
Channel											
PCFICH/PDCC		5M	Hz: R.11 F	DD	5M	Hz: R.11 T	DD	5	MHz: R.1	1 TDD	
H/PHICH			л <u>г</u> . т. т. т. ИНz: R.6 F			<u></u> ИНz: R.6 Т			0MHz: R		
parameters:		_	1Hz: R.10 F		-	1Hz: R.10			)MHz: R.		
DL Reference											
Measurement											
Channel											
OCNG Patterns			lz: OP.15 l			tz: OP.10			/IHz: OP.		
defined			IHz: OP.1 I		-	1Hz: OP.2			MHz: OF		
DDOLL DA	15	20M	Hz: OP.11	רטט	20N	1Hz: OP.8	טטו	20	MHz: OF	מטו 8.י	
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB dB		0			0			0		
PHICH_RB PDCCH_RA	dВ		U			U			0		
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG RB <sup>Note 1</sup>	dB										
Noc Note 2	dBm/15		-104		-104						
	kHz										
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17	-3	17	17	-3	-infinity	17	-3	
Ê <sub>s</sub> /I <sub>ot</sub>	dB	17	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76	
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107	
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107	
lo Note 3	dBm/Ch	-59.13	-59.13	-74.45	-59.17	-56.13	-73.20				
	BW	+10log	+10log	+10log	+10log	+10log	+10log	Specifie	d in colu	mns for Cell 2	
		(N <sub>RB,c</sub>	$(N_{RB,c}$	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	Specifie	u III colul	IIIIS IOI CEII Z	
		/50)	/50)	/50)	(50) (50) (50) (50)						
Propagation Condition			AWGN		ETU70 ETU70						
Correlation			1x2 Low			1x2 Low			1x2 L	OW	
Matrix and											
Antenna											
Configuration					-						
Timing offset to Cell 1	μs		-		0			3			
Time alignment error relative to cell 1 Note 5	μs		-			≤TAE			N/A		

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.23.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for Cell 3with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.A.8.16.24 E-UTRAN TDD-FDD CA Event Triggered Reporting Under Deactivated SCell in Non-DRX with PCell in TDD

#### A.8.16.24.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in TDD the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements for SCell stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2.

In this test case there are 3 cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the PCell on the TDD primary component carrier, Cell 2 is the configured and deactivated SCell on the FDD secondary component carrier, and Cell 3 is the neighbor cell on the FDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At the beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

The test parameters are given in Table A.8.16.24.1-1 and Table A.8.16.24.1-2.

Table A.8.16.24.1-1: General test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in TDD

	Parameter	Unit	Value	Comment
E-UT	RA RF Channel		1, 2	Two radio channels are used for this test
Num	ber		•	
	e PCell		Cell 1	Primary cell on RF channel number 1.
Conf	igured deactivated		Cell 2	Configured deactivated secondary cell on
SCel			Cell 2	RF channel number 2.
Neig	hbour cell		Cell 3	Neighbor cell to be identified on RF
				channel number 2.
	ength		Normal	
	cial subframe		6	As specified in table 4.2-1 in TS 36.211.
	guration			
	k-downlink		1	As specified in table 4.2-2 in TS 36.211.
	guration		-	
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm		Actual RSRP threshold for event A2.
			-98	Needs to take absolute accuracy tolerance
			00	in clause 9.1.11.1 into account plus
				margin.
	Time To Trigger	S	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB		Offset parameter for evaluation of event
			-6	A6. Needs to take relative accuracy
			-0	tolerance in clause 9.1.11.2 into account
				plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	individual offset for cells	dB	0	Individual offset for cells on primary
	F channel number 1		O .	component carrier.
Cell-	individual offset for cells	dB	0	Individual offset for cells on secondary
on R	F channel number 2		O	component carrier.
Filter	coefficient		0	L3 filtering is not used
SCel	I measurement cycle	ms	220	
	sCycleSCell)		320	
Ť1	,	S	E	During this time the UE shall be aware of
			5	cells 1 and 2 but not cell 3.
T2		S	≤12	UE shall report Event A6 within 6.4s
			S12	(20×scellMeasCycle)
T3		S	E	UE shall report Event A2 within 200 ms
		1	5	and 1.6s for cells 1 and 2, respectively.

Table A.8.16.24.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in TDD

Parameter	Unit		Cell 1			Cell 2		Cell 3			
		T1	T2	T3	T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel Number			1				2				
BW <sub>channel</sub>		101	1Hz: N <sub>RB,c</sub> = MHz: N <sub>RB,c</sub> = 1Hz: N <sub>RB,c</sub> =	= 50	$5MHz: N_{RB,c} = 25$ $10MHz: N_{RB,c} = 50$ $20MHz: N_{RB,c} = 100$						
PDSCH			<u>птг. тчкв,с –</u> ИНz: R.4 Т[				ZUIVII IZ. INRI	3,c = 100			
parameters: DL Reference Measurement Channel		10	MHz: R.0 T MHz: R.3 T	DD		-			-		
PCFICH/PDCCH/ PHICH			1Hz: R.11 T MHz: R.6 T			MHz: R.11 F			z: R.11 F Hz: R.6 F		
parameters: DL Reference Measurement Channel			МНz: R.10 Т			10MHz: R.6 FDD 20MHz: R.10 FDD			lz: R.10 F		
OCNG Patterns defined		101	IHz: OP.9 T MHz: OP.1	ΓDD	101	Hz: OP.16 F MHz: OP.2 F	DD	10MF	z: OP.16 I Iz: OP.2 I	FDD	
PBCH_RA	dB	∠∪\\	//Hz: OP.7	טטו	∠UIV	IHz: OP.12	רטט	∠UIVIH	z: OP.12	רטט	
PBCH_RB	dB	1									
PSS_RA	dB										
SSS_RA	dB	}									
PCFICH_RB	dB	1									
PHICH_RA	dB	}									
PHICH_RB	dB		0			0			0		
PDCCH_RA	dB	1	Ü			Ü			J		
PDCCH_RB	dB	ł									
PDSCH_RA	dB	1									
PDSCH RB	dB	1									
OCNG_RA <sup>Note 1</sup>	dB										
OCNG RR <sup>Note 1</sup>	dB										
N <sub>oc</sub> Note 2	dBm/15 kHz		-104		-10			4			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17	-3	17	17	-3	-infinity	17	-3	
Ês/lot	dB	17	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76	
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107	
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107	
lo Note 3	dBm/Ch BW				Specified in columns for Cell 2						
Propagation Condition			AWGN			ETU70			ETU70		
Correlation Matrix and Antenna Configuration			1x2 Low		1x2 Low			1x2 Low			
Timing offset to Cell 1	μs		-		0			3			
Time alignment error relative to cell 1 Note 5	μs		-			≤TAE		N/A			
Note 1: OCNG s	hall be use	d cuch that	all colle are	fully alloca	tod and a co	netant total	transmittae	I nower che	ctral dans	sity ic	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

#### A.8.16.24.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 3 with a measurement reporting delay of less than 6.4s ( $20 \times$  measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.A.8.16.25 E-UTRAN TDD-FDD CA Event triggered reporting on deactivated SCell with PCell interruption in non-DRX with PCell in FDD

#### A.8.16.25.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in FDD the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2 while at the same time fulfilling the requirement on interruption rate.

In this test case there are three cells: Cell1, Cell2 and Cell3. Cell 1 is the PCell on the FDD primary component carrier, Cell 2 is the configured and deactivated SCell on the TDD secondary component carrier, and Cell 3 is the neighbor cell on the TDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

The test parameters are given in Table A.8.16.25.1-1 and A.8.16.25.1-2 below.

Table A.8.16.25.1-1: General test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in FDD

	Parameter	Unit	Value	Comment
E-UT Numb	RA RF Channel per		1, 2	Two radio channels are used for this test
Active	e PCell		Cell 1	Primary cell on RF channel number 1.
SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neigh	nbour cell		Cell 3	Neighbor cell to be identified on RF channel number 2.
CP le	ngth		Normal	
	ial subframe guration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in TDD cells
	k-downlink guration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	ndividual offset for cells channel number 1	dB	0	Individual offset for cells on primary component carrier.
	ndividual offset for cells channel number 2	dB	0	Individual offset for cells on secondary component carrier.
Filter	coefficient		0	L3 filtering is not used
	SCell measurement cycle (measCycleSCell)		1280	
Ť1		S	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		S	≤30	UE shall report Event A6 within 25.6s (20xscellMeasCycle)

Table A.8.16.25.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in FDD

Parameter	Unit	Се	II 1	Ce	ell 2	Cell 3		
		T1	T2	T1	T2	T1	T2	
E-UTRA RF		,	1		2			
Channel Number						05		
BW <sub>channel</sub>			I <sub>RB,c</sub> = 25		5MHz: N <sub>RE</sub>			
			$N_{RB,c} = 50$		10MHz: N <sub>R</sub>			
DDCCII			I <sub>RB,c</sub> = 100		20MHz: N <sub>RE</sub>	<sub>3,c</sub> = 100		
PDSCH			R.5 FDD R.0 FDD					
parameters: DL Reference			R.4 FDD		_	_		
Measurement		ZUIVII IZ.	11.4100		-			
Channel								
PCFICH/PDCCH/		5MHz· R	.11 FDD	5MHz: R	R.11 TDD	5MHz: R	11 TDD	
PHICH			R.6 FDD		R.6 TDD	10MHz:		
parameters:			R.10 FDD		R.10 TDD	20MHz: F		
DL Reference		20111112.1	(.10100	20111112.1	1.10 100	20111112.1		
Measurement								
Channel								
OCNG Patterns		5MHz: OI	P.20 FDD	5MHz: O	P.10 TDD	5MHz: OF	P.10 TDD	
defined			P.10 FDD		OP.2 TDD	10MHz: C		
			P.17 FDD		OP.8 TDD	20MHz: C		
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB	(	)		0	C	)	
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
N <sub>oc</sub> <sup>Note 2</sup>	dBm/15	-1	01		-101	1		
	kHz							
Ê <sub>s</sub> /N <sub>oc</sub>	dB	16	16	16	16	-infinity	16	
Ê <sub>s</sub> /I <sub>ot</sub>	dB	16	16	16	-0.11	-infinity	-0.11	
RSRP Note 3	dBm/15	-85	-85	-85	-85	-infinity	-85	
Naia 0	kHz							
SCH_RP Note 3	dBm/15	-85	-85	-85	-85	-infinity	-85	
Note 3	kHz							
lo Note 3	dBm/Ch	-57.11	-57.11	-57.11	-54.15	Specified in	columns for	
	BW	+10log	+10log	+10log	+10log	Ce		
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)			
Propagation Condition		AW	GN	AW	/GN	AW	GN	
Condition Correlation Matrix		4,01		120	Low	1x2	Low	
and Antenna		1x2 Low		1XZ	Low	1 1 1 2	LUW	
Configuration								
Timing offset to	116		-		0	3	<u> </u>	
Cell 1	μs	•	=		J		,	
Time alignment	116		<u> </u>	< T	AE	N/	'Α	
error relative to	μs			]	/ \L	IN/	, ,	
cell 1 Note 5								
	hall be used	such that all cel	ls are fully allocat	ted and a constar	nt total transmitted	power spectral	density is	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.25.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 3, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.A.8.16.26 E-UTRAN TDD-FDD CA Event triggered reporting on deactivated SCell with PCell interruption in non-DRX with PCell in TDD

#### A.8.16.26.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in TDD the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2 while at the same time fulfilling the requirement on interruption rate.

In this test case there are three cells: Cell1, Cell2 and Cell3. Cell 1 is the PCell on the TDD primary component carrier, Cell 2 is the configured and deactivated SCell on the FDD secondary component carrier, and Cell 3 is the neighbor cell on the FDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

The test parameters are given in Table A.8.16.26.1-1 and Table A.8.16.26.1-2 below.

Table A.8.16.26.1-1: General test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in TDD

	Parameter	Unit	Value	Comment
E-UT Numl	RA RF Channel ber		1, 2	Two radio channels are used for this test
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.
SCel			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neigl	nbour cell		Cell 3	Neighbor cell to be identified on RF channel number 2.
CP le	ength		Normal	
	ial subframe guration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in TDD cells
	k-downlink guration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	ndividual offset for cells F channel number 1	dB	0	Individual offset for cells on primary component carrier.
	ndividual offset for cells F channel number 2	dB	0	Individual offset for cells on secondary component carrier.
Filter	coefficient		0	L3 filtering is not used
	I measurement cycle sCycleSCell)	ms	1280	
Ť1	•	s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤30	UE shall report Event A6 within 25.6s (20xscellMeasCycle)

Table A.8.16.26.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in TDD

Parameter	Unit	Се	II 1	Ce	ell 2	Cell 3		
		T1	T2	T1	T2	T1	T2	
E-UTRA RF			1		2			
Channel Number								
BW <sub>channel</sub>			I <sub>RB,c</sub> = 25	5MHz: N <sub>RB,c</sub> = 25				
			$N_{RB,c} = 50$		10MHz: N <sub>R</sub>			
			$I_{RB,c} = 100$		20MHz: N <sub>R</sub>	<sub>B,c</sub> = 100		
PDSCH			R.4 TDD					
parameters:			R.0 TDD					
DL Reference		ZUIVIHZ:	R.3 TDD		-	•	•	
Measurement Channel								
PCFICH/PDCCH/		5M⊔→ D	2.11 TDD	5M⊔ E	R.11 FDD	5MHz: R	11 EDD	
PHICH			R.6 TDD		R.6 FDD		R.6 FDD	
parameters:			R.10 TDD		R.10 FDD		R.10 FDD	
DL Reference		201011 12. 1	V. 10 100	201011 12.	IX.101 DD	201011 12. 1	(.101 DD	
Measurement								
Channel								
OCNG Patterns		5MHz: C	P.9 TDD	5MHz: O	P.16 FDD	5MHz: OF	P.16 FDD	
defined			OP.1 TDD		OP.2 FDD	10MHz: C		
			OP.7 TDD		P.12 FDD	20MHz: O		
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB	(	)		0	(	)	
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Noc Note 2	dBm/15	-1	01		-101	1		
	kHz							
Ê <sub>s</sub> /N <sub>oc</sub>	dB	16	16	16	16	-infinity	16	
Ês/I <sub>ot</sub>	dB	16	16	16	-0.11	-infinity	-0.11	
RSRP Note 3	dBm/15	-85	-85	-85	-85	-infinity	-85	
· · Note 3	kHz							
SCH_RP Note 3	dBm/15	-85	-85	-85	-85	-infinity	-85	
lo Note 3	kHz	==	==	== 11				
10	dBm/Ch	-57.11	-57.11	-57.11	-54.15	Specified in	columns for	
	BW	+10log	+10log	+10log	+10log	Ce		
Dranagation		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50) /GN	AW	CN	
Propagation Condition		AWGN		AW	/GN	Avv	GIN	
Correlation Matrix		1v2	Low	1v2	Low	1x2	Low	
and Antenna		١Х∠	LOW	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LUW	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LUW	
Configuration								
Timing offset to	μs				0		3	
Cell 1	μδ	,			O .	`	,	
Time alignment	μs		-	< 7	ГАЕ	N,	/Δ	
error relative to	μδ			]	· / \_		, ,	
cell 1 Note 5								
	hall be used	d such that all ce	lls are fully alloca	ted and a constar	nt total transmitted	power spectra	I density is	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.26.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 3, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.A.8.16.27 3 DL PCell in FDD CA Event Triggered Reporting with 2 Deactivated SCells in Non-DRX

#### A.8.16.27.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.27.1-1 and A.8.16.27.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (for only SCell1 i.e. cell2), A2 (PCell and SCells) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. At the beginning of T2 the transmission power of cell 4 is increased to the same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. Also, at the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, which shall result in reporting of Event A1. At the beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for Cell 1, for Cell 2 and for Cell 3.

Table A.8.16.27.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in FDD

	Parameter	Unit	Value	Comment		
E-UT	RA RF Channel Number		1, 2, 3	Three radio channels are used for this test		
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.		
Conf	gurad dagativated CCall		Cell 2	Configured deactivated secondary cell on RF		
Coni	gured deactivated SCell		Cell 2	channel number 2.		
Conf	gured deactivated SCell		Cell 3	Configured deactivated secondary cell on RF		
Con	gured deactivated Scell		Cell 3	channel number 3.		
Naial	nbour cell		Cell 4	Neighbour cell to be identified on RF channel		
				number 3.		
CP le	ength		Normal			
DRX			OFF	Continuous monitoring of primary cell		
				As specified in table 4.2-1 in TS 36.211. The		
Spec	ial subframe configuration		6	same configuration applies to all TDD cells		
				(cell2, cell3 and cell4).		
				As specified in table 4.2-2 in TS 36.211. The		
Uplin	k-downlink configuration		1	same configuration applies to all TDD cells		
				(cell2, cell3 and cell4).		
	Hysteresis	dB	0	Hysteresis for evaluation of event A1.		
				Actual RSRP threshold for event A1. Needs to		
A1	Threshold RSRP	dBm	-98	take absolute accuracy tolerance in section		
				9.1.11.1 into account plus margin.		
	Time To Trigger	S	0			
	Hysteresis	dB	0	Hysteresis for evaluation of event A2.		
				Actual RSRP threshold for event A2. Needs to		
A2	Threshold RSRP	dBm	-98	take absolute accuracy tolerance in section		
				9.1.11.1 into account plus margin.		
	Time To Trigger	S	0			
	Hysteresis	dB	0	Hysteresis for evaluation of event A6.		
	<b>2</b> "			Offset parameter for evaluation of event A6.		
A6	Offset	dB	-6	Needs to take relative accuracy tolerance in		
Α0				section 9.1.11.2 into account plus margin.		
	Report on leave		False			
	Time To Trigger	S	0			
	ndividual offset for cells on	dB	0	Individual offset for cells on primary component		
	nannel number 1	uD	0	carrier.		
	ndividual offset for cells on	dB	0	Individual offset for cells on secondary		
	nannel number 2	uD		component carrier.		
	ndividual offset for cells on	dB	0	Individual offset for cells on secondary		
	nannel number 3	uD.		component carrier.		
	coefficient		0	L3 filtering is not used		
	measurement cycle	ms	320			
(mea	sCycleSCell)	1113	020			
				During this time the cell1 and cell3 shall be		
T1		S	5	known to the UE; but cell2 and cell 4 shall be		
				unknown to the UE.		
T2		s	≤12	UE should report Event A1 for cell2 and event		
14		3	212	A6 for cell4 within 6.4s (20xscellMeasCycle)		
Т3		s	5	UE should report Event A2 within 200 ms. 1.6s,		
13		3	3	and 1.6s for cells 1, 2 and 3, respectively.		

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Table A.8.16.27.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in FDD

Parameter	Unit		Cell 1			Cell 2			Cell 3		Cell 4		
		T1	T2	Т3	T1	T2	Т3	T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel			1			2					3		
Number													
BW <sub>channel</sub>			Hz: N <sub>RB,c</sub> =			Hz: N <sub>RB,c</sub> =					I <sub>RB,c</sub> = 25		
			10MHz: $N_{RB,c} = 50$		10MHz: $N_{RB,c} = 50$					$N_{RB,c} = 50$			
			Hz: N <sub>RB,c</sub> =		20M	Hz: N <sub>RB,c</sub> =	= 100			20MHz: N	$N_{RB,c} = 100$		
PDSCH parameters:		5MHz: R.5 FDD				-		-				-	
DL Reference		_	/Hz: R.0 F										
Measurement		201	/IHz: R.4 F	-טט									
Channel PCFICH/PDCCH/PHI		ENA	U-, D 44 F	חח	ENA	Hz: R.11 T	-DD	ENA	Hz: R.11 T	TDD.	EMI	Hz: R.11 T	.DD
CH parameters:		5MHz: R.11 FDD 10MHz: R.6 FDD				пz. к.тт. ИHz: R.6 Т			пz. к.тт. ИНz: R.6 Т			¬2. к. г. г ИНz: R.6 Т	
DL Reference			IHz: R.10			IHz: R.10			1Hz: R.10			Hz: R.10	
Measurement		2010	11 12. 13.10	ו טט	2010	11 12. 11. 10	טטו	2010	11 12. 11. 10	טטו	20101	112. 11.10	טטו
Channel													
OCNG Patterns		5M⊢	lz: OP.15	FDD	5ME	lz: OP.10	TDD	5MF	lz: OP.10	TDD	5MH	z: OP.10	TDD
			Hz: OP.1		10MHz: OP.2 TDD			10MHz: OP.2 TDD			10MHz: OP.2 TDD		
			Hz: OP.11		20MHz: OP.8 TDD 20MHz: OP.8 TDD				Hz: OP.8				
PBCH_RA	dB												
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PCFICH_RB	dB												
PHICH_RA	dB												
PHICH_RB	dB		0		0			0			0		
PDCCH_RA	dB												
PDCCH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA <sup>Note 1</sup>	dB												
OCNG_RB <sup>Note 1</sup> N <sub>oc</sub> Note 2	dB		404			404					0.4		
	dBm/15 KHz	47	-104		: f::t	-104		47	47		04	47	0
Ê <sub>s</sub> /N <sub>oc</sub> Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB dB	17 17	17 17	-3 -3	-infinity	17 17	-3 -3	17 17	17 -0.09	-3 -4.76	-infinity	-0.09	-3 -4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-3 -107	-infinity -infinity	-87	-3 -107	-87	-0.09	-4.76	-infinity -infinity	-0.09 -87	-4.76 -107
SCH RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
lo Note 3	dBm/Ch BW	-59.13	-59.13	-74.45	-76.22	-59.13	-74.45	-59.13	-56.17	-73.20	-11111111111111111111111111111111111111	-01	-101
10	dDill, Oli DVV	+10log	+10log	+10log	+10log	+10log	+10log	+10log	+10log	+10loa	Specific	ed in colur	nns for
		(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	Сробии	Cell 3	
		/50)	/50)	/50)	/50)	/50)	/50)	/50)	/50)	/50)	0011 0		
Propagation Condition		,	AWGN	,	,	ETU70	,	,	ETU70	/		ETU70	

Correlation Matrix and		1x2	1x2 Low	1x2 Low	1x2 Low
Antenna Configuration					
Timing offset to Cell 1	μs	-	0	0	3
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	μs	-	-	≤TAE	N/A

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.27.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.16.28 3 DL PCell in TDD CA Event Triggered Reporting with 2 Deactivated SCells in Non-DRX

#### A.8.16.28.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.28.1-1 and A.8.16.28.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (for only SCell1 i.e. cell2), A2 (PCell and SCells) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. At the beginning of T2 the transmission power of cell 4 is increased to the same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. Also, at the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, which shall result in reporting of Event A1. At the beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for Cell 1, for Cell 2 and for Cell 3.

Table A.8.16.28.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in TDD

	Parameter	Unit	Value	Comment
E-UT	RA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.
Conf	igured deactivated SCell		Cell 2	Configured deactivated secondary cell on
				RF channel number 2.
Conf	Configured deactivated SCell		Cell 3	Configured deactivated secondary cell on
				RF channel number 3.
Neig	hbour cell		Cell 4	Neighbour cell to be identified on RF
05.1				channel number 3.
	ength		Normal	O antino con a mitaria no afronima a con a
DRX			OFF	Continuous monitoring of primary cell
Spec	cial subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
			б	The same configuration applies to TDD cell (cell1).
Unlin	k-downlink configuration			As specified in table 4.2-2 in TS 36.211.
Opin	ik-downlink configuration		1	The same configuration applies to TDD
				cell (cell1).
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1.
				Needs to take absolute accuracy tolerance
				in section 9.1.11.1 into account plus
				margin.
	Time To Trigger	S	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of events A1 A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for events A2.
				Needs to take absolute accuracy tolerance
				in section 9.1.11.1 into account plus
				margin.
	Time To Trigger	S	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event
				A6. Needs to take relative accuracy
				tolerance in section 9.1.11.2 into account
	Report on leave		False	plus margin.
	Time To Trigger	S	0	
Call-	individual offset for cells on	dB	0	Individual offset for cells on primary
	hannel number 1	ub	U	component carrier.
	individual offset for cells on	dB	0	Individual offset for cells on secondary
	hannel number 2	u.b	· ·	component carrier.
	individual offset for cells on	dB	0	Individual offset for cells on secondary
	hannel number 3		· ·	component carrier.
	coefficient		0	L3 filtering is not used
	I measurement cycle	ms	320	<u>y</u>
	(measCycleSCell)			
Ť1	•	S	5	During this time the cell1 and cell3 shall be
				known to the UE; but cell2 and cell 4 shall
				be unknown to the UE.
T2		S	≤12	UE should report Event A1 for cell2 and
				event A6 for cell4 within 6.4s
				(20xscellMeasCycle)
T3		S	5	UE should report Event A2 within 200 ms.
				1.6s, and 1.6s for cells 1, 2 and 3,
				respectively.

Table A.8.16.28.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3

#### DL CA event triggered reporting under fading propagation

conditions with 2 configured but deactivated SCells in non-DRX with PCell in TDD

Parameter	Unit		Cell 1		u <del>c</del> aciiva	Cell 2			Cell 3		Cell 4			
	-	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	Т3	
E-UTRA RF Channel			- 1	•		2			3					
Number			1			2					ა 			
BW <sub>channel</sub>		5MI	Hz: N <sub>RB,c</sub> =	= 25	5MI	Hz: N <sub>RB,c</sub> =	= 25			5MHz: N	$I_{RB,c} = 25$			
		10M	IHz: N <sub>RB,c</sub>	= 50	10M	IHz: N <sub>RB,c</sub> :	= 50			10MHz: I	$N_{RB,c} = 50$			
			Hz: N <sub>RB,c</sub> =		20MI	Hz: N <sub>RB,c</sub> =	= 100	20MHz: N <sub>RB,c</sub> = 100						
PDSCH parameters:			IHz: R.4 T			-			-			-		
DL Reference			//Hz: R.0 T											
Measurement		201	//Hz: R.3 T	TDD										
Channel														
PCFICH/PDCCH/PHI			Hz: R.11 T			Hz: R.11 F			Hz: R.11 F			Hz: R.11 F		
CH parameters:			//Hz: R.6 T			//Hz: R.6 F			⁄/Hz: R.6 F			1Hz: R.6 F		
DL Reference		20M	IHz: R.10	TDD	20M	IHz: R.10 l	FDD	20N	1Hz: R.10	FDD	20M	Hz: R.10	FDD	
Measurement														
Channel														
OCNG Patterns			Hz: OP.9 1			lz: OP.16			lz: OP.16			z: OP.16		
			Hz: OP.1			Hz: OP.2			Hz: OP.2			Hz: OP.2		
		20M	Hz: OP.7	TDD	20M	Hz: OP.12	FDD	20MI	Hz: OP.12	FDD	20MF	lz: OP.12	FDD	
PBCH_RA	dB													
PBCH_RB	dB													
PSS_RA	dB													
SSS_RA	dB													
PCFICH_RB	dB													
PHICH_RA	dB				1									
PHICH_RB	dB		0		0				0		0			
PDCCH_RA	dB													
PDCCH_RB	dB													
PDSCH_RA	dB													
PDSCH_RB	dB													
OCNG_RA <sup>Note 1</sup>	dB													
OCNG_RB <sup>Note 1</sup>	dB													
Noc Note 2	dBm/15 KHz		-104			-104					04			
F./N	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3	
Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76	
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107	
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107	
lo Note 3	dBm/Ch BW	-59.13	-59.13	-74.45	-76.22	-59.13	-74.45	-59.13	-56.17	-73.20				
		+10log	+10log	+10log										
		(N <sub>RB,c</sub>	$(N_{RB,c})$	( 112,0 (112,0 (112,0 (112,0 (112,0)) ( (112,0)(112,0 (112,0))) ( (112,0)(112,0)(112,0)(112,0)(112,0)(112,0)(112,0)(112,0)(112,			Cell 3							
		/50)	/50)	/50)	/50)	/50)	/50)	/50)	/50)	/50)				
Propagation Condition			AWGN			ETU70			ETU70		ETU70			

Correlation Matrix and Antenna Configuration		1x2	1x2 Low	1x2 Low	1x2 Low
Timing offset to Cell 1	μs	-	0	0	3
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	μs	-	-	≤ TAE	N/A

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.28.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.16.29 3 DL FDD CA Event Triggered Reporting under Deactivated SCells in Non-DRX

#### A.8.16.29.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects Events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.29.1-1 and A.8.16.29.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (SCell 1), Events A2 (PCell and SCell 1/2) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. Immediately at beginning of T2 the transmission power of cell 2 is increased above a threshold value such that this shall result in reporting of Event A1 for SCell 1, and cell 4 is increased to the same level as for Cell 3.Due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell 1/2, respectively.

Table A.8.16.29.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

	Parameter	Unit	Value	Comment
	RA RF Channel		1, 2, 3	Three radio channels are used for this test
Num				
	re PCell		Cell 1	Primary cell on RF channel number 1.
SCel	igured deactivated Il		Cell 2 (SCell 1)	Configured deactivated secondary cell 1 on RF channel number 2.
			Cell 3 (SCell 2)	Configured deactivated secondary cell 2 on RF channel number 3.
Neig	hbour cell		Cell 4	Neighbor cell to be identified on RF channel number 3.
CP I	ength		Normal	
DRX			OFF	Continuous monitoring of primary cell
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin. No event A1 reporting is configured for cell 1 and 3.
	Time To Trigger	S	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	S	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	individual offset for cells F channel number 1	dB	0	Individual offset for cells on primary component carrier.
	individual offset for cells F channel number 2	dB	0	Individual offset for cells on secondary component carrier 1.
Cell-	individual offset for cells F channel number 3	dB	0	Individual offset for cells on secondary component carrier 2.
	r coefficient		0	L3 filtering is not used
	Il measurement cycle asCycleSCell) for SCell d 2	ms	320	
T1		S	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		S	≤12	UE should report Event A1 within 1.6s (5xscellMeasCycle) UE should report Event A6 within 6.4s (20xscellMeasCycle)
Т3		S	5	UE should report Event A2 within 200 ms and 1.6s for cells 1, 2 and 3, respectively.

Table A.8.16.29.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit		Cell 1			Cell 2			Cell 3			Cell 4		
		T1	T2	Т3	T1	T2	Т3	T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			2					3			
Number														
BW <sub>channel</sub>			Hz: N <sub>RB,c</sub> =			Hz: N <sub>RB,c</sub> =					$N_{RB,c} = 25$			
			IHz: N <sub>RB,c</sub> :			IHz: N <sub>RB,c</sub>				10MHz: I				
			Hz: N <sub>RB,c</sub> =		20M	Hz: N <sub>RB,c</sub> =	= 100			20MHz: N	$I_{RB,c} = 100$			
PDSCH parameters:			IHz: R.5 F		-				-			-		
DL Reference			/IHz: R.0 F											
Measurement		201	/IHz: R.4 F	DD										
Channel														
PCFICH/PDCCH/PHI		5MI	Hz: R.11 F	DD	5MI	Hz: R.11 F	-DD	5M	Hz: R.11 F	-DD	5MI	Hz: R.11 F	-DD	
CH parameters:		101	/IHz: R.6 F	DD	101	/IHz: R.6 F	DD	101	⁄/Hz: R.6 F	-DD	10N	1Hz: R.6 F	FDD .	
DL Reference		20N	IHz: R.10 l	FDD	20N	IHz: R.10	FDD	20N	1Hz: R.10	FDD	20M	Hz: R.10	FDD	
Measurement														
Channel														
OCNG Patterns			lz: OP.15			lz: OP.16			lz: OP.16			z: OP.16		
			Hz: OP.1		10MHz: OP.2 FDD				IHz: OP.2			Hz: OP.2		
		20MI	Hz: OP.11	FDD	20MHz: OP.12 FDD			20MI	Hz: OP.12	FDD	20MF	1z: OP.12	FDD	
PBCH_RA	dB													
PBCH_RB	dB													
PSS_RA	dB													
SSS_RA	dB													
PCFICH_RB	dB													
PHICH_RA	dB													
PHICH_RB	dB		0			0			0			0		
PDCCH_RA	dB													
PDCCH_RB	dB													
PDSCH_RA	dB													
PDSCH RB	dB													
OCNG_RA <sup>Note 1</sup>	dB													
OCNG RB <sup>Note 1</sup>	dB													
Noc Note 2			-104			-104				-1	04			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3	
Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.05	-4.76	
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107	
SCH RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107	
lo Note 3	dBm/Ch BW									,				
•		+10log	+10log	+10log								mns for		
				Cell 3										
		/50) /50) /50) /50) /50)			/50)	/50)	/50)	/50)						

Propagation Condition		AWGN	ETU70	ETU70	ETU70
Correlation Matrix and		1x2	1x2 Low	1x2 Low	1x2 Low
Antenna Configuration					
Timing offset to Cell 1	μs	-	0	0	3
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	μs	-	-	≤ TAE	N/A

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3: Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.29.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6..4s (20×measCycleSCell) from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.16.30 3 DL TDD CA Event Triggered Reporting under Deactivated SCells in Non-DRX

#### A.8.16.30.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects Events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.30.1-1 and A.8.16.30.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (SCell 1), Events A2 (PCell and SCell 1/2) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. Immediately at beginning of T2 the transmission power of cell 2 is increased above a threshold value such that this shall result in reporting of Event A1 for SCell 1, and cell 4 is increased to the same level as for Cell 3.Due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell 1/2, respectively.

Table A.8.16.30.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

	Parameter	Unit	Value	Comment		
E-UT Num	RA RF Channel		1, 2, 3	Three radio channels are used for this test		
	e PCell		Cell 1	Primary cell on RF channel number 1.		
	gured deactivated		Cell 2 (SCell 1)	Configured deactivated secondary cell 1 on RF channel number 2.		
			Cell 3 (SCell 2)	Configured deactivated secondary cell 2 on RF channel number 3.		
Neigl	nbour cell		Cell 4	Neighbor cell to be identified on RF channel number 3.		
CP le	ength		Normal			
DRX			OFF	Continuous monitoring of primary cell		
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.		
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin. No event A1 reporting is configured for cell 1 and 3.		
	Time To Trigger	S	0	, in the second		
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.		
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.		
	Time To Trigger	S	0	Ĭ		
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.		
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.		
	Report on leave		False			
	Time To Trigger	S	0			
	ndividual offset for cells F channel number 1	dB	0	Individual offset for cells on primary component carrier.		
	ndividual offset for cells F channel number 2	dB	0	Individual offset for cells on secondary component carrier 1.		
	ndividual offset for cells F channel number 3	dB	0	Individual offset for cells on secondary component carrier 2.		
	coefficient		0	L3 filtering is not used		
	I measurement cycle sCycleSCell) for SCell I 2	ms	320			
T1		S	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.		
T2	T2		s		≤12	UE should report Event A1 within 1.6s (5xscellMeasCycle) UE should report Event A6 within 6.4s (20xscellMeasCycle)
Т3		S	5	UE should report Event A2 within 200 ms and 1.6s for cells 1, 2 and 3, respectively.		

Table A.8.16.30.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit		Cell 1			Cell 2			Cell 3			Cell 4		
		T1	T2	T3	T1	T2	Т3	T1	T2	Т3	T1	T2	T3	
E-UTRA RF Channel			1			2					3			
Number														
BW <sub>channel</sub>			Hz: N <sub>RB,c</sub> =			Hz: N <sub>RB,c</sub> =					$I_{RB,c} = 25$			
			IHz: N <sub>RB,c</sub>			IHz: N <sub>RB,c</sub>					$N_{RB,c} = 50$			
			$20MHz: N_{RB,c} = 100$			Hz: N <sub>RB,c</sub> =	= 100			20MHz: N	$I_{RB,c} = 100$			
PDSCH parameters:			1Hz: R.5 T		-				-			-		
DL Reference			ИHz: R.0 Т											
Measurement		201	⁄IHz: R.4 Т	ΓDD										
Channel														
PCFICH/PDCCH/PHI			Hz: R.11 T		5MI	Hz: R.11 T	DD D	5M	Hz: R.11 T	ΓDD	5MI	Hz: R.11 T	DD	
CH parameters:			⁄IHz: R.6 Т		101	//Hz: R.6 1	TDD .	101	ИHz: R.6 Т	TDD	10N	1Hz: R.6 1	DD	
DL Reference		20N	IHz: R.10	TDD	20N	Hz: R.10	TDD	20N	1Hz: R.10	TDD	20M	Hz: R.10	TDD	
Measurement														
Channel														
OCNG Patterns		5MH	lz: OP.15	TDD	5MH	lz: OP.16	TDD	5MH	lz: OP.16	TDD	5MH	z: OP.16	TDD	
			Hz: OP.1		10MHz: OP.2 TDD				IHz: OP.2			Hz: OP.2		
		20MI	Hz: OP.11	TDD	20MI	Hz: OP.12	TDD	20MI	Hz: OP.12	TDD	20MHz: OP.12 TDD			
PBCH_RA	dB													
PBCH_RB	dB													
PSS_RA	dB													
SSS_RA	dB													
PCFICH_RB	dB													
PHICH RA	dB													
PHICH RB	dB		0		0				0		0			
PDCCH_RA	dB													
PDCCH_RB	dB													
PDSCH RA	dB													
PDSCH RB	dB													
OCNG_RA <sup>Note 1</sup>	dB													
OCNG RB <sup>Note 1</sup>	dB													
N <sub>oc</sub> Note 2	u.s		-104			-104				-1	04			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3	
Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.05	-4.76	
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107	
SCH RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107	
lo Note 3	dBm/Ch BW	-59.13	-59.13	-74.45	-76.22	-59.13	-74.45					101		
10	GDIII/OII DVV	+10log	+10log	+10log	+10log	+10log	+10log	+10log	+10log	+10log	Specific	ed in colu	mns for	
		(N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub>RB,c</sub> (N <sub></sub>		Орссии	Cell 3	11113 101								
		/50)	/50)		/50) /50) /50) /50) /50)			/50)	/50)					

Propagation Condition		AWGN	ETU70	ETU70	ETU70
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low	1x2 Low
Timing offset to Cell 1	μs	-	0	0	3
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	μs	-	-	≤ TAE	N/A

- OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 1:
- Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as Note 2: AWGN of appropriate power for Noc to be fulfilled.
- Es/lot, RSRP, SCH\_RP and lo have been derived from other parameters for information purposes. They are not settable parameters themselves. The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3:
- Note 4:
- Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation. Note 5:

#### A.8.16.30.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s ( $5 \times$  measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in PDCCH.

## A.8.16.31 E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in FDD

#### A.8.16.31.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.31.1-1 and A.8.16.31.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the FDD primary component (RF Channel 1), Cell 2 is SCell on the TDD secondary component (RF Channel 2), and Cell 3 is SCell on the TDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the TDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell 2 during T4.

Table A.8.16.31.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in FDD

	Parameter	Unit	Value	Comment
E-UT	RA RF Channel		1 2 2	three radio channels are used for this test
Numl	ber		1, 2, 3	
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.
Confi	igured deactivated		Cell 2	Configured deactivated secondary cell on
SCel			Gell 2	RF channel number 2.
	igured deactivated		Cell 3	Configured deactivated secondary cell on
SCel			Oeii 3	RF channel number 3.
Neigl	nbour cell		Cell 4	Neighbor cell to be identified on RF
				channel number 3.
CP le			Normal	
	ial subframe		6	As specified in table 4.2-1 in TS 36.211.
	guration		•	The same configuration in TDD cells
	k-downlink		1	As specified in table 4.2-2 in TS 36.211.
	guration			The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB		Offset parameter for evaluation of event
			-3	A6. Needs to take relative accuracy
			· ·	tolerance in clause 9.1.11.2 into account
				plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	ndividual offset for cells	dB	0	Individual offset for cells on primary
	F channel number 1		•	component carrier.
	ndividual offset for cells	dB	0	Individual offset for cells on secondary
	F channel number 2	-		component carrier.
	individual offset for cells	dB	0	Individual offset for cells on secondary
	F channel number 3			component carrier.
	coefficient		0	L3 filtering is not used
	I measurement cycle	ms s	1280	
T1	Т1		5	During this time the UE shall be aware of
	T2		-	cells 1, 2 and 3 but not cell 4.
T2	12		≤30	UE should report Event A6 within 25.6s
To		S		(20xscellMeasCycle)
13	T3 T4		1	During this time the UE shall activate cell 2
14	T4		≤10	UE should report Event A6 within 6.4s
				(5xscellMeasCycle)

Table A.8.16.31.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in FDD

Parameter	Unit Cell 1						Ce	ell 2			Ce	ell 3		Cell 4				
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	
E-UTRA RF Channel Number				1				2				3			;	3		
BW <sub>channel</sub>	MHz			$N_{RB,c} = 25$ $N_{RB,c} = 50$ $N_{RB,c} = 100$		5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100				5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$				5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100				
PDSCH parameters: DL Reference Measurement Channel			5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			N/A	N/A	N/A	5MHz: R.4 TDD 10MHz : R.0 TDD 20MHz : R.3 TDD		۸	I/A		N/A				
PCFICH/PDCCH/ PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD					10MHz:	1.11 TDD R.6 TDD R.10 TDD			
OCNG Pattern defined in A.3.2.1 and A.3.2.2		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.10 TDD 10MHz : OP.2 TDD 20MHz : OP.8 TDD	5MHz: OP.10 TDD 10MHz : OP.2 TDD 20MHz : OP.8 TDD	5MHz: OP.10 TDD 10MHz : OP.2 TDD 20MHz : OP.8 TDD	5MHz: OP.9 TDD 10MHz : OP.1 TDD 20MHz : OP.7 TDD		10MHz:	P.10 TDD OP.2 TDD OP.8 TDD			10MHz: (	P.10 TDD DP.2 TDD DP.8 TDD			
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB	dB dB dB dB dB dB dB dB dB dB dB dB dB	0			0			0				(	)					

OCNG_RA <sup>Note 1</sup>	dB																
OCNG_RB <sup>Note 1</sup>	dB																
$N_{oc}$ Note 3	dBm/15 kHz		-101			-101				-101							
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
lo Note 3	dBm/Ch BW	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-54.15 +10log (N <sub>RB,c</sub> /50)						
Propagation Condition			ÁW	GN	,	,	ÁW	GN	,		ÁW	GN	,		ÁW	GN	,
Antenna Configuration			1>	x2			1:	K2			1)	<b>K</b> 2			1)	(2	
Timing offset to Cell 1	μs	-				0			0				3				
Time alignment error relative to cell 1 Note 5	μѕ	-			≤ TAE			≤ TAE				N/A					
Time alignment error relative to cell 2 Note 5	μѕ	-			-			≤ TAE					N,	/A			

OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 1:

Note 2:

The resources for uplink transmission are assigned to the UE on cell1 prior to the start of time period T2 and on cell2 prior to the start of time period T4.

Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Note 3:  $N_{oc}$  to be fulfilled.

RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation. Note 4:

Note 5:

#### A.8.16.31.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the start of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.16.32 E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in TDD

#### A.8.16.32.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.32.1-1 and A.8.16.32.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the TDD primary component (RF Channel 1), Cell 2 is SCell on the FDD secondary component (RF Channel 2), and Cell 3 is SCell on the FDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the FDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of Cell 4 is increased to same level as for Cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell2 during T4.

Table A.8.16.32.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in TDD

	Parameter	Unit	Value	Comment		
E-UT	RA RF Channel		1, 2, 3	Three radio channels are used for this test		
Numl	ber		1, 2, 3			
	e PCell		Cell 1	Primary cell on RF channel number 1.		
	igured SCell		Cell 2	Configured secondary cell on RF channel number 2.		
	igured SCell		Cell 3	Configured secondary cell on RF channel number 3.		
	hbour cell		Cell 4	Neighbor cell to be identified on RF channel number 3.		
CP le			Normal			
	ial subframe guration on PCell		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.		
	k-downlink guration on PCell		1			
DRX			OFF	Continuous monitoring of primary cell		
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.		
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.		
	Report on leave		False			
	Time To Trigger	S	0			
	ndividual offset for cells F channel number 1	dB	0	Individual offset for cells on primary component carrier.		
	individual offset for cells F channel number 2	dB	0	Individual offset for cells on secondary component carrier.		
	individual offset for cells F channel number 3	dB	0	Individual offset for cells on secondary component carrier.		
Filter	coefficient		0	L3 filtering is not used		
	I measurement cycle	ms	1280			
T1		S	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.		
T2		S	≤30	UE should report Event A6 within 25.6s (20xscellMeasCycle)		
T3		S	1	During this time the UE shall activate cell 2		
T4		S	≤10	UE should report Event A6 within 6.4s (5xscellMeasCycle)		
NOT				th is independent of channel bandwidth and is		

performed according to the principle defined in section A.3.6.1.

Table A.8.16.32.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in TDD

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Parameter	Unit		Ce	ell 1			Ce	ell 2			С	ell 3			Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	
E-UTRA RF		1					2				3					3		
Channel Number																		
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100					$5MHz: N_{RB,c} = 25$ $10MHz: N_{RB,c} = 50$				5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$				5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50			
								$I_{RB,c} = 100$				$N_{RB,c} = 10$	00		20MHz: N <sub>RB,c</sub> = 100			
PDSCH		5MHz: R.4 TDD				N/A					N/A				ľ	N/A		
parameters:		10MHz: R.0 TDD 20MHz: R.3 TDD						R.7										
DL Reference						FDD												
Measurement									10MHz									
Channel									: R.3 FDD									
									20MHz									
									: R.6									
									FDD									
PCFICH/PDCCH/P			5MHz: F	R.11 TDD	)		5MHz: F	R.11 FDD	100		5MHz·	R.11 FDD	)		5MHz: R.11 FDD			
HICH parameters		10MHz: R.6 TDD						R.6 FDD		10MHz: R.6 FDD					10MHz: R.6 FDD			
· ····································			20MHz:					R.10 FDD				R.10 FDI			20MHz: R.10 FDD			
OCNG Pattern				P.9 TDE		5MHz:	5MHz:	5MHz:	5MHz:			P.16FDD				OP.16FDD;		
defined in A.3.2.1			10MHz: (	OP.1 TDI	)	OP.19	OP.19	OP.19	OP.20		10MHz:0	OP.2 FDD	);		10MHz:	OP.2 FDD;		
			20MHz: (	DP. 7 TD	D	FDD;	FDD;	FDD;	FDD;		20MHz:	OP.12FD	D		20MHz:	OP.12FDD		
						10MHz	10MHz	10MHz	10MHz									
						:OP.6	:OP.6	:OP.6	:OP.10									
						FDD;	FDD;	FDD;	FDD;									
						20MHz	20MHz	20MHz	20MHz									
						:	:	:	: OP.17									
						OP.14 FDD	OP.14 FDD	OP.14 FDD	FDD									
PBCH RA	dB					רטט	ן רטט	ן רטט										
PBCH RB	dB	1																
PSS_RA	dB	1																
SSS_RA	dB	1																
PCFICH_RB	dB	1																
PHICH_RA	dB	1		_				_								_		
PHICH_RB	dB	1		0				0				0				0		
PDCCH_RA	dB																	
PDCCH_RB	dB																	
PDSCH_RA	dB																	
PDSCH_RB	dB																	
OCNG_RA <sup>Note 1</sup>	dB																	
OCNG_RB <sup>Note 1</sup>	dB													1				

$N_{oc}^{ m Note  3}$	dBm/15 kHz	-101				-101				-101								
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11	
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85	
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85	
lo Note 3	dBm/Ch BW	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-54.15 +10log (N <sub>RB,c</sub> /50)							
Propagation Condition		AWGN				AWGN				AWGN				AWGN				
Antenna Configuration		1x2				1x2					1:	<b>(</b> 2		1x2				
Timing offset to Cell	μs	-				0				0				3				
Time alignment error relative to cell 1 Note5	μs	-				≤ TAE				≤ TAE				N/A				
Time alignment error relative to cell 2 Note5	μs	-				-					≤T	AE		N/A				

OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 1:

The resources for uplink transmission are assigned to the UE on cell1 prior to the start of time period T2 and on cell2 prior to the start of time period T4. Note 2:

Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$ Note 3: to be fulfilled.

RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation. Note 4:

Note 5:

#### A.8.16.32.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the beginning of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.16.33 E-UTRAN FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX

#### A.8.16.33.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.33.1-1 and A.8.16.33.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the FDD primary component (RF Channel 1), Cell 2 is SCell on the FDD secondary component (RF Channel 2), and Cell 3 is SCell on the FDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the FDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of Cell 4 is increased to same level as for Cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell2 during T4.

Table A.8.16.33.1-1: General test parameters for E-UTRAN FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX

	Parameter	Unit	Value	Comment				
E-UT	RA RF Channel		1, 2, 3	Three radio channels are used for this test				
Num	ber		1, 2, 3					
	e PCell		Cell 1	Primary cell on RF channel number 1.				
Conf	igured deactivated		Cell 2	Configured deactivated secondary cell on				
SCel			Och Z	RF channel number 2.				
	igured deactivated		Cell 3	Configured deactivated secondary cell on				
SCel			OCII O	RF channel number 3.				
Neigl	hbour cell		Cell 4	Neighbor cell to be identified on RF				
				channel number 3.				
	CP length		Normal					
DRX			OFF	Continuous monitoring of primary cell				
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.				
	Offset	dB		Offset parameter for evaluation of event				
			-3	A6. Needs to take relative accuracy				
			-3	tolerance in clause 9.1.11.2 into account				
				plus margin.				
	Report on leave		False					
	Time To Trigger	S	0					
Cell-i	individual offset for cells	dB	0	Individual offset for cells on primary				
	F channel number 1		U	component carrier.				
Cell-i	individual offset for cells	dB	0	Individual offset for cells on secondary				
on R	F channel number 2		U	component carrier.				
Cell-i	individual offset for cells	dB	0	Individual offset for cells on secondary				
	F channel number 3		•	component carrier.				
Filter	coefficient		0	L3 filtering is not used				
	I measurement cycle	ms	1280					
T1		S	5	During this time the UE shall be aware of				
			3	cells 1, 2 and 3 but not cell 4.				
T2		S	≤30	UE should report Event A6 within 25.6s				
			230	(20xscellMeasCycle)				
T3		S	1	During this time the UE shall activate cell 2				
T4		S	≤10	UE should report Event A6 within 6.4s				
			210	(5xscellMeasCycle)				

Table A.8.16.33.1-2: Cell specific test parameters for E-UTRAN FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX (Cell #1 and Cell #2)

Parameter	Unit		Ce	II 1			Се	ell 2		Cell 3					Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	
E-UTRA RF Channel			,	1				2				3				3		
Number																		
BW <sub>channel</sub>			5MHz: N					$I_{RB,c} = 25$				$N_{RB,c} = 2$				$N_{RB,c} = 25$		
			10MHz: N					$N_{RB,c} = 50$				$N_{RB,c} = 5$				$N_{RB,c} = 5$		
			20MHz: N		0	20MHz: N <sub>RB,c</sub> = 100				20MHz: N <sub>RB,c</sub> = 100				20MHz: N <sub>RB,c</sub> = 100				
PDSCH parameters:			5MHz: F			N/A	N/A	N/A	5MHz:	N/A			N/A					
DL Reference			10MHz: R.3 FDD 20MHz: R.6 FDD					R.7										
Measurement Channel			20MHz:	R.6 FDD					FDD									
									10MHz:									
									R.3 FDD									
									20MHz:									
									R.6									
									FDD									
PCFICH/PDCCH/PHICH			5MHz: R	11 FDD			5MHz· R	R.11 FDD	טטו		5MHz·	R.11 FDI	<u> </u>		5MHz·	R.11 FDD	)	
parameters			10MHz:					R.6 FDD				R.6 FDI				:: R.6 FDD		
parametere			20MHz: F					R.10 FDD			-	R.10 FD				: R.10 FDI		
OCNG Pattern defined			5MHz: OI			5MHz:	5MHz:	5MHz:	5MHz:		5MHz: C					OP.16 FDI		
in A.3.2.1			10MHz: O			OP.19	OP.16	OP.19	OP.20		10MHz:					OP.2 FDI		
			20MHz: O			FDD	FDD9	FDD	FDD		20MHz: (					OP.12 FD		
						10MHz:	10MHz:	10MHz:	10MHz:									
						OP.6	OP.6	OP.6	OP.10									
						FDD	FDD	FDD	FDD									
						20MHz:	20MHz:	20MHz:	20MHz:									
						OP.14	OP.14	OP.14	OP.17									
						FDD	FDD	FDD	FDD									
PBCH_RA	dB																	
PBCH_RB	dB																	
PSS_RA	dB																	
SSS_RA	dB																	
PCFICH_RB	dB																	
PHICH_RA	dB		(	)				0				0				0		
PHICH_RB	dB		,	J			,	U				U				U		
PDCCH_RA	dB																	
PDCCH_RB	dB																	
PDSCH_RA	dB																	
PDSCH_RB	dB																	
OCNG_RA <sup>Note 1</sup>	dB																	
OCNG_RB <sup>Note 1</sup>	dB																	

$N_{oc}^{ m Note~3}$	dBm/15 kHz		-1	01			-1	01					-1	01			
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	- Infinity	16	- Infinity	16
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	- Infinity	-0.11	- Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	- Infinity	-85	- Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	- Infinity	-85	- Infinity	-85
lo Note 3	dBm/Ch BW	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-54.15 +10log (N <sub>RB,c</sub> /50)						
Propagation Condition			ÁW	GN	•	,	ÁW	GN			ÁW	GN	•		ÁW	GN	•
Antenna Configuration			1:	(2			1:	(2			1>	(2			1)	x2	
Timing offset to Cell 1	μs			•				)		0					3	3	
Time alignment error relative to cell 1 Note 5	μs		·	-		≤ TAE				≤ TAE					N,	/A	
Time alignment error relative to cell 2 Note 5	μs		-			-			≤ TAE			N/A					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE on cell1 from the start of time period T2 and on cell2 from the start of time period T4.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.33.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the beginning of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.16.34 E-UTRAN TDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX

#### A.8.16.34.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.34.1-1 and A.8.16.34.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the TDD primary component (RF Channel 1), Cell 2 is SCell on the TDD secondary component (RF Channel 2), and Cell 3 is SCell on the TDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the TDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell 2 during T4.

Table A.8.16.34.1-1: General test parameters for E-UTRAN TDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX

	Parameter	Unit	Value	Comment
E-UT	RA RF Channel		1, 2, 3	three radio channels are used for this test
Num	ber		1, 2, 3	
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.
Conf	igured deactivated		Cell 2	Configured deactivated secondary cell on
SCel			Gell 2	RF channel number 2.
Conf	igured deactivated		Cell 3	Configured deactivated secondary cell on
SCel			Oeli 3	RF channel number 3.
Neigl	nbour cell		Cell 4	Neighbor cell to be identified on RF
				channel number 3.
CP le			Normal	
	ial subframe		6	As specified in table 4.2-1 in TS 36.211.
	guration			The same configuration in both cells
	k-downlink		1	As specified in table 4.2-2 in TS 36.211.
	guration			The same configuration in both cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB		Offset parameter for evaluation of event
			-3	A6. Needs to take relative accuracy
				tolerance in clause 9.1.11.2 into account
				plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	ndividual offset for cells	dB	0	Individual offset for cells on primary
	F channel number 1	-		component carrier.
	individual offset for cells	dB	0	Individual offset for cells on secondary
	F channel number 2			component carrier.
	ndividual offset for cells	dB	0	Individual offset for cells on secondary
	F channel number 3			component carrier.
	coefficient		0	L3 filtering is not used
	I measurement cycle	ms	1280	
T1		S	5	During this time the UE shall be aware of
TC		_		cells 1, 2 and 3 but not cell 4.
T2		S	≤30	UE should report Event A6 within 25.6s
		_	4	(20xscellMeasCycle)
T3		S	1	During this time the UE shall activate cell 2
T4		S	≤10	UE should report Event A6 within 6.4s
				(5xscellMeasCycle)

Table A.8.16.34.1-2: Cell specific test parameters for E-UTRAN TDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX

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Parameter	Unit		Ce	ell 1			Ce	ell 2			C	ell 3		Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
E-UTRA RF				1				2				3				3	
Channel Number																	
BW <sub>channel</sub>	MHz		5MHz: N					$N_{RB,c} = 25$			5MHz: I	$N_{RB,c} = 25$	;			$N_{RB,c} = 25$	
			10MHz:					$N_{RB,c} = 50$				$N_{RB,c} = 50$				$N_{RB,c} = 50$	
			20MHz: N					$N_{RB,c} = 100$		20MHz: N <sub>RB,c</sub> = 100						$N_{RB,c} = 100$	
PDSCH			5MHz: R.4 TDD N/A N/A N 10MHz: R.0 TDD			N/A	5MHz:		1	N/A			N/A				
parameters:									R.4								
DL Reference			20MHz: R.3 TDD						TDD								
Measurement									10MHz								
Channel									: R.0								
									TDD								
									20MHz								
									: R.3 TDD								
PCFICH/PDCCH/P			5MHz: F	2 11 TD	`			<u> </u> R.11 TDD	טטון		5MU	R.11 TDD	\		5MU 0	R.11 TDD	
HICH parameters:			10MHz:					R.6 TDD				R.6 TDD				R.6 TDD	
DL Reference			20MHz:	_			-	R.10 TDD			-	R.10 TDE			-	R.10 TDD	
Measurement			ZUIVII IZ.	11.10 10	D		ZUIVII IZ.	11.10 100			ZUIVII IZ.	11.10 101	,		ZUIVII IZ.	11.10 100	
Channel																	
OCNG Pattern			5MHz: C	OP 9 TD	<u> </u>	5MHz:	5MHz:	5MHz:	5MHz:		5MHz: C	P.10 TDI	)		5MHz: O	P.10 TDD	
defined in A.3.2.2			10MHz: (			OP.10	OP.10	OP.10	OP.9			OP.2 TDI				OP.2 TDD	
			20MHz: (			TDD	TDD	TDD	TDD			OP.8 TDI				OP.8 TDD	
			-			10MHz	10MHz	10MHz	10MHz		-				-		
						: OP.2	: OP.2	: OP.2	: OP.1								
						TDD	TDD	TDD	TDD								
						20MHz	20MHz	20MHz	20MHz								
						: OP.8	: OP.8	: OP.8	: OP.7								
						TDD	TDD	TDD	TDD								
PBCH_RA	dB	_															
PBCH_RB	dB	_															
PSS_RA	dB	_															
SSS_RA	dB																
PCFICH_RB	dB	_															
PHICH_RA	dB	_		0				0						^			
PHICH_RB	dB	_		0				0				0				0	
PDCCH_RA	dB	_															
PDCCH_RB	dB	_															
PDSCH_RA	dB	_															
PDSCH_RB	dB																
OCNG_RA <sup>Note 1</sup>	dB																

OCNG_RB <sup>Note 1</sup>	dB																
$N_{oc}^{ m Note  3}$	dBm/15 kHz		-1	01			-101					)1					
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
lo <sup>Note 3</sup>	dBm/Ch BW	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-57.11 +10log (N <sub>RB,c</sub> /50)	-54.15 +10log (N <sub>RB,c</sub> /50)						
Propagation Condition			ÁW	GN	,			GN	,	,	ÁW	GN	,			'GN	,
Antenna Configuration			1:	<b>(</b> 2			1:	x2		1x2				1x2			
Timing offset to Cell 1	μs		·	-		0			0				3				
Time alignment error relative to cell 1 Note 5	μs			-		≤TAE			≤ TAE				N/A				
Time alignment error relative to cell 2 Note 5	μs		,	-		-			≤ TAE			N/A					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE on cell1 prior to the start of time period T2 and on cell2 prior to the start of time period T4.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.34.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the start of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# A.8.16.35 3 DL PCell in FDD CA Activation and Deactivation of Known SCell in Non-DRX

#### A.8.16.35.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is known by the UE at the time of activation and PCell is in FDD.

The test parameters are given in Tables A.8.16.35.1-1 and cell-specific parameters in A.8.16.35.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and deactivated Cell 3 (SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the Scell1. The UE receives the SCell2 activation command in a subframe (m+10) during activation of the SCell1. The UE shall be able to report valid CSI for the activated SCell1 at latest in subframe (m+29). The UE shall start reporting CSI for SCell1 in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+10). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+9) and (n+15) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.35.1-1: General test parameters for known SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2, 3	Three radio channels are used for this test
Number		1, 2, 0	
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated		Cell 2	Deconfigured deactivated secondary cell
SCell1		Cell 2	on RF channel number 2.
Configured deactivated		Cell 3	Configured deactivated secondary cell on
SCell2		Cell 3	RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and		0	CQI reporting for SCell every second
offset configuration index		O	subframe
Cell-individual offset for cells	dB	0	Individual offset for cells on PCC.
on RF channel number 1	uБ	U	
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC1.
on RF channel number 2	uБ	O	
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC2.
on RF channel number 3	uБ	O	
SCell measurement cycle	ms	320	
(measCycleSCell)	1113	320	
T1			During this time the PCell and SCell2 shall
	S	7	be known and the SCell1 configured and
			detected.
T2	s	1	During this time the UE shall activate the
	0	ļ	SCell1.
T3	S	1	During this time the UE shall deactivate
	3	ı	the SCell1.

Table A.8.16.35.1-2: Cell specific test parameters for E-UTRAN TDD known SCell1 activation with PCell in FDD

Parameter	Unit	Cell 1	Cell 2	Cell 3
		T1 T2 T3	T1 T2 T3	T1 T2 T3
E-UTRA RF Channel		1	2	3
Number				
BW <sub>channel</sub>	MHz	5MHz: $N_{RB,c} = 25$	5MHz: N <sub>RB,c</sub> = 25	5MHz: $N_{RB,c} = 25$
		$10MHz: N_{RB,c} = 50$	10MHz: $N_{RB,c} = 50$	$10MHz: N_{RB,c} = 50$
		$20MHz: N_{RB,c} = 100$	20MHz: N <sub>RB,c</sub> = 100	20MHz: $N_{RB,c} = 100$
PDSCH parameters:		5MHz: R.7 FDD	-	-
DL Reference		10MHz: R.3 FDD		
Measurement Channel		20MHz: R.6 FDD		
PCFICH/PDCCH/PHIC		5MHz: R.11 FDD	5MHz: R.11 TDD	5MHz: R.11 TDD
H parameters:		10MHz: R.6 FDD	10MHz: R.6 TDD	10MHz: R.6 TDD
DL Reference		20MHz: R.10 FDD	20MHz: R.10 TDD	20MHz: R.10 TDD
Measurement Channel			-1411 OD 40 TDD	-1111 00 10 700
OCNG Patterns		5MHz: OP.20 FDD	5MHz: OP.10 TDD	5MHz: OP.10 TDD
		10MHz: OP.10 FDD	10MHz: OP.2 TDD 20MHz: OP.8 TDD	10MHz: OP.2 TDD 20MHz: OP.8 TDD
BBOLL BA	15	20MHz: OP.17 FDD	201VII 12. OI .0 100	201VII 12. OI .0 1DD
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	0
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
Noc Note 2	dBm/15	-104	-104	-104
<u> </u>	kHz			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17	17
Ê <sub>s</sub> /I <sub>ot</sub>	dB	17	17	17
RSRP Note 3	dBm/15	-87	-87	-87
SCH_RP Note 3	kHz	07	0.7	07
SCH_RP****	dBm/15	-87	-87	-87
lo Note 3	kHz	50.40	<b>50.40</b>	<b>50.10</b>
10	dBm/Ch	-59.13	-59.13	-59.13
	BW	+10log	+10log	+10log
Drangastian Canditian		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
Propagation Condition		AWGN	AWGN	AWGN
Antenna Configuration		1x2	1x2	1x2 0
Timing offset to Cell 1	μs	-	0	_
Time alignment error	μs	-	≤ TAE	≤ TAE
relative to cell 1 Note 5				✓ <b>Т</b> ^ ⊏
Time alignment error	μs	-	-	≤ TAE
relative to cell 2 Note 5	1			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.35.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+9) and outside the subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.36 3 DL PCell in TDD CA Activation and Deactivation of Known SCell in Non-DRX

### A.8.16.36.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is known by the UE at the time of activation and PCell is in TDD.

The test parameters are given in Tables A.8.16.36.1-1 and cell-specific parameters in A.8.16.36.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and deactivated Cell 3 (SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m where m is 4 or 9, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the Scell1. The UE receives the SCell2 activation command in a subframe (m+15) during activation of the SCell1. The UE shall be able to report valid CSI for the activated SCell1 at latest in a subframe (m+29). The UE shall start reporting CSI for SCell1 in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+11) and (m+20) to (m+26).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+15). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+11) and (n+20) to (n+26).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.36.1-1: General test parameters for known SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every UL subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC1.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	Ø	7	During this time the PCell and SCell2 shall be known and the SCell1 configured and detected.
T2	S	1	During this time the UE shall activate the SCell1.
T3	S	1	During this time the UE shall deactivate the SCell1.

Table A.8.16.36.1-2: Cell specific test parameters for E-UTRAN FDD known SCell1 activation with PCell in TDD

Parameter	Unit	Cell 1		Cell 2			Cell 3			
		T1 T2	Т3	T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel		1			2			3		
Number		1			2					
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB,c</sub> =	25	5MH	z: N <sub>RB,c</sub> = 2	25	5MF	łz: N <sub>RB,c</sub> =	25	
		$10MHz: N_{RB,c} =$		10MF	Iz: N <sub>RB,c</sub> =	50	10M	Hz: N <sub>RB,c</sub> =	= 50	
		$20MHz: N_{RB,c} =$	100	$20MHz: N_{RB,c} = 100$			$20MHz: N_{RB,c} = 100$			
PDSCH parameters:		5MHz: R.4 TDI	0		-			-		
DL Reference		10MHz: R.0 TD								
Measurement Channel		20MHz: R.3 TD	D							
PCFICH/PDCCH/PHIC		5MHz: R.11 T	DC	5MHz: R.11 FDD			5MH	lz: R.11 F	DD	
H parameters:		10MHz: R.6 TDD		10MHz: R.6 FDD			10M	IHz: R.6 F	DD	
DL Reference		20MHz: R.10 TDD		20MHz: R.10 FDD			20MI	Hz: R.10 F	-DD	
Measurement Channel										
OCNG Patterns		5MHz: OP.9 TD		5MHz	5MHz: OP.16 FDD			z: OP.16 F	-DD	
		10MHz: OP.1 TDD		10MHz: OP.2 FDD			_	Hz: OP.2 F		
		20MHz: OP.7 TDD		20MHz: OP.12 FDD			20MF	lz: OP.12	FDD	
PBCH_RA	dB							· · · · · · · · · · · · · · · · · · ·		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB	0			0			0		
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 1</sup>	dB									
OCNG RB <sup>Note 1</sup>	dB									
Noc Note 2	dBm/15 kHz	-104			-104			-104		
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17			17			17		
Ês/lat	dB	17			17			17		
RSRP Note 3	dBm/15 kHz	-87			-87			-87		
SCH_RP Note 3	dBm/15 kHz	-87			-87			-87		
Io Note 3	dBm/Ch BW	-59.13			-59.13			-59.13		
· <del>· ·</del>	32, 3 2	+10log			+10log			+10log		
		(N <sub>RB,c</sub> /50)		(1	N <sub>RB,c</sub> /50)		(	N <sub>RB,c</sub> /50)		
Propagation Condition		AWGN			AWGN		,	AWGN		
Antenna Configuration		1x2		1x2				1x2		
Timing offset to Cell 1	μS	-			0			0		
Time alignment error	μς	-			≤ TAE			≤ TAE		
relative to cell 1 Note 5	μο				- · · · · · ·			/ \_		
Time alignment error	μS	-			_			≤ TAE		
relative to cell 2 Note 5	μο			_						
							L			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

#### A.8.16.36.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+11) and outside the subframes (m+20) to (m+26).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+11) and outside the subframes (n+20) to (n+26).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

## A.8.16.37 3 DL FDD CA activation and deactivation of known SCell in non-DRX

## A.8.16.37.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL FDD carrier aggregation, when the SCells are known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.37-1 and cell-specific parameters in A.8.16.37-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the Scell1. The UE receives the SCell2 activation command in a subframe (m+10) during activation of the SCell1. The UE shall be able to report valid CSIs for the activated SCell1 at latest in asubframe (m+29). The UE shall start reporting CSI for SCell1 in subframe in (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+10). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+9) and (n+15) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for Scell1 is discontinued.

Table A.8.16.37-1: General test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2, 3	Three radio channels are used for this test
Number			
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell		Cell 2	Deconfigured secondary cell on RF
			channel number 2.
Configured deactivated		Cell 3	Configured deactivated secondary cell on
SCell			RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and		0	CQI reporting for SCells every second
offset configuration index		U	subframe
Cell-individual offset for cells	dB	0	Individual offset for cells on PCC.
on RF channel number 1			
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC1.
on RF channel number 2			
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC2.
on RF channel number 3			
Filter coefficient		0	L3 filtering is not used
SCell measurement cycle	ms	320	
(measCycleSCell)			
T1	S	7	During this time the PCell and SCell2 shall
			be known and the SCell1 configured and
			detected.
T2	S	1	During this time the UE shall activate the
			SCell1 and SCell2.
T3	S	1	During this time the UE shall deactivate
			the SCell1 and SCell2.

Table A.8.16.37-2: Cell specific test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Cell 1	Cell 2	Cell 3	
		T1 T2 T3	T1 T2 T3	T1 T2 T3	
E-UTRA RF Channel		1	2	3	
Number					
BW <sub>channel</sub>		5MHz: $N_{RB,c} = 25$	5MHz: $N_{RB,c} = 25$	5MHz: $N_{RB,c} = 25$	
		$10MHz: N_{RB,c} = 50$	$10MHz: N_{RB,c} = 50$	$10MHz: N_{RB,c} = 50$	
		$20MHz: N_{RB,c} = 100$	$20MHz: N_{RB,c} = 100$	$20MHz: N_{RB,c} = 100$	
PDSCH parameters:		5MHz: R.7 FDD	-	-	
DL Reference		10MHz: R.3 FDD			
Measurement Channel		20MHz: R.6 FDD			
PCFICH/PDCCH/PHICH		5MHz: R.11 FDD	5MHz: R.11 FDD	5MHz: R.11 FDD	
parameters:		10MHz: R.6 FDD	10MHz: R.6 FDD	10MHz: R.6 FDD	
DL Reference		20MHz: R.10 FDD	20MHz: R.10 FDD	20MHz: R.10 FDD	
Measurement Channel					
OCNG Patterns		5MHz: OP.20 FDD	5MHz: OP.16 FDD	5MHz: OP.16 FDD	
		10MHz: OP.10 FDD	10MHz: OP.2 FDD	10MHz: OP.2 FDD	
		20MHz: OP.17 FDD	20MHz: OP.12 FDD	20MHz: OP.12 FDD	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0	0	0	
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
Noc Note 2	dBm/15 kHz	-104	-104	-104	
$\begin{array}{c} \hat{E}_s/N_{oc} \\ \hat{E}_s/I_{ot} \end{array}$	dB	17	17	17	
Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	17	17	
RSRP Note 3	dBm/15 kHz	-87	-87	-87	
SCH_RP Note 3	dBm/15 kHz	-87	-87	-87	
lo Note 3	dBm/Ch BW	-59.13+10log	-59.13+10log	-59.13+10log	
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition		AWGN	AWGN	AWGN	
Antenna Configuration		1x2	1x2	1x2	
Timing offset to Cell 1	μs	-	0	0	
Time alignment error	μS	-	≤ TAE	≤ TAE	
relative to cell 1 Note 5	'-				
Time alignment error	μs	-	-	≤TAE	
relative to cell 2 Note 5	'				
N	1 1 11 1				

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

### A.8.16.37.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+9) and outside the subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

## A.8.16.38 3 DL TDD CA activation and deactivation of known SCell in non-DRX

#### A.8.16.38.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL TDD carrier aggregation, when the SCells are known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.38-1 and cell-specific parameters in A.8.16.38-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m where m is 4 or 9, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the Scell1. The UE receives the SCell2 activation command in a subframe (m+15) during activation of the SCell1. The UE shall be able to report valid CSIs for the activated SCell1 at latest in a subframe (m+29). The UE shall start reporting CSI for SCell1 in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+11) and (m+20) to (m+26).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE, in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+15). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+11) and (n+20) to (n+26).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for Scell1 is discontinued.

Table A.8.16.38-1: General test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2, 3	Three radio channels are used for this test
Number			
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell		Cell 2	Deconfigured secondary cell on RF
			channel number 2.
Configured deactivated		Cell 3	Configured deactivated secondary cell on
SCell			RF channel number 3.
CP length		Normal	
Special subframe		6	As specified in table 4.2-1 in TS 36.211.
configuration		0	The same configuration applies to all cells.
Uplink-downlink		1	As specified in table 4.2-2 in TS 36.211.
configuration		-	The same configuration applies to all cells
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and		0	CQI reporting for SCells every UL
offset configuration index		0	subframe
Cell-individual offset for cells	dB	0	Individual offset for cells on PCC.
on RF channel number 1			
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC1.
on RF channel number 2			
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC2.
on RF channel number 3			
Filter coefficient		0	L3 filtering is not used
SCell measurement cycle	ms	320	
(measCycleSCell)			
T1	S	7	During this time the PCell and SCell2 shall
			be known and the SCell1 configured and
			detected.
T2	S	1	During this time the UE shall activate the
			SCell1 and SCell2.
T3	S	1	During this time the UE shall deactivate
			the SCell1 and SCell2

Table A.8.16.38-2: Cell specific test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Cell 1	Cell 2	Cell 3	
		T1 T2 T3	T1 T2 T3	T1 T2 T3	
E-UTRA RF Channel Number		1	2	3	
BW <sub>channel</sub>		5MHz: N <sub>RB,c</sub> = 25	5MHz: N <sub>RB,c</sub> = 25	5MHz: N <sub>RB,c</sub> = 25	
DVV channel		10MHz: $N_{RB,c} = 20$	10MHz: N <sub>RB,c</sub> = 25	$10MHz: N_{RB,c} = 20$	
		$100 \text{MHz}$ : $N_{RB,c} = 30$	$20MHz: N_{RB,c} = 100$	$1000112. N_{RB,c} = 50$ $20MHz: N_{RB,c} = 100$	
PDSCH parameters:		5MHz: R.4 TDD	201VII 12. 14RB,c = 100	201VII 12. 14RB,c = 100	
DL Reference		10MHz: R.0 TDD	_	_	
Measurement Channel		20MHz: R.3 TDD			
PCFICH/PDCCH/PHICH		5MHz: R.11 TDD	5MHz: R.11 TDD	5MHz: R.11 TDD	
parameters:		10MHz: R.6 TDD	10MHz: R.6 TDD	10MHz: R.6 TDD	
DL Reference		20MHz: R.10 TDD	20MHz: R.10 TDD	20MHz: R.10 TDD	
Measurement Channel		2011112111110112	2011112.11.10 122	2011112: 14:10 122	
OCNG Patterns		5MHz: OP.9 TDD	5MHz: OP.10 TDD	5MHz: OP.10 TDD	
CONC Fallonio		10MHz: OP.1 TDD	10MHz: OP.2 TDD	10MHz: OP.2 TDD	
		20MHz: OP.7 TDD	20MHz: OP.8 TDD	20MHz: OP.8 TDD	
PBCH_RA	dB	-			
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH RA	dB				
PHICH_RB	dB	0	0	0	
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
Noc Note 2	dBm/15 kHz	-104	-104	-104	
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17	17	
Ê <sub>s</sub> /N <sub>oc</sub> Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	17	17	
RSRP Note 3	dBm/15 kHz	-87	-87	-87	
SCH_RP Note 3	dBm/15 kHz	-87	-87	-87	
lo Note 3	dBm/Ch BW	-59.13+10log	-59.13+10log	-59.13+10log	
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition		AWGN	AWGN	AWGN	
Antenna Configuration		1x2	1x2	1x2	
Timing offset to Cell 1	μs	-	0	0	
Time alignment error	μs	-	≤ TAE	≤ TAE	
relative to cell 1 Note 5	•				
Time alignment error	μs	-	-	≤ TAE	
relative to cell 2 Note 5	•				
Note 1. OCNC shall be		II II 4 - II 4 I			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

### A.8.16.38.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframe (m+8) and (m+9) were subject to interruption when an intra-band SCell is actitivated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 3: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

During T3 the UE shall stop sending CSI reports for SCell1 at latest in subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+11) and outside the subframes (m+20) to (m+26).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+11) and outside the subframes (n+20) to (n+26).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.39 E-UTRA TDD-FDD 3DL CA Activation and Deactivation of Unknown SCell in Non-DRX with PCell in FDD

#### A.8.16.39.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.39.1-1 and cell-specific parameters in A.8.16.39.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 is FDD cell, and Cell 2 and Cell 3 are TDD cells. Cell 1 and Cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell1) becomes configured on radio channel 2 (SCC1). During T1 Cell 2 (SCell1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of the Cell 3 (SCell2) in subframe (m+10). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSI for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI for SCell1 in subframe (m+8), and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+10). The UE shall carry out deactivation of the Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+9) and (n+10) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.39.1-1: General test parameters for unknown SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2, 3	Three radio channels are used for this test
Number		1, 2, 3	
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated		Cell 2	Deconfigured deactivated secondary cell
SCell1		Cell 2	on RF channel number 2.
Configured deactivated		Cell 3	Configured deactivated secondary cell on
SCell2		Cell 3	RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and		0	CQI reporting for SCell every second
offset configuration index		0	subframe
Cell-individual offset for cells	dB	0	Individual offset for cells on PCC.
on RF channel number 1	uБ	0	
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC1.
on RF channel number 2	ŭ U	U	
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC2.
on RF channel number 3	uБ	0	
SCell measurement cycle	<b>m</b> 0	320	
(measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell and SCell2 shall
	1116	100	be known and the SCell1 configured.
T2	C	1	During this time the UE shall activate the
	S	<u> </u>	SCell1 and SCell2.
T3		1	During this time the UE shall deactivate
	S	<b>'</b>	the SCell1 and SCell2.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.39.1-2: Cell specific test parameters for E-UTRAN TDD known SCell1 activation with PCell in FDD

Parameter	Unit		Cell 1			Cell 2			Cell 3	
		T1	T2	T3	T1	T2	Т3	T1	T2	T3
E-UTRA RF Channel Number			1			2			3	
TDD special subframe configuration			-			6			6	
TDD uplink-downlink configuration			-			1			1	
BW <sub>channel</sub>	MHz	5M	Hz: N <sub>RB,c</sub> =	25	5MI	Hz: N <sub>RB,c</sub> =	25	5M	Hz: N <sub>RB,c</sub> =	- 25
DVV channel	1711 12	10M	112: N <sub>RB,c</sub> = 1Hz: N <sub>RB,c</sub> = Hz: N <sub>RB,c</sub> =	50	10M	Hz: N <sub>RB,c</sub> = Hz: N <sub>RB,c</sub> =	= 50	101	//Hz: N <sub>RB,c</sub>	= 50
PDSCH parameters:			1Hz: R.7 FD			-			-	
DL Reference			MHz: R.3 FI							
Measurement Channel			MHz: R.6 FI							
PCFICH/PDCCH/PHIC			Hz: R.11 F[			Hz: R.11 T			Hz: R.11 T	
H parameters:		-	MHz: R.6 Fเ		_	⁄IHz: R.6 Т		-	MHz: R.6 T	
DL Reference		20M	1Hz: R.10 F	DD	20M	Hz: R.10 T	DD	201	/IHz: R.10	TDD
Measurement Channel										
OCNG Patterns			lz: OP.20 F			Iz: OP.10 T			Hz: OP.10	
			Hz: OP.10 F		_	Hz: OP.2 1		-	1Hz: OP.2	
PBCH_RA	dB	20MI	Hz: OP.17 [	-טט	20M	Hz: OP.8 1	טט	201	1Hz: OP.8	טטו
PBCH_RB	dB				1					
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB dB									
PHICH_RA	dB		0			^			0	
PHICH_RB			0			0			0	
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB OCNG_RA <sup>Note 1</sup>	dB dB									
OCNG_RA	dB dB									
Noc Note 2			-104			-104			-104	
	dBm/15 kHz				1.6.1					
Ê <sub>s</sub> /N <sub>oc</sub>	dB		17		-infinity	17			17	
Ê <sub>s</sub> /I <sub>ot</sub>	dB		17		-infinity 17		17			
RSRP Note 3	dBm/15 kHz		-87		-infinity	-8			-87	
SCH_RP Note 3	dBm/15 kHz		-87		-infinity	-8			-87	
lo Note 3	dBm/Ch		-59.13		-76.22	-59.			-59.13	
	BW		+10log		+10log	+10			+10log	
			(N <sub>RB,c</sub> /50)		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub>	/50)		(N <sub>RB,c</sub> /50)	
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	μѕ	-		0			0			
Time alignment error relative to cell 1 Note 5	μs		-		≤ TAE		≤TAE			
Time alignment error relative to cell 2 Note 5	μs		-		-			≤TAE		

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
- Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
- Note 6: TDD special subframe configuration and uplink-downlink configuration are as specified in Table 4.2-1 and 4.2-2 in TS36.211 [16]. The same configuration applies to all TDD cells.

### A.8.16.39.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 at latest in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3 interruption of PCell during SCells deactivation shall not happen outside subframes (n+5) to (n+9) and outside subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.40 E-UTRA TDD-FDD 3DL CA Activation and Deactivation of Unknown SCell in Non-DRX with PCell in TDD

### A.8.16.40.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.40.1-1 and cell-specific parameters in A.8.16.40.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 is TDD cell, and Cell 2 and Cell 3 are FDD cells. Cell 1 and Cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell1) becomes configured on radio channel 2 (SCC1). During T1 Cell 2 (SCell1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m, where m is 4 or 9. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of the Cell 3 (SCell2) in subframe (m+15). Since UE received SCell2 activation command during activation

of SCell1, the UE shall be able to report valid CSI for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI for SCell1 in subframe (m+8), and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+20) to (m+24).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+15). The UE shall carry out deactivation of the Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9) and (n+20) to (n+24).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation of SCells command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.40.1-1: General test parameters for unknown SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2, 3	Three radio channels are used for this test
Number		1, 2, 5	
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated		Cell 2	Deconfigured deactivated secondary cell
SCell1		Oeli Z	on RF channel number 2.
Configured deactivated		Cell 3	Configured deactivated secondary cell on
SCell2		Cell 3	RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and		0	CQI reporting for SCell every second
offset configuration index		U	subframe
Cell-individual offset for cells	dB	0	Individual offset for cells on PCC.
on RF channel number 1	ub	0	
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC1.
on RF channel number 2	ub	0	
Cell-individual offset for cells	dB	0	Individual offset for cells on SCC2.
on RF channel number 3	ub	0	
SCell measurement cycle	ms	320	
(measCycleSCell)	1110	020	
T1	ms	100	During this time the PCell and SCell2 shall
	1110	100	be known and the SCell1 configured.
T2	s	1	During this time the UE shall activate the
	3	'	SCell1 and SCell2.
Т3	s	1	During this time the UE shall deactivate
N	3	1	the SCell1 and SCell2.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.16.40.1-2: Cell specific test parameters for E-UTRAN FDD known SCell1 activation with PCell in TDD

Parameter	Unit		Cell 1			Cell 2			Cell 3	
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number			1			2			3	
TDD special subframe configuration			6			-			-	
TDD uplink-downlink configuration			1			-			-	
BW <sub>channel</sub>	MHz	5M	Hz: N <sub>RB,c</sub> =	25	5ML	Hz: N <sub>RB,c</sub> =	25	5N/	Hz: N <sub>RB,c</sub> =	. 25
DVV channel	IVII IZ		112. NRB,c = 1Hz: N <sub>RB,c</sub> =			Hz: $N_{RB,c} =$			ли. тикв,с = ИНz: N <sub>RB,с</sub> :	
			Hz: $N_{RB,c} =$			$Hz: N_{RB,c} =$			Hz: N <sub>RB,c</sub> =	
PDSCH parameters:			/IHz: R.4 TD			-			-	
DL Reference			MHz: R.0 TI							
Measurement Channel			MHz: R.3 TI							
PCFICH/PDCCH/PHIC			Hz: R.11 TI			Hz: R.11 F			Hz: R.11 F	
H parameters:		_	MHz: R.6 TI		_	//Hz: R.6 FI		_	MHz: R.6 F	
DL Reference Measurement Channel		2010	/Hz: R.10 T	טט	20101	Hz: R.10 F	טט	201	//Hz: R.10 I	-טט
OCNG Patterns		5M	Hz: OP.9 TI	חח	5ML	z: OP.16 F	חח	51/1	Hz: OP.16	EDD
OCING Fatterns			112. OF .9 11 1Hz: OP.1 T			Hz: OP.10 F			12. OF.101 1Hz: OP.21	
			1112. OF.1 1 1Hz: OP.7 T		-	1z: OF.2 f 1z: OP.12 l		_	Hz: OP.12	
PBCH_RA	dB	2010			20.711			2017	0, ,,_	
PBCH_RB	dB							1		
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB		0			0			0	
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 1</sup>	dB									
OCNG_RB <sup>Note 1</sup> Noc Note 2	dB		404			404			404	
	dBm/15 kHz		-104			-104			-104	
Ê <sub>s</sub> /N <sub>oc</sub>	dB		17		-infinity 17		17			
Ê <sub>s</sub> /I <sub>ot</sub>	dB		17		-infinity	17			17	
RSRP Note 3	dBm/15 kHz		-87		-infinity	-8			-87	
SCH_RP Note 3	dBm/15 kHz		-87		-infinity	-8	7		-87	
lo Note 3	dBm/Ch		-59.13		-76.22	-59.			-59.13	
	BW		+10log		+10log	+10			+10log	
			(N <sub>RB,c</sub> /50)		(N <sub>RB,c</sub> /50)	$(N_{RB,c}$	/50)		(N <sub>RB,c</sub> /50)	
Propagation Condition		AWGN		AWGN				AWGN		
Antenna Configuration		1x2		1x2			1x2			
Timing offset to Cell 1	μs		-			0			0	
Time alignment error relative to cell 1 Note 5	μs	-		≤ TAE		≤ TAE				
Time alignment error relative to cell 2 Note 5	μs		-			-			≤TAE	

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
- Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
- Note 6: TDD special subframe configuration and uplink-downlink configuration are as specified in Table 4.2-1 and 4.2-2 in TS36.211 [16]. The same configuration applies to all TDD cells.

### A.8.16.40.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside subframes (m+5) and (m+9) and outside the subframes (m+20) to (m+24).

During T3 interruption of PCell during SCells deactivation shall not happen outside subframes (n+5) to (n+9) and outside subframes (n+20) to (n+24).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.41 3DL FDD CA activation and deactivation of unknown SCell in non-DRX

#### A.8.16.41.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL FDD carrier aggregation, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.41-1 and cell-specific parameters in A.8.16.41-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 and Cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell1) becomes configured on radio channel 2 (SCC1). During T1 the signal level of Cell 2 (SCell1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of the SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC

message for activation of Cell 3 (SCell2) in subframe (m+10). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSIs for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+10). The UE shall carry out deactivation of Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+9) and (n+15) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI reports with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.41-1: General test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell1		Cell 2	Deconfigured secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCells every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
SCell measurement cycle (measCycleSCell)	ms	320	
Ť1	ms	100	During this time the PCell and SCell2 shall be known and the SCell1 configured.
T2	S	1	During this time the UE shall activate the SCell1 and SCell2.
Т3	S	1	During this time the UE shall deactivate the SCell1 and SCell2.
Note: This test verifies the RRM is to the principle defined in s			pendent of channel bandwidth and is performed according

Table A.8.16.41-2: Cell specific test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Cell 1 Cell 2		ell 2	Cell 3		
		T1 T2 T3	T1	T2 T3	T1 T2 T3		
E-UTRA RF Channel Number		1		2	3		
BW <sub>channel</sub>		5MHz: N <sub>RB,c</sub> = 25	5MHz:	$N_{RB,c} = 25$	5MHz: N <sub>RB,c</sub> = 25		
		$10MHz: N_{RB,c} = 50$		$N_{RB,c} = 50$	10MHz: $N_{RB,c} = 50$		
		20MHz: N <sub>RB,c</sub> = 100	20MHz:	$N_{RB,c} = 100$	20MHz: $N_{RB,c} = 100$		
PDSCH parameters:		5MHz: R.7 FDD		-	=		
DL Reference Measurement Channel		10MHz: R.3 FDD 20MHz: R.6 FDD					
PCFICH/PDCCH/PHICH		5MHz: R.11 FDD	5MHz:	R.11 FDD	5MHz: R.11 FDD		
parameters:		10MHz: R.6 FDD		:: R.6 FDD	10MHz: R.6 FDD		
DL Reference Measurement		20MHz: R.10 FDD		R.10 FDD	20MHz: R.10 FDD		
Channel							
OCNG Patterns		5MHz: OP.20 FDD		OP.16 FDD	5MHz: OP.16 FDD		
		10MHz: OP.10 FDD		OP.2 FDD	10MHz: OP.2 FDD		
		20MHz: OP.17 FDD	20MHz:	OP.12 FDD	20MHz: OP.12 FDD		
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB	0		0	0		
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
N <sub>oc</sub> Note 2	dBm/	-104	-	104	-104		
<u> </u>	15 kHz						
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	-infinity	17	17		
Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	-infinity	17	17		
RSRP Note 3	dBm/ 15 kHz	-87	-infinity	-87	-87		
SCH_RP Note 3	dBm/	-87	-infinity	-87	-87		
Note 2	15 kHz						
lo Note 3	dBm/ Ch BW	-59.13+10log (N <sub>RB,c</sub> /50)	-76.22 +10log	-59.13+10log (N <sub>RB,c</sub> /50)	-59.13+10log (N <sub>RB,c</sub> /50)		
	OII DVV	(INRB,C / 30)	(N <sub>RB,c</sub> /50)	(14RB,c /30)	(14RB,c 750)		
Propagation Condition		AWGN		WGN	AWGN		
Antenna Configuration		1x2			1x2		
Timing offset to Cell 1	μS	-	0		0		
Time alignment error relative to cell 1 Note 5	μs	-	≤	TAE	≤ TAE		
Time alignment error relative to Cell 2 Note 5	μs	-		-	≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: The time alignment error (TAE) between two cells specified in TS36.104 [30] clause 6.5.3.1 (value depends upon the type of carrier aggregation).

#### A.8.16.41.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+9) and outside the subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.42 3DL TDD CA activation and deactivation of unknown SCell in non-DRX

### A.8.16.42.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL TDD carrier aggregation, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.42-1 and cell-specific parameters in A.8.16.42-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 and cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on redio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell 1) becomes configured on radio channel 2 (SCC1). During T1 the signal level of Cell 2 (SCell 1) is powered off and UE is not aware of Cell 2 (SCell 1).

A MAC message for activation of the SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m, where m is 4 or 9. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of Cell 3 (SCell2) in subframe (m+15). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSIs for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+11) and (m+20) to (m+26).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+15). The UE shall carry out deactivation of Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+11) and (n+20) to (n+26).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI reports with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.42-1: General test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Value	Comment			
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test			
Active PCell		Cell 1	Primary cell on RF channel number 1.			
Deconfigured SCell1		Cell 2	Deconfigured secondary cell on RF channel number 2.			
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.			
CP length		Normal				
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211 [16]. The same configuration applies to all cells.			
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211 [16]. The same configuration applies to all cells			
DRX		OFF	Continuous monitoring of primary cell			
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCells every UL subframe			
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.			
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.			
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.			
Filter coefficient		0	L3 filtering is not used			
SCell measurement cycle (measCycleSCell)	ms	320				
T1	ms	100	During this time the PCell and SCell2 shall be known and the SCell1 configured,			
T2	S	1	During this time the UE shall activate the SCell1 and SCell2.			
ТЗ	S	1	During this time the UE shall deactivate the SCell1 and SCell2			
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.						

Table A.8.16.42-2: Cell specific test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Cell 1		Cell 2	Cell 3	
		T1 T2 T3	T1	T2 T3	T1 T2 T3	
E-UTRA RF Channel Number		1		2	3	
BW <sub>channel</sub>		5MHz: N <sub>RB,c</sub> = 25	5MHz:	$N_{RB,c} = 25$	5MHz: N <sub>RB,c</sub> = 25	
		$10MHz: N_{RB,c} = 50$		$N_{RB,c} = 50$	10MHz: $N_{RB,c} = 50$	
		$20MHz: N_{RB,c} = 100$	20MHz:	$N_{RB,c} = 100$	20MHz: $N_{RB,c} = 100$	
PDSCH parameters:		5MHz: R.4 TDD		-	-	
DL Reference Measurement		10MHz: R.0 TDD				
Channel		20MHz: R.3 TDD		D 44 TDD	CMILE, D.44 TDD	
PCFICH/PDCCH/PHICH parameters:		5MHz: R.11 TDD 10MHz: R.6 TDD		R.11 TDD z: R.6 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD	
DL Reference Measurement		20MHz: R.10 TDD		: R.10 TDD	20MHz: R.10 TDD	
Channel		201VII 12. TV. TO TDD	2011112	14.10 100	20101112.113.110 120	
OCNG Patterns		5MHz: OP.9 TDD	5MHz:	OP.10 TDD	5MHz: OP.10 TDD	
		10MHz: OP.1 TDD		: OP.2 TDD	10MHz: OP.2 TDD	
		20MHz: OP.7 TDD	20MHz	: OP.8 TDD	20MHz: OP.8 TDD	
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	0		0	0	
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG RB <sup>Note 1</sup>	dB					
N <sub>oc</sub> Note 2	dBm/	-104		-104	-104	
	15 kHz					
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	-infinit	17	17	
Ê <sub>s</sub> /I <sub>ot</sub> Note 3	dB	17	-infinit	17	17	
RSRP Note 3	dBm/	-87	-infinit	-87	-87	
Note 2	15 kHz					
SCH_RP Note 3	dBm/	-87	-infinit	-87	-87	
lo Note 3	15 kHz					
lo note o	dBm/	-59.13+10log	-76.22	-59.13+10log	-59.13+10log	
	Ch BW	(N <sub>RB,c</sub> /50)	+10log (N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	
Propagation Condition		AWGN		WGN	AWGN	
Antenna Configuration		1x2		1x2	1x2	
Timing offset to Cell 1	μs	-		0	0	
Time alignment error relative to cell 1 Note 5	μs	-	<u></u>	TAE	≤ TAE	
Time alignment error relative to cell 2 Note 5	μs	-		-	≤ TAE	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: The time alignment error (TAE) between two cells specified in TS 36.104 [30] clause 6.5.3.1 (value depends upon the type of carrier aggregation).

### A.8.16.42.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframes (m+8) and (m+9) were subject to interruption when an intra-band SCell is activated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+11) and outside the subframes (m+20) to (m+26).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+11) and outside the subframes (n+20) to (n+26).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.43 E-UTRAN TDD-FDD CA activation and deactivation of known SCell in non-DRX with PCell in FDD

#### A.8.16.43.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is known by the UE at the time of activation and PCell is in FDD.

The test parameters are given in Tables A.8.16.43.1-1 and cell-specific parameters in A.8.16.43.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). The UE now starts monitoring also the SCC. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+24). The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.8.16.43.1-1: General test parameters for known SCell activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2	Two radio channels are used for this test
Number		1, 2	
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated		Cell 2	Deconfigured deactivated secondary cell
SCell		Oeii 2	on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and		0	CQI reporting for SCell every second
offset configuration index		U	subframe
Cell-individual offset for cells	dB	0	Individual offset for cells on primary
on RF channel number 1	uБ	U	component carrier.
Cell-individual offset for cells	dB	0	Individual offset for cells on secondary
on RF channel number 2	uБ	U	component carrier.
SCell measurement cycle	ms	320	
(measCycleSCell)	1113	320	
T1	s	7	During this time the PCell shall be known
	٥	1	and the SCell configured and detected.
T2	s	1	During this time the UE shall activate the
	3	I	SCell.
T3	C	1	During this time the UE shall deactivate
	S	1	the SCell.

Table A.8.16.43.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation with PCell in FDD

Parameter	Unit	Cell 1	Cell 2
		T1 T2 T3	T1 T2 T3
E-UTRA RF Channel		1	2
Number			
BW <sub>channel</sub>	MHz	5MHz: $N_{RB,c} = 25$	5MHz: $N_{RB,c} = 25$
		10MHz: $N_{RB,c} = 50$	10MHz: $N_{RB,c} = 50$
		20MHz: $N_{RB,c} = 100$	20MHz: N <sub>RB,c</sub> = 100
PDSCH parameters:		5MHz: R.7 FDD	-
DL Reference		10MHz: R.3 FDD	
Measurement Channel		20MHz: R.6 FDD	
PCFICH/PDCCH/PHIC		5MHz: R.11 FDD	5MHz: R.11 TDD
H parameters:		10MHz: R.6 FDD	10MHz: R.6 TDD
DL Reference		20MHz: R.10 FDD	20MHz: R.10 TDD
Measurement Channel			
OCNG Patterns		5MHz: OP.20 FDD	5MHz: OP.10 TDD
		10MHz: OP.10 FDD	10MHz: OP.2 TDD
DDOLL DA	,_	20MHz: OP.17 FDD	20MHz: OP.8 TDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RANote 1	dB		
OCNG_RB <sup>Note 1</sup>	dB		
N <sub>oc</sub> <sup>Note 2</sup>	dBm/15	-104	-104
	kHz		
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	17
Ê <sub>s</sub> /I <sub>ot</sub>	dB	17	17
RSRP Note 3	dBm/15	-87	-87
Niete 2	kHz		
SCH_RP Note 3	dBm/15	-87	-87
Noto 4	kHz		
lo Note 3	dBm/Ch	-59.13	-59.13
	BW	+10log	+10log
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
Propagation Condition		AWGN	AWGN
Antenna Configuration		1x2	1x2
Timing offset to Cell 1	μs	-	0
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\text{oc}}$  to be fulfilled.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.43.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+10) if the suframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+24).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+24) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# A.8.16.44 E-UTRAN TDD-FDD CA activation and deactivation of unknown SCell in non-DRX with PCell in FDD

#### A.8.16.44.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is unknown by the UE at the time of activation and PCell is in FDD.

The test parameters are given in Tables A.8.16.44.1-1 and cell-specific parameters in A.8.16.44.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Cell 1 has constant signal level throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). During T1 the SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 2 is increased to same level as for cell 1. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+34) provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.44.1-1: General test parameters for unknown SCell activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell shall be known and the SCell configured, but not detected.
T2	S	1	During this time the UE shall activate the SCell.
Т3	S	1	During this time the UE shall deactivate the SCell.

Table A.8.16.44.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation

Parameter	Unit	Cell 1	Cell 2			
		T1 T2 T3	T1 T2 T3			
E-UTRA RF Channel		1	2			
Number		•	_			
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB,c</sub> = 25	5MHz: $N_{RB,c} = 25$			
		10MHz: N <sub>RB,c</sub> = 50	10MHz: N <sub>RB,c</sub> = 50			
DDCCI I marrametara		20MHz: N <sub>RB,c</sub> = 100	20MHz: N <sub>RB,c</sub> = 100			
PDSCH parameters: DL Reference		5MHz: R.7 FDD 10MHz: R.3 FDD	-			
Measurement Channel		20MHz: R.6 FDD				
PCFICH/PDCCH/PHIC		5MHz: R.11 FDD	5MHz: R.11 TDD			
H parameters:		10MHz: R.6 FDD	10MHz: R.6 TDD			
DL Reference		20MHz: R.10 FDD	20MHz: R.10 TDD			
Measurement Channel		2011112.11.10122	2011112.11.10 100			
OCNG Patterns		5MHz: OP.20 FDD	5MHz: OP.10 TDD			
		10MHz: OP.10 FDD	10MHz: OP.2 TDD			
		20MHz: OP.17 FDD	20MHz: OP.8 TDD			
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	0	0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup> Noc Note 2	dB					
N <sub>oc</sub> Note 2	dBm/15	-104	-104			
<u>^</u>	kHz					
Ê <sub>s</sub> /N <sub>oc</sub>	dB	17	-Infinity 17			
Ê <sub>s</sub> /I <sub>ot</sub>	dB	17	-Infinity 17			
RSRP Note 3	dBm/15	-87	-Infinity -87			
OOLL DD Note 3	kHz	~=	1.6.7			
SCH_RP Note 3	dBm/15	-87	-Infinity -87			
lo Note 3	kHz dBm/Ch	-59.13	-76.22 -59.13			
10	BW	-59.13 +10log				
	DVV	(N <sub>RB,c</sub> /50)				
		(1 <b>1</b> RB,c /30)	(N <sub>RB,c</sub> (N <sub>RB,c</sub> /50)			
Propagation Condition		AWGN	AWGN			
Antenna Configuration		1x2	1x2			
Timing offset to Cell 1	μS	-	0			
Time alignment error	μS	-	≤ TAE			
relative to cell 1 Note 5	μο		- :/\L			
Note 1: OCNG shall be used such that all cells are fully allocated and a constant						

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: Es/lot, RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.16.44.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation and deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+34) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

### A.8.17 RSTD Measurements for E-UTRAN Carrier Aggregation

### A.8.17.1 E-UTRAN FDD RSTD measurement reporting delay test case

#### A.8.17.1.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the secondary component carrier and also the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4.

In the tests, there are two configured component carriers: PCC and SCC, and three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell on the PCC, Cell 2 is an active SCell on the SCC, and Cell 3 is a neighbour cell on the SCC. In all tests, Cell 2 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells on SCC, and the UE is expected to report RSTD measurements performed on SCC only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC and SCC, and the UE is expected to report RSTD measurements performed on PCC and on SCC.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 is active only in T2 and T3, and Cell 3 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.1.1-1, Table A.8.17.1.1-2, Table A.8.17.1.1-3 and Table A.8.17.1.1-4.

Table A.8.17.1.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCell		С	ell 1	PCell is on RF channel 1 (PCC).
SCell		С	ell 2	SCell on RF channel 2 (SCC). Cell 2 is the assistance data reference cell.
Other neighbor cell			ell 3	Neighbor cell on RF channel 2 (SCC).
PCFICH/PDCCH/PHICH parameters			easurement Channel 3 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz		10	
PRS Transmission Bandwidth	RB		50	PRS are transmitted over the system bandwidth
PRS configuration index $I_{\rm PRS}$			cells on PCC cells on SCC	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ – 160 DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes $N_{\mathrm{PRS}}$			1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 2 – PCI of Cell 3)mod6=0		The PCI of Cell 1 is selected randomly. PCIs of Cell 2 and Cell 3 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
CP length		Normal		
DRX		(	ON	DRX parameters are further specified in Table A.8.17.1.1-3
Radio frame receive time offset between the cells at the UE antenna connector	μs		o Cell 2: 1 o Cell 2: -1	PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	μs		error as specified in [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	μs	Cell 3: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	μs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA assistance data		OTDOA neighbor cells include Cell 3 and other 14 cells on SCC	OTDOA neighbor cells include Cell 1 and other 7 cells on PCC, and Cell 3 and other 6 cells on SCC	The list includes the reference cell (received in OTDOA-ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA-ProvideAssistanceData [24]. Cell 1 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 3 always appears at random places in the second half of the list.

prs-SubframeOffset			on PCC: 310 xcept reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset			on PCC: 0 xcept reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: Cell 1: '11110000' '11111111100000000' Cell 2: Cell 2: '000011111' Cell 3: Cell 3: Cell 3: '111110000' '1111111100000000'		Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	S	3		The length of the time interval from the beginning of each test
T2	S	1.28 2.48		The length of the time interval that follows immediately after time interval T1
Т3	s	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.1.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3			
E-UTRA RF Channel Number		1	N/A	N/A			
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low			
OCNG patterns defined in A.3.2.1		OP.5 FDD	N/A	N/A			
PBCH_RA PBCH_RB PSS_RA							
SSS_RA PCFICH_RB	† -						
PHICH_RA	dB	0	N/A	N/A			
PHICH_RB PDCCH_RA							
PDCCH_RB OCNG_RA <sup>Note 1</sup> OCNG_RB <sup>Note 1</sup>							
$N_{oc}$ Note 3	dBm/ 15 kHz	-95	N/A	N/A			
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	-Infinity	-Infinity	-Infinity			
Io Note 4	dBm/ 9 MHz	-67.22	N/A	N/A			
$\hat{\mathbf{E}}_{\mathrm{s}}/N_{oc}$	dB	0	-Infinity	-Infinity			
Propagation Condition Note 1: OCNG sha	all be used s	ETU30					

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: lo levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.1.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	Т3	T2	Т3	T2	T3
E-UTRA RF			1		2		2
Channel Number							
Correlation Matrix		1x2	2 Low	1x2	Low	1x2	Low
and Antenna							
Configuration						00.0	1
OCNG patterns		OP.	5 FDD	OP.6	FDD	OP.6	N/A
defined in A.3.2.1						FDD	
PBCH_RA	}						
PBCH_RB							
PSS_RA	-						
SSS_RA	<u> </u>						
PCFICH_RB							
PHICH_RA	dB		0	C	)	0	N/A
PHICH_RB	<u> </u>						
PDCCH_RA	<u> </u>						
PDCCH_RB							
OCNG_RA <sup>Note 1</sup>							
OCNG_RB <sup>Note 1</sup>							
PRS_RA	dB	-6	N/A	N/A	3	3	N/A
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-98	-98	-98	-95	-98	-95
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
PRS $\hat{E}_{_{s}}/I_{_{ot}}^{}$ Note 4	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
lo Note 4	dBm/ 9 MHz	-69.94	N/A	N/A	-66.68	-70.11	N/A
PRP Note 4	dBm/ 15 kHz	-102	-Infinity	-Infinity	-96	-106	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-99	-109	-Infinity
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-4	-11	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.17.1.1-4: DRX parameters for the test of E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	
Drx-InactivityTimer	psf1	As appointed in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2
longDRX-CycleStartOffset	sf320	13 30.331 [2], Clause 6.3.2
shortDRX	Disable	

### A.8.17.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 2 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 2, and RSTD measurements from Cell 2 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD 0000 and RSTD 12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil\frac{n}{M}\right\rceil$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 3 with respect to the reference cell Cell 2. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1 and Cell 3 with respect to the reference cell Cell 2.

### A.8.17.2 E-UTRAN TDD RSTD measurement reporting delay test case

### A.8.17.2.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the secondary component carrier and also the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4.

In the tests, there are two configured component carriers: PCC and SCC, and three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell on the PCC, Cell 2 is an active SCell on the SCC, and Cell 3 is a neighbour cell on the SCC. In all tests, Cell 2 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells on SCC, and the UE is expected to report RSTD measurements performed on SCC only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC and SCC, and the UE is expected to report RSTD measurements performed on PCC and on SCC.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 is active only in T2 and T3, and Cell 3 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.2.1-1, Table A.8.17.2.1-2, Table A.8.17.2.1-3 and Table A.8.17.2.1-4.

Table A.8.17.2.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCell		Ce	II 1	PCell is on RF channel 1 (PCC).
SCell		Се	·II 2	SCell on RF channel 2 (SCC). Cell 2 is the assistance data reference cell.
Other neighbor cell		Ce	ell 3	Neighbor cell on RF channel 2 (SCC).
PCFICH/PDCCH/PHICH parameters			asurement Channel TDD	As specified in clause A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz		0	
PRS Transmission Bandwidth	RB	5	0	PRS are transmitted over the system bandwidth
PRS configuration index $I_{\mathrm{PRS}}$			ells on PCC ells on SCC	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ $-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes $N_{\mathrm{PRS}}$			1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 2 – PCI of Cell 3)mod6=0		The PCI of Cell 1 is selected randomly. PCIs of Cell 2 and Cell 3 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
TDD uplink-downlink configuration		1		As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch- point periodicity and two downlink consecutive subframes
TDD special subframe configuration			6	As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_{\rm s}$ and
OD to a site		NI	1	UpPTS of $4384 \cdot T_{\rm s}$
CP length		INOI	mal	DRX parameters are further
DRX		C	N	specified in Table A.8.17.2.1-3
Radio frame receive time offset between the cells at the UE antenna connector	μs		Cell 2: 1 Cell 2: -1	PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	μs		error as specified in [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	μs	Cell 3: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	μs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA		16 cells	s in total	The list includes the reference

	1	Г	T	
assistance data		OTDOA neighbor cells include Cell 3 and other 14 cells on SCC	OTDOA neighbor cells include Cell 1 and other 7 cells on PCC, and Cell 3 and other 6 cells on SCC	cell (received in OTDOA-ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA-ProvideAssistanceData [24]. Cell 1 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 3 always appears at random places in the second half of the list.
prs-SubframeOffset			on PCC: 310 xcept reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset			on PCC: 0 xcept reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: Cell 1: '11110000' '1111111100000000' Cell 2: Cell 2: '000011111' '00000000111111111' Cell 3: Cell 3: '11110000' '1111111100000000'		Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	S	3		The length of the time interval from the beginning of each test
T2	S	1.28	2.48	The length of the time interval that follows immediately after time interval T1
Т3	s	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.2.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3			
E-UTRA RF		1	N/A	N/A			
Channel Number Correlation Matrix		1x2 Low	1x2 Low	1x2 Low			
and Antenna		IXZ LOW	TXZ LOW	TAZ LOW			
Configuration							
OCNG patterns		OD 4 TDD	NI/A	NI/A			
defined in A.3.2.2		OP.1 TDD	N/A	N/A			
PBCH_RA							
PBCH_RB	1						
PSS_RA	1						
SSS_RA	1						
PCFICH_RB	1						
PHICH_RA	dB	0	N/A	N/A			
PHICH_RB	1						
PDCCH_RA	1						
PDCCH_RB	1						
OCNG_RA <sup>Note 1</sup>	1						
OCNG_RB <sup>Note 1</sup>							
$N_{\it oc}^{$	dBm/ 15 kHz	-95	N/A	N/A			
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-Infinity	-Infinity	-Infinity			
Io Note 4	dBm/ 9 MHz	-67.22	N/A	N/A			
$\hat{E}_{s}/N_{oc}$	dB	0 -Infinity -Infinity					
Propagation Condition		ETU30					
Note 1: OCNG sha	all be used s	such that active cell (Co	ell 1) is fully allocated	and a constant total			

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: lo levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.2.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	Т3	T2	Т3	T2	T3
E-UTRA RF			1		2		2
Channel Number							
Correlation Matrix		1x2	2 Low	1x2	Low	1x2	Low
and Antenna							
Configuration						00.0	1
OCNG patterns defined in A.3.2.2		OP.	1 TDD	OP.2	TDD	OP.2 TDD	N/A
						טטו	1
PBCH_RA	1						
PBCH_RB	1						
PSS_RA	-						
SSS_RA	<u> </u>						
PCFICH_RB	10		•				N1/A
PHICH_RA	dB		0	C	)	0	N/A
PHICH_RB	<u> </u>						
PDCCH_RA	<u> </u>						
PDCCH_RB							
OCNG_RA <sup>Note 1</sup>							
OCNG_RB <sup>Note 1</sup>							
PRS_RA	dB	-6	N/A	N/A	3	3	N/A
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-98	-98	-98	-95	-98	-95
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
PRS $\hat{E}_{_{s}}/I_{_{ot}}^{}$ Note 4	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
lo Note 4	dBm/ 9 MHz	-69.94	N/A	N/A	-66.68	-70.11	N/A
PRP Note 4	dBm/ 15 kHz	-102	-Infinity	-Infinity	-96	-106	-Infinity
RSRP	dBm/ 15 kHz	-96	-96	-105	-99	-109	-Infinity
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-4	-11	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.17.2.1-4: DRX parameters for the test of E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	
Drx-InactivityTimer	psf1	As appointed in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2
longDRX-CycleStartOffset	sf320	13 30.331 [2], Clause 6.3.2
shortDRX	Disable	

### A.8.17.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 2 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 2, and RSTD measurements from Cell 2 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD 0000 and RSTD 12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left[\frac{n}{M}\right],$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 3 with respect to the reference cell Cell 2. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1 and Cell 3 with respect to the reference cell Cell 2.

## A.8.17.3 E-UTRAN FDD RSTD Measurement Reporting Test Case for 20 MHz

### A.8.17.3.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.1.1.

The parameters of this test are the same as defined in Subclause A.8.17.1.1 except that the values of the parameters in Table A.8.17.3.1-1, Table A.8.17.3.1-2 and Table A.8.17.3.1-1 will replace the values of the corresponding parameters in Table A.8.17.1.1-1, Table A.8.17.1.1-2 and Table A.8.17.1.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.3.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 FDD		As specified in section A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20		
PRS Transmission Bandwidth	RB	100		PRS are transmitted over the system bandwidth

Note 1: See Table A.8.17.1.1-1 for the other parameters.

This test verifies the RRM requirement which is independent of channel bandwidth and is performed Note 2: according to the principle defined in section A.3.6.1.

Table A.8.17.3.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.1		OP.13 FDD	N/A	N/A
lo Note 1	dBm/ 18 MHz	-64.21	N/A	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are

not settable parameters themselves.

Note 2: See Table A.8.17.1.1-2 for the other parameters.

Table A.8.17.3.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	Т3
OCNG patterns defined in A.3.2.1		OP.1	3 FDD	OP.14	FDD	OP.14 FDD	N/A
Io Note 1	dBm/ 18 MHz	-66.93	N/A	N/A	-63.67	-67.09	N/A

lo levels have been derived from other parameters for information purposes. They are Note 1: not settable parameters themselves.

See Table A.8.17.1.1-3 for the other parameters. Note 2:

#### A.8.17.3.2 **Test Requirements**

The test requirements defined in section A.8.17.1.2 shall apply in this test case.

### A.8.17.4 E-UTRAN TDD RSTD Measurement Reporting Test Case for 20 MHz

#### A.8.17.4.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.4.1-1, Table A.8.17.4.1-2 and Table A.8.17.4.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.4.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit		Value	Comment		
		Test 1 Test 2				
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD				As specified in section A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20				
PRS Transmission Bandwidth	RB		100	PRS are transmitted over the system bandwidth		

Note 1: See Table A.8.17.2.1-1 for the other parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.4.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.2		OP.7 TDD	N/A	N/A
Io Note 1	dBm/ 18 MHz	-64.21	N/A	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

not settable parameters themselves.

Note 2: See Table A.8.17.2.1-2 for the other parameters.

Table A.8.17.4.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.2		OP.	7 TDD	OP.8	TDD	OP.8 TDD	N/A
Io Note 1	dBm/ 18 MHz	-66.93	N/A	N/A	-63.67	-67.09	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.2.1-3 for the other parameters.

### A.8.17.4.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

### A.8.17.5 E-UTRAN FDD RSTD Measurement Reporting Test Case for 10MHz+5MHz

### A.8.17.5.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.1.1.

The parameters of this test are the same as defined in Subclause A.8.17.1.1 except that the values of the parameters in Table A.8.17.5.1-1, Table A.8.17.5.1-2 and Table A.8.17.5.1-1 will replace the values of the corresponding parameters in Table A.8.17.1.1-1, Table A.8.17.1.1-2 and Table A.8.17.1.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.5.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Va	Comment	
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			Cell 1: R.6 FDD Cell 2: R.11 FDD Cell 3: R.11 FDD	As specified in section A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	Cell 1: 10 Cell 2: 5 Cell 3: 5	Cell 1: 10 Cell 2: 5 Cell 3: 5	
PRS Transmission Bandwidth	RB	Cell 1: 50 Cell 2: 25 Cell 3: 25	Cell 1: 50 Cell 2: 25 Cell 3: 25	PRS are transmitted over the system bandwidth

Note 1: See Table A.8.17.1.1-1 for the other parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.5.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parar	Parameter		Cell 1	Cell 2	Cell 3			
		dBm/	-67.22	N/A	N/A			
lo Note 1		9 MHz	-07.22	IN//A	14/73			
10		dBm/	N/A	N/A	N/A			
		4.5MHz	IN/A	IN/A	IN/A			
Note 1:	1: lo levels have been derived from other parameters for information purposes.							

They are not settable parameters themselves.

Note 2: See Table A.8.17.1.1-2 for the other parameters.

Table A.8.17.5.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.	5 FDD	OP.19	FDD	OP.19 FDD	N/A
lo Note 1	dBm/ 9 MHz	-69.94	N/A	N/A	N/A	N/A	N/A
10	dBm/ 4.5MHz	N/A	N/A	N/A	-69.69	-73.12	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.1.1-3 for the other parameters.

### A.8.17.5.2 Test Requirements

The test requirements defined in section A.8.17.1.2 shall apply in this test case.

## A.8.17.6 E-UTRAN TDD RSTD Measurement Reporting Test Case for 10MHz+5MHz

### A.8.17.6.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.6.1-1, Table A.8.17.6.1-2 and Table A.8.17.6.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.6.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Va	lue	Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		Cell 1: R.6 TDD Cell 2: R.11 TDD Cell 3: R.11 TDD	Cell 1: R.6 TDD Cell 2: R.11 TDD Cell 3: R.11 TDD	As specified in section A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	Cell 1: 10 Cell 2: 5 Cell 3: 5	Cell 1: 10 Cell 2: 5 Cell 3: 5	
PRS Transmission Bandwidth	RB	Cell 1: 50 Cell 2: 25 Cell 3: 25	Cell 1: 50 Cell 2: 25 Cell 3: 25	PRS are transmitted over the system bandwidth

Note 1: See Table A.8.17.2.1-1 for the other parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.6.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
lo Note 1	dBm/ 9 MHz	-67.22	N/A	N/A
10	dBm/ 4.5MHz	N/A	N/A	N/A

Note 1: lo levels have been derived from other parameters for information purposes.

They are not settable parameters themselves.

Note 2: See Table A.8.17.1.1-2 for the other parameters.

Table A.8.17.6.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.	1 TDD	OP.10	TDD	OP.10 TDD	N/A
lo Note 1	dBm/ 9 MHz	-69.94	N/A	N/A	N/A	N/A	N/A
10	dBm/ 4.5MHz	N/A	N/A	N/A	-69.69	-73.12	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.1.1-3 for the other parameters.

### A.8.17.6.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

### A.8.17.7 E-UTRAN FDD RSTD Measurement Reporting Test Case for 5 + 5 MHz Bandwidth

### A.8.17.7.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.1.1.

The parameters of this test are the same as defined in Subclause A.8.17.1.1 except that the values of the parameters in Table A.8.17.7.1-1, Table A.8.17.7.1-2 and Table A.8.17.7.1-1 will replace the values of the corresponding parameters in Table A.8.17.1.1-1, Table A.8.17.1.1-2 and Table A.8.17.1.1-3, respectively.

This test verifies the RRM requirement which is independent of channel bandwidth and is performed Note: according to the principle defined in section A.3.6.1.

Table A.8.17.7.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH			Measurement	As specified in section
parameters		Channel	R.11 FDD	A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5		
PRS Transmission Bandwidth	RB	2	5	PRS are transmitted over the system bandwidth

Note 1: See Table A.8.17.1.1-1 for the other parameters.

This test verifies the RRM requirement which is independent of channel bandwidth and is Note 2: performed according to the principle defined in section A.3.6.1.

Table A.8.17.7.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.1		OP.18 FDD	N/A	N/A
lo <sup>Note 1</sup>	dBm/ 4.5 MHz	-70.23	N/A	N/A

lo levels have been derived from other parameters for information purposes. Note 1: They are not settable parameters themselves.

See Table A.8.17.1.1-2 for the other parameters.

Note 2:

Table A.8.17.7.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2 T3		T2 T3		T2	Т3
OCNG patterns defined in A.3.2.1		OP.18 FDD		OP.19 FDD		OP.19 FDD	N/A
Io Note 1	dBm/ 4.5 MHz	-72.95	N/A	N/A	-69.69	-73.12	N/A

lo levels have been derived from other parameters for information purposes. They are Note 1: not settable parameters themselves.

Note 2: See Table A.8.17.1.1-3 for the other parameters.

#### A.8.17.7.2 **Test Requirements**

The test requirements defined in section A.8.17.1.2 shall apply in this test case.

### A.8.17.8 E-UTRAN TDD RSTD Measurement Reporting Test Case for 5+5 MHz bandwidth

#### A.8.17.8.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.8.1-1, Table A.8.17.8.1-2 and Table A.8.17.8.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.8.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		DL Reference Channel F		As specified in section A.3.1.2.1
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5		
PRS Transmission Bandwidth	RB	25		PRS are transmitted over the system bandwidth

Note 1: See Table A.8.17.2.1-1 for the other parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.8.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.1		OP.9 TDD	N/A	N/A
Io Note 1	dBm/ 4.5 MHz	-70.23	N/A	N/A

Note 1: lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.2.1-2 for the other parameters.

Table A 8 17 8 1-3: Call-specific test parameters for E-LITPAN TDD PSTD measurement reporting

Table A.8.17.8.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2 T3		T2	Т3
OCNG patterns defined in A.3.2.1		OP.9 TDD		OP.10 TDD		OP.10 TDD	N/A
lo <sup>Note 1</sup>	dBm/ 4.5 MHz	-72.95	N/A	N/A	-69.69	-73.12	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.2.1-3 for the other parameters.

#### A.8.17.8.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

## A.8.17.9 E-UTRAN TDD RSTD Measurement Reporting Test Case for 20MHz+10MHz

### A.8.17.9.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.9.1-1, Table A.8.17.9.1-2 and Table A.8.17.9.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.9.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Va	lue	Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		Cell 1: R.10 TDD Cell 2: R.6 TDD Cell 3: R.6 TDD	Cell 1: R.10 TDD Cell 2: R.6 TDD Cell 3: R.6 TDD	As specified in section A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	Cell 1: 20 Cell 2: 10 Cell 3: 10	Cell 1: 20 Cell 2: 10 Cell 3: 10	
PRS Transmission Bandwidth	RB	Cell 1: 100 Cell 2: 50 Cell 3: 50	Cell 1: 100 Cell 2: 50 Cell 3: 50	PRS are transmitted over the system bandwidth

Note 1: See Table A.8.17.2.1-1 for the other parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.9.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
lo Note 1	dBm/ 18 MHz	-64.21	N/A	N/A
10	dBm/ 9 MHz	N/A	N/A	N/A

Note 1: lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.1.1-2 for the other parameters.

Table A.8.17.9.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cel	12	Cell 3	
		T2	T2 T3		T2 T3		Т3
OCNG patterns defined in A.3.2.1		OP.7 TDD		OP.2 TDD		OP.2 TDD	N/A
lo Note 1	dBm/ 18 MHz	-66.93	N/A	N/A	N/A	N/A	N/A
10	dBm/ 9MHz	N/A	N/A	N/A	-66.68	-70.11	N/A

Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: See Table A.8.17.1.1-3 for the other parameters.

### A.8.17.9.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

# A.8.17.10 E-UTRAN 3 DL FDD CA RSTD Measurement Reporting Delay Test Case

### A.8.17.10.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the same secondary component carrier, the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4, and also the measurement period requirements for RSTD measurements performed on different secondary component carriers specified in Clause 8.4.5.

In the tests, there are three configured component carriers: PCC, SCC1 and SCC2, and four synchronous cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the PCC, Cell 2 is SCell on the SCC1, Cell 3 is SCell on the SCC2 and Cell 4 is a neighbour cell on the SCC2. In all tests, Cell 3 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells only on SCC2, and the UE is expected to report RSTD measurements performed on SCC2 only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC, SCC1 and SCC2, and the UE is expected to report RSTD measurements performed on PCC, SCC1 and SCC2.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, Cell 2 is active only in T2 and T3, Cell 3 is active only during T2 and T3, and Cell 4 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T3, and Cell 4 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.10.1-1, Table A.8.17.10.1-2, Table A.8.17.10.1-3 and Table A.8.17.10.1-4.

Table A.8.17.10.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit		alue	Comment
		Test 1	Test 2	DCall is an DE shannel 4
PCell		С	Cell 1	PCell is on RF channel 1 (PCC).
SCell 1		С	Cell 2	SCell 1 on RF channel 2 (SCC1).
SCell 2		С	Cell 3	SCell 2 on RF channel 3 (SCC2). Cell 3 is the assistance data reference cell.
Other neighbor cell		С	Cell 4	Neighbor cell on RF channel 3 (SCC2).
PCFICH/PDCCH/PHICH parameters			easurement Channel 6 FDD	As specified in clause A.3.1.2.1
PRS configuration index $I_{\mathrm{PRS}}$		181 for all	cells on PCC cells on SCC1 cells on SCC2	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ $-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Physical cell ID PCI		(PCI of Cell 3 – P	PCI of Cell 4)mod6=0	The PCIs of Cell 1 and Cell 2 are selected randomly. PCIs of Cell 3 and Cell 4 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
CP length		No	ormal	
DRX			ON	DRX parameters are further specified in Table A.8.17.10.1-3
Radio frame receive time offset between the cells at the UE antenna connector	μѕ	Cell 3 to	to Cell 2: 1 o Cell 2: -1 to Cell 2: 3	PRS are transmitted from synchronous cells
Time alignment errors between cell1, cell2 and cell3	μs		error as specified in [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	μs	Cell 4: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	μs		5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA assistance data		OTDOA neighbor cells include Cell 4 and other 14 cells on SCC2  OTDOA neighbor cells include Cell 1 and other 3 cells on PCC, Cell 2 and other 3 cells on SCC1 and Cell 4 and other 6 cells on SCC2		The list includes the reference cell (received in OTDOA-ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA-ProvideAssistanceData [24]. Cell 1 and Cell 2 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.

prs-SubframeOffset		Cells o	on PCC: 310 n SCC1: 320 except reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells	on PCC: 0 on SCC1: 0 except reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000' Cell 4: '00001111'	Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000' Cell 4: 0000000011111111'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	S		3	The length of the time interval from the beginning of each test
T2	s	1.28 2.48		The length of the time interval that follows immediately after time interval T1
Т3	S	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.10.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3	Cell 4
E-UTRA RF Channel Number		1	N/A	N/A	N/A
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5,10,20	N/A	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low	1x2 Low
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	N/A	N/A	N/A
OCNG patterns defined in A.3.2.1		5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD	N/A	N/A	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA <sup>Note 1</sup> OCNG_RB <sup>Note 1</sup>	dB	0	N/A	N/A	N/A
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-95	N/A	N/A	N/A
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-Infinity	-Infinity	-Infinity	-Infinity
lo Note 4	dBm/ 9 MHz	-67.22 +10log (N <sub>RB,c</sub> /50)	N/A	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity	-Infinity
Propagation Condition			ETU:	30	

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: lo levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.10.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit		Cell 1		Cell 2		II 3	Cell 4	
		T2	T3	T2	T3	T2	Т3	T2	T3
E-UTRA RF Channel Number		1	1	2	2	;	3	3	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5,10	0,20	5,10	5,10,20		0,20	5,10,2	.0
Correlation Matrix and Antenna Configuration		1x2	Low	1x2 Low		1x2 Low		1x2 Lo	w
Antenna Comiguration		5MHz	: R.11	5MHz	: R.11	5MHz	:: R.11	5MHz:	
PCFICH/PDCCH/PHICH			DD D		DD DD		DD In: D.C	R.11 FDD	
parameters as specified			10MHz: R.6 FDD		lz: R.6 DD		Iz: R.6 DD	10MHz: R.6 FDD	N/A
in clause A.3.1.2.1			z: R.10		z: R.10		z: R.10	20MHz:	
		FL	DD	FL	DD	FL	OD	R.10 FDD 5MHz:	
OCNG patterns defined			OP.18		OP.19		OP.19	OP.19	
in A.3.2.1 (There is no PDSCH			DD z: OP.5		DD z: OP.6		DD z: OP.6	FDD 10MHz:	
allocated in the		FD	DD	F	DD	FI	DD	OP.6 FDD	N/A
subframe transmitting PRS)			: OP.13 DD		: OP.14 OD		: OP.14 OD	20MHz: OP.14	
,		, ,		1 -	JD	1 .	JD	FDD	
PRS Transmission Bandwidth (PRS									
transmission bandwidth		ENALI	z: 25	ENALI	z: 25	ENAL	2F	5MHz: 25	
depends on selected	RB		z. 25 Iz: 50	-	z. 25 Iz: 50	5MHz: 25 10MHz: 50		10MHz: 50	N/A
channel bandwidth. PRS are transmitted			lz:100		lz:100	20MHz:100		20MHz:100	
over the system									
bandwidth)  Number of consecutive									
downlink positioning									
subframes $N_{ m PRS}$ .									
$N_{ m PRS}$ also depends on		_	lz: 2	_	Hz: 2		Hz: 2	5MHz: 2	N1/A
selected channel		20M	Hz: 1 Hz:1		Hz: 1 Hz:1		Hz: 1  Hz:1	10MHz: 1 20MHz:1	N/A
bandwidth. As defined in TS 36.211 [16]. The									
number of subframes in									
a positioning occasion									
PBCH_RA PBCH_RB									
PSS_RA									
SSS_RA									
PCFICH_RB PHICH_RA	dB		)		0		0	0	N/A
PHICH_RB	uD.		,	`	3		O		14// (
PDCCH_RA									
PDCCH_RB									
OCNG_RA <sup>Note 1</sup> OCNG_RB <sup>Note 1</sup>									
PRS_RA	dB	-6	N/A	N/A	3	N/A	3	3	N/A
Note 3	dBm/	00	00	00	0.5	00	05	00	O.F.
TV oc	15 kHz	-98	-98	-98	-95	-98	-95	-98	-95
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-4	- Infinity	- Infinity	-1	- Infinity	-1	-8	- Infinity
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}^{\mathrm{Note 4}}$	dB	-4	- Infinity	- Infinity	-1	- Infinity	-1	-8	- Infinity

Io Note 4	dBm/ 9 MHz	-69.94 +10log (N <sub>RB,c</sub> /50)	N/A	N/A	-66.68 +10log (N <sub>RB,c</sub> /50)	N/A	-66.68 +10log (N <sub>RB,c</sub> /50)	-70.11 +10log (N <sub>RB,c</sub> /50)	N/A
PRP Note 4	dBm/ 15 kHz	-102	- Infinity	- Infinity	-96	- Infinity	-96	-106	- Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-99	-105	-99	-109	- Infinity
$\hat{ ext{E}}_{ ext{s}}/N_{oc}$ Note 4	dB	2	2	-7	-4	-7	-4	-11	- Infinity
Propagation Condition					Е	TU30			

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.17.10.1-4: DRX parameters for the test of E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	
Drx-InactivityTimer	psf1	As appoiling in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2
longDRX-CycleStartOffset	sf320	13 30.331 [2], Clause 6.3.2
shortDRX	Disable	

### A.8.17.10.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 4 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 3, RSTD measurements from Cell 2 and Cell 3, and RSTD measurements from Cell 4 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD\_0000 and RSTD\_12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil\frac{n}{M}\right\rceil,$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 4 with respect to the reference cell Cell 3. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1, Cell 2 and Cell 4 with respect to the reference cell Cell 3.

# A.8.17.11 E-UTRAN 3 DL TDD CA RSTD Measurement Reporting Delay Test Case

#### A.8.17.11.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the same secondary component carrier, the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4, and also the measurement period requirements for RSTD measurements performed on different secondary component carriers specified in Clause 8.4.5.

In the tests, there are three configured component carriers: PCC, SCC1 and SCC2, and four synchronous cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the PCC, Cell 2 is SCell on the SCC1, Cell 3 is SCell on the SCC2 and Cell 4 is a neighbour cell on the SCC2. In all tests, Cell 3 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells only on SCC2, and the UE is expected to report RSTD measurements performed on SCC2 only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC, SCC1 and SCC2, and the UE is expected to report RSTD measurements performed on PCC, SCC1 and SCC2.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, Cell 2 is active only in T2 and T3, Cell 3 is active only during T2 and T3, and Cell 4 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T3, and Cell 4 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of T2, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.11.1-1, Table A.8.17.11.1-2, Table A.8.17.11.1-3 and Table A.8.17.11.1-4.

Table A.8.17.11.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Valu	ue	Comment
		Test 1	Test 2	

PCell		Ce	ell 1	PCell is on RF channel 1 (PCC).
SCell 1		Ce	ell 2	SCell 1 on RF channel 2 (SCC1).
SCell 2		Ce	ell 3	SCell 2 on RF channel 3 (SCC2). Cell 3 is the assistance data reference cell.
Other neighbor cell		Cell 4		Neighbor cell on RF channel 3 (SCC2).
PCFICH/PDCCH/PHICH parameters			Measurement R.6 TDD	As specified in clause A.3.1.2.2
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5MHz or 10N	MHz or 20MHz	All channels in a test have the same bandwidth.
PRS configuration index $I_{\rm PRS}$		184 for all c	cells on PCC ells on SCC1 ells on SCC2	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}$ –160 DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Physical cell ID PCI		(PCI of Cell 3 – PCI of Cell 4)mod6=0		The PCIs of Cell 1 and Cell 2 are selected randomly. PCIs of Cell 3 and Cell 4 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
TDD uplink-downlink configuration			1	As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes
TDD special subframe configuration			6	As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_{\rm s}$ and UpPTS of $4384 \cdot T_{\rm s}$
CP length		No	rmal	7307 1 <sub>8</sub>
DRX			DN .	DRX parameters are further specified in Table A.8.17.11.1-3
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 3 to	Cell 2: 1 Cell 2: -1 Cell 2: 3	PRS are transmitted from synchronous cells
Time alignment errors among cell1, cell2 and cell3	μs	specified in 3GF	ment error as PP TS 36.104 [30] 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	μs	Cell 4: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	μs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA		16 cells	s in total	The list includes the reference cell

assistance data		OTDOA neighbor cells include Cell 4 and other 14 cells on SCC2	OTDOA neighbor cells include Cell 1 and other 3 cells on PCC, Cell 2 and other 3 cells on SCC1 and Cell 4 and other 6 cells on SCC2	(received in OTDOA-ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA-ProvideAssistanceData [24]. Cell 1 and Cell 2 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
prs-SubframeOffset		Cells on PCC: 310 Cells on SCC1: 320 Cells on SCC2, except reference cell: 0		Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0		The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000' Cell 4: '00001111'	Cell 1: '11111111000 00000' Cell 2: '00000000111 11111' Cell 3: '11111111000 00000' Cell 4: 000000001111 1111'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	S	3		The length of the time interval from the beginning of each test
T2	S	1.28	2.48	The length of the time interval that follows immediately after time interval T1
Т3	S	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.11.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3	Cell 4		
E-UTRA RF Channel		1	N/A	N/A	N/A		
Number				1 47 1	14/71		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5,10,20	N/A	N/A	N/A		
Correlation Matrix and		1x2 Low	1x2 Low	1x2 Low	1x2 Low		
Antenna Configuration							
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	N/A	N/A	N/A		
OCNG patterns defined in A.3.2.2		5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	N/A	N/A	N/A		
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA	dB	0	N/A	N/A	N/A		
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA <sup>Note 1</sup>							
OCNG_RB <sup>Note 1</sup>							
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-95	N/A	N/A	N/A		
PRS $\hat{\mathbf{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-Infinity	-Infinity	-Infinity	-Infinity		
lo Note 4	dBm/ 9 MHz	-67.22 +10log (N <sub>RB,c</sub> /50)	N/A	N/A	N/A		
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity	-Infinity		
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: lo levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.11.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Ce	II 1	Се	II 2	Се	II 3	Cell 4	ļ
		T2	Т3	T2	T3	T2	Т3	T2	Т3

E-UTRA RF Channel Number		1	l	2	2	;	3	3	
Correlation Matrix and Antenna Configuration		1x2	Low	1x2	Low	1x2	Low	1x2 Lo	w
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5,10	),20	5,10	0,20	5,10	0,20	5,10,2	0
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz TE 10MH TE 20MH:	DD Iz: R6 DD z: R10	TI 10MH TI 20MH	:: R11 DD Iz: R6 DD z: R10 DD	TI 10MH TI 20MH	z: R11 DD Hz: R6 DD z: R10 DD	5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	N/A
OCNG patterns defined in A.3.2.1		TE 10MHz TE	:: OP.1 )D :: OP.7	TE 10MHz TE 20MHz	OP.10 DD :: OP.1 DD :: OP.7	TI 10MHz TI 20MHz	OP.10 DD z: OP.1 DD z: OP.7 DD	5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	N/A
PRS Transmission Bandwidth (PRS transmission bandwidth depends on selected channel bandwidth. PRS are transmitted over the system bandwidth)	RB	_	z: 25 Hz: 50 Hz:100	10MF	z: 25 Hz: 50 Hz:100	10MF	z: 25 Hz: 50 Hz:100	5MHz: 25 10MHz: 50 20MHz:100	N/A
Number of consecutive downlink positioning subframes $^{N_{\mathrm{PRS}}}$ . $^{N_{\mathrm{PRS}}}$ also depends on selected channel bandwidth. As defined in TS 36.211 [16]. The number of subframes in a positioning occasion		5MH 10MI 20M		_	lz: 2 Hz: 1 Hz:1	10M	Hz: 2 Hz: 1 Hz:1	5MHz: 2 10MHz: 1 20MHz:1	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB OCNG_RA OCNG_RB Note 1	dB	(	)	(	)		0	0	N/A
PRS_RA	dB	-6	N/A	N/A	3	N/A	3	3	N/A
$N_{oc}^{ m Note  3}$	dBm/ 15 kHz	-98	-98	-98	-95	-98	-95	-98	-95
						1		T .	
PRS $\hat{\mathbf{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-4	- Infinity	- Infinity	-1	- Infinity	-1	-8	- Infinity

Io Note 4	dBm/ 9 MHz	-69.94 +10log (N <sub>RB,c</sub> /50)	N/A	N/A	-66.68 +10log (N <sub>RB,c</sub> /50)	N/A	-66.68 +10log (N <sub>RB,c</sub> /50)	-70.11 +10log (N <sub>RB,c</sub> /50)	N/A
PRP Note 4	dBm/ 15 kHz	-102	- Infinity	- Infinity	-96	- Infinity	-96	-106	- Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-99	-105	-99	-109	- Infinity
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 4}}$	dB	2	2	-7	-4	-7	-4	-11	- Infinity
Propagation Condition		ETU30							

- Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: If PRS\_RA is not "N/A",  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS\_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes

Table A.8.17.11.1-4: DRX parameters for the test of E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	
Drx-InactivityTimer	psf1	As appoiling in
drx-RetransmissionTimer	sf1	As specified in TS 36.331 [2], Clause 6.3.2
longDRX-CycleStartOffset	sf320	- 13 30.331 [2], Clause 0.3.2
shortDRX	Disable	

### A.8.17.11.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 4 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 3, RSTD measurements from Cell 2 and Cell 3, and RSTD measurements from Cell 4 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD\_0000 and RSTD\_12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil\frac{n}{M}\right\rceil,$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 4 with respect to the reference cell Cell 3. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1, Cell 2 and Cell 4 with respect to the reference cell Cell 3.

### A.8.18 E-UTRAN TDD – HRPD Measurements

# A.8.18.1 E-UTRAN TDD-HRPD event triggered reporting under fading propagation conditions

### A.8.18.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- HRPD cell search requirements in clause 8.1.2.4.12.

The test parameters are given in Tables A.8.18.1.1-1, A.8.18.1.1-2 and A.8.18.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.18.1.1-1: General test parameters for E-UTRAN TDD to HRPD event triggered reporting under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	E-UTRAN TDD cell
Neighbouring cell		Cell 2	HRPD cell
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
E-UTRAN TDD measurement quantity		RSRP	
Inter-RAT (HRPD) measurement quantity		CDMA2000 HRPD Pilot Strength	
b1-ThresholdCDMA2000	dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B1
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	Non-DRX test
Access Barring Information	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)	MHz	10	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
HRPD RF Channel Number		1	One HRPD carrier frequency is used.
HRPD neighbour cell list size		8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1	S	5	
T2	S	3	

Table A.8.18.1.1-2: Cell specific test parameters for E-UTRAN TDD cell#1 for event triggered reporting under fading propagation conditions

Parameter	Unit	Cell 1 (E	E-UTRA)			
		T1	T2			
E-UTRA RF Channel		1				
number						
BW <sub>channel</sub>	MHz	1	0			
Correlation Matrix and		1x2	Low			
Antenna Configuration						
OCNG Patterns defined in		OP.1	TDD			
TS36.133 A.3.2.2.1 (OP.1						
TDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB	0				
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{ m Note~2}$	dBm/15	-6	98			
	kHz					
RSRP Note 3	dBm/15	-98	-98			
	KHz					
$\hat{E}_s/N_{oc}$	dB	0	0			
$\hat{E}_s/I_{ot}$	dB	0	0			
Propagation Condition		ETI	J70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OEDM symbols						

OFDM symbols.

Interference from other cells and noise sources not specified in the Note 2: test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it ac}$  to be fulfilled.

RSRP levels have been derived from other parameters for Note 3: information purposes. They are not settable parameters themselves.

Table A.8.18.1.1-3: Cell specific test parameters for HRPD (cell # 2) for event triggered reporting under fading propagation conditions

Parameter	Unit	Cell 2 (HRPD)	
		T1	T2
$\frac{\text{Control}  E_b}{N_t}  \text{(38.4 kbps)}$	dB	21	
$\frac{\text{Control}  E_{b}}{N_{t}} $ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
$I_{oc}$	dBm/1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3
Propagation Condition		ETU70	

### A.8.18.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2134 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.19 E-UTRAN TDD – CDMA2000 1X Measurements

## A.8.19.1 E-UTRAN TDD – CDMA2000 1X event triggered reporting under fading propagation conditions

### A.8.19.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- CDMA2000 1X cell search requirements in clause 8.1.2.4.10.

The test parameters are given in Tables A.8.19.1.1-1, A.8.19.1.1-2 and A.8.19.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.19.1.1-1: General test parameters for E-UTRAN TDD-CDMA2000 1X event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on CDMA2000 1X RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
CDMA2000 1X Channel Number		1	One CDMA2000 1X carrier frequency is used.
Inter-RAT (CDMA2000 1X) measurement quantity		CDMA2000 1xRTT Pilot Strength	
B1-Threshold-CDMA2000	dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B1
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
cdma2000 1X neighbour cell list size		8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1	S	5	
T2	S	3	

Table A.8.19.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of CDMA2000 1X cell under fading propagation conditions

Parameter	Unit	Cell 1
		T1 T2
E-UTRA RF Channel Number		1
BW <sub>channel</sub>	MHz	10
Correlation Matrix and		1x2 Low
Antenna Configuration		
OCNG Pattern defined in		
A.3.2.2.1 (OP.1 TDD)		OP.1 TDD
PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	_
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA <sup>Note 1</sup>	dB	
OCNG_RB <sup>Note 1</sup>	dB	
$\hat{E}_{s}/I_{ot}$	dB	4 4
$\hat{E}_s/N_{oc}$	dB	4 4
N <sub>oc</sub>	dBm/15 kHz	-98
RSRP	dBm/15 kHz	-94 -94
SCH_RP	dBm/15 kHz	-94 -94
Propagation Condition		ETU70
Note 1: OCNG shall be used	auch that both o	alls are fully allocated and a constant total transmitted power

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.19.1.1-3: Cell specific test parameters for CDMA2000 1X (cell # 2) for event triggered reporting of CDMA2000 1X cell under fading propagation conditions

Parameter	Unit	Cell 2 (cd	ma2000 1X)		
		T1	T2		
$\begin{array}{c c} \hline Pilot & E_c \\ \hline I_{or} \\ \hline \end{array}$	dB	-7			
$\begin{array}{c c} Sync & E_c \\ \hline I_{or} \end{array}$	dB	-16			
$\frac{\text{Paging}  \text{E}_{\text{c}}}{\text{I}_{\text{or}}}  \text{(4.8 kbps)}$	dB	-	·12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity 0			
$I_{oc}$	dBm/1.2288 MHz	-	55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10		
Propagation Condition		ET	Ū70		

### A.8.19.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2134 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.20 Inter-frequency/RAT Measurements in CA mode

## A.8.20.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

It is not necessary for CA UEs to be tested in A.8.3.1 if this case is done.

### A.8.20.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.20.1.1-1 and A.8.20.1.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
E-UTRA RF Channel Number for Scell		3	One FDD carrier frequencies is used
Channel Bandwidth (BWchannel)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Configured active Scell		Cell 3	Cell 3 is on RF channel number 3
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Cell2 timing offset to cell1	ms	3	Asynchronous cells
Cell3 timing offset to cell1	μs	0	Synchronous cells
Time alignment error between cell3 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	S	5	
T2	S	5	

Table A.8.20.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Ce	ell 2	Cell 3		
		T1	T2	T1	T2	T1	T2	
E-UTRA RF		1			2	3	3	
Channel Number								
BW <sub>channel</sub>	MHz	10	)	•	10	10	0	
Correlation Matrix		1x2 L	_OW	1x2	Low	1x2	Low	
and Antenna								
Configuration								
OCNG Patterns								
defined in		OP.1	FDD	OP.2	2 FDD	OP.1	FDD	
A.3.2.1.1 (OP.1								
FDD) and in								
A.3.2.1.2 (OP.2								
FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB	_		0		0		
PHICH_RB	dB	0						
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
N <sub>oc Note 3</sub>	dBm/15 kHz				-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	-94	-94	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	4	4	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	-94	-94	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	4	4	
Propagation Condition		ETU70						

The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2:

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it ac}$  to be fulfilled.

RSRP and SCH RP levels have been derived from other parameters for information purposes. They are not Note 4: settable parameters themselves

#### A.8.20.1.2 **Test Requirements**

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement NOTE: reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.20.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

It is not necessary for CA UEs to be tested in A.8.4.1 if this case is done.

### A.8.20.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.20.2.1-1 and A.8.20.2.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
E-UTRA RF Channel Number for Scell		3	One TDD carrier frequencies is used
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Configured active Scell		Cell 3	Cell 3 is on RF channel number 3
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Cell2 timing offset to cell1	μs	3	Synchronous cells
Cell3 timing offset to cell1	μs	0	Synchronous cells
Time alignment error between cell3 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	S	5	
T2	S	10	

Table A.8.20.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1			ell 2	Cell 3		
		T1	T2	T1	T2	T1	T2	
E-UTRA RF			1	2		3		
Channel Number								
BW <sub>channel</sub>	MHz	1	10	,	10	1	0	
Correlation Matrix		1x2	Low	1x2	Low	1x2	Low	
and Antenna								
Configuration								
OCNG Pattern								
defined in		OP.1	I TDD	OP.2	2 TDD	OP.1	TDD	
A.3.2.2.1 (OP.1								
TDD) and in								
A.3.2.2.2 (OP.2)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB		_	0			_	
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	-Infinity	7	4	4	
$N_{oc}^{$	dBm/15 kHz			-I	-98		I	
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	-94	-94	
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91	-94	-94	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	4	4	
Propagation		ETU70						
Condition  Note 1: OCNG st	l nall be used such t							

density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.20.2.2 **Test Requirements**

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI<sub>DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.8.20.2A E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth.

### A.8.20.2A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.20.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.20.2A.1-1 and A.8.20.2A.1-2 will replace the values of corresponding parameters in Tables A.8.20.2.1-1 and A.8.20.2.1-2.

Table A.8.20.2A.1-1: General test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth

Parameter	Unit	Value	Comment				
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.2				
		Channel R.3 TDD					
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2				
parameters		Channel R.10 TDD	·				
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20					
Note 1: See Table A.8.20.2.1-1 for other general test parameters.							
Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according							
to the principle define	d in section	A.3.6.1.					

Table A.8.20.2A.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3			
		T1	T2	T1	T2	T1	T2		
BW <sub>channel</sub>	MHz	20		20		20			
OCNG Pattern									
defined in A.3.2.2		OP.7 TDD OP.8 TDD OP.7 TDD					TDD		
Note 1: See Table	Note 1: See Table A.8.20.2.1-1 for other general test parameters.								

### A.8.20.2A.2 Test Requirements

The test requirements defined in section A.8.20.2.2 shall apply to this test case.

## A.8.20.2B E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth.

### A.8.20.2B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.20.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.20.2B.1-1 and A.8.20.2B.1-2 will replace the values of corresponding parameters in Tables A.8.20.2.1-1 and A.8.20.2.1-2.

Table A.8.20.2B.1-1: General test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth

Unit	Value	Comment
MHz	20	
	DL Reference Measurement	As specified in section
	Channel R.3 TDD	A.3.1.1.2
	DL Reference Measurement	As specified in section
	Channel R.10 TDD	A.3.1.2.2
МНэ	10	
IVII IZ	10	
	DL Reference Measurement	As specified in section
	Channel R.0 TDD	A.3.1.1.2
	DL Reference Measurement	As specified in section
	Channel R.6 TDD	A.3.1.2.2
		MHz  DL Reference Measurement Channel R.3 TDD  DL Reference Measurement Channel R.10 TDD  MHz  10  DL Reference Measurement Channel R.0 TDD  DL Reference Measurement Channel R.0 TDD  DL Reference Measurement

Note 1: See Table A.8.20.2.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.20.2B.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3		
		T1	T2	T1	T2	T1	T2	
BW <sub>channel</sub>	MHz	20		10		10		
OCNG Pattern								
defined in A.3.2.2		OP.7 TDD OP.2 TDD OP.1 TDD					TDD	
Note 1: See Table A.8.20.2.1-1 for other general test parameters.								

### A.8.20.2B.2 Test Requirements

The test requirements defined in section A.8.20.2.2 shall apply to this test case.

### A.8.20.3 E-UTRAN FDD - UTRAN FDD event triggered reporting under fading propagation conditions

It is not necessary for CA UEs to be tested in A.8.5.1 if this case is done.

### A.8.20.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.20.3.1-1, A.8.20.3.1-2 and A.8.20.3.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.3.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN		DL Reference Measurement	As specified in clause A.3.1.1.1.
FDD)		Channel R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1.
parameters		Channel R.6 FDD	
(E-UTRAN FDD)			
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Configured active Scell		Cell 3	Cell 3 is on E-UTRA RF channel number 2.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA RF Channel Number for		2	One E-UTRA FDD carrier frequency is
Scell			used.
E-UTRA Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
b1-Threshold-UTRA	dB	-18	CPICH Ec/lo threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	S	5	
T2	S	6	

Table A.8.20.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1, cell # 3) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1		Cel	Cell 3		
		T1	T2	T1	T2		
E-UTRA RF Channel		1		2			
Number							
BW <sub>channel</sub>	MHz	1(	)	1(	)		
Correlation Matrix		1x2	_ow	1x2 l	OW		
and Antenna							
Configuration							
OCNG Pattern							
defined in A.3.2.1.1		OP.1	FDD	OP.1	FDD		
(OP.1 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB	0	)	0	l .		
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	4			
$\hat{E}_s/N_{oc}$	dB	4	4	4			
$N_{oc}$	dBm/15			-98			
	kHz		T	1			
RSRP	dBm/15 kHz	-94	-94	-9	4		
SCH_RP	dBm/15	-94	-94	-9	4		
Dranagation	kHz		<u> </u>	TUZO			
Propagation Condition			<b>_</b>	TU70			

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.20.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.941			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8		
$I_{oc}$	dBm/3.84 MHz	-70			
CPICH_Ec/lo	dB	-Infinity	-14		
Propagation Condition		Case 5 (Note	: 3)		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I<sub>or</sub>

Note3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.

### A.8.20.3.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.20.4 E-UTRAN TDD to UTRAN TDD cell search under fading propagation conditions

It is not necessary for CA UEs to be tested in A.8.7.1 if this case is done.

### A.8.20.4.1 Test Purpose and Environment

#### A.8.20.4.1.1 1.28 Mcps TDD option

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD to UTRA TDD cell search requirements in clause 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 1 E-UTRA TDD PCell, 1 E-UTRA TDD SCell and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.20.4.1.2-1, A.8.20.4.1.2-2, and A.8.20.4.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.4.1.1-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA RF Channel Number for Scell		2	One E-UTRA TDD carrier frequency is used.
Active cell		Cell 1	E-UTRA TDD cell
Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Configured active SCell		Cell 3	E-UTRA TDD cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1		normal	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
Ofn	dB	0	
Thresh	dBm	-87	
T1	S	5	
T2	s	10	

Table A.8.20.4.1.1-2: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 1, cell3)

Parameter	Unit	Cell 1		C	Cell 3	
		T1	T2	T1	T2	
E-UTRA RF Channel Number		1			2	
BW <sub>channel</sub>	MHz	1	0		10	
Correlation Matrix and Antenna		1x2	Low	1x2	2 Low	
Configuration						
OCNG Pattern defined in A.3.2.2.1 (OP.1		OP 1	TDD	OP	1 TDD	
TDD)		01.1	100	01.	1 100	
PBCH_RA	dB	]				
PBCH_RB	dB	]				
PSS_RA	dB	ļ				
SSS_RA	dB	ļ				
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB	0	0	0	0	
PDCCH_RA	dB					
PDCCH_RB	dB	ļ				
PDSCH_RA	dB					
PDSCH_RB	dB	ļ				
OCNG_RA <sup>Note1</sup>	dB					
OCNG_RB <sup>Note1</sup>	dB					
$\hat{ extbf{E}}_{ ext{s}}/ extbf{I}_{ ext{ot}}$	dB	9	9	9	9	
$\hat{E}_s/N_{oc}$	dB	9	9	9	9	
$N_{oc}$	dBm/15kHz	-98			•	
RSRP	dBm/15kHz	-89	-89	-89	-89	
SCH_RP	dBm/15kHz	-89	-89	-89	-89	
Propagation Condition			ET	J70	-	

The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2:

Table A.8.20.4.1.1-3: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)				
Timeslot Number		0 DwPTS			PTS	
		T1	T2	T1	T2	
UTRA RF Channel Number NOTE1			Char	nel 2		
PCCPCH_Ec/lor	dB	-3	-3			
DwPCH_Ec/lor	dB			0	0	
OCNS_Ec/lor <sup>NO1E2</sup>	dB	-3	-3			
$\hat{I}_{or}/I_{oc}$	dB	-inf	5	-inf	5	
$I_{oc}$	dBm/1.2 8 MHz	-80				
PCCPCH RSCP	dBm	-inf -78 n.a.		n.a.		
Propagation Condition			Case 3 <sup>NOTE3</sup>			

In the case of multi-frequency cell, the UTRA RF Channel Note 1:

Number is the primary frequency's channel number. The power of the OCNS channel that is added shall make Note 2: the total power from the cell to be equal to  $\ensuremath{\text{I}_{or}}\xspace$ 

Case 3 propagation conditions are defined in Annex B of Note 3: TS 25.102

### A.8.20.4.2 Test Requirements

### A.8.20.4.2.1 1.28 Mcps TDD option

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2xTTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.20.4A E-UTRAN TDD with 20 MHz +20 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions

### A.8.20.4A.1 Test Purpose and Environment

### A.8.20.4A.1.1 1.28 Mcps TDD option

The purpose of this test case is the same as for the test defined in subclause A.8.20.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8. 20.4A.1.1-1 and A.8. 20.4A.1.1-2 will replace the values of corresponding parameters in Tables A.8. 20.4.1.1-1 and A.8. 20.4.1.1-2.

Table A.8.20.4A.1.1-1: General test parameters for E-UTRA TDD with 20MHz +20MHz bandwidth to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment		
PDSCH parameters		DL Reference Measurement	As specified in section		
·		Channel R.3 TDD	A.3.1.1.2		
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section		
parameters	Channel R.10 TDD A.3.1.2.2		A.3.1.2.2		
Note 1: See Table A.8.20.4.1.1-1					
Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed					
according to the principle defined in section A.3.6.1.					

Table A.8.20.4A.1.1-2: Cell specific test parameters for cell search E-UTRA TDD with 20MHz +20MHz bandwidth to UTRA TDD test case (cell 1, cell3)

Parameter	Unit	Cell 1		Ce	ell 3
		T1	T2	T1	T2
BW <sub>channel</sub>	MHz	20		20	
OCNG Pattern defined in A.3.2.2		OP.7 TDD OP.7 TDD			' TDD
Propagation Condition		ETU70			
Note 1: See Table A.8.20.4.1.1-2 for other general test parameters.					
Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is					
performed according to the prin	ciple defined in secti-	on A.3.6.1.			

### A.8.20.4A.2 Test Requirements

#### A.8.20.4A.2.1 1.28 Mcps TDD option

The test requirements defined in section A.8.20.4.2.1 shall apply to this test case.

### A.8.20.4B E-UTRAN TDD with 20 MHz +10 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions

### A.8.20.4B.1 Test Purpose and Environment

### A.8.20.4B.1.1 1.28 Mcps TDD option

The purpose of this test case is the same as for the test defined in subclause A.8.20.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8. 20.4B.1.1-1 and A.8. 20.4B.1.1-2 will replace the values of corresponding parameters in Tables A.8. 20.4.1.1-1 and A.8. 20.4.1.1-2.

Table A.8.20.4B.1.1-1: General test parameters for E-UTRA TDD with 20MHz +10MHz bandwidth to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
Channel bandwidth for Cell 1 (BW <sub>channel</sub> )	MHz	20	
PDSCH parameters for Cell 1		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for Cell 1		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel bandwidth for Cell 3 (BW <sub>channel</sub> )	MHz	10	
PDSCH parameters for Cell 3		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for Cell 3		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2

Note 1: See Table A.8.20.4.1.1-1 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.20.4B.1.1-2: Cell specific test parameters for cell search E-UTRA TDD with 20MHz +10MHz bandwidth to UTRA TDD test case (cell 1, cell3)

Parameter	Unit	Cell 1		Cell 3	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
BW <sub>channel</sub>	MHz	20		10	
OCNG Pattern defined in A.3.2.2		OP.7 TDD		OP.1 TDD	

Note 1: See Table A.8.20.4.1.1-2 for other general test parameters.

Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

#### A.8.20.4B.2 Test Requirements

#### A.8.20.4B.2.1 1.28 Mcps TDD option

The test requirements defined in section A.8.20.4.2.1 shall apply to this test case.

## A.8.21 CSG Proximity Indication Testing Case for E-UTRAN FDD – FDD Inter frequency

Note: The test case in this section forms the basis for a signalling test for CSG proximity detection.

### A.8.21.1 Test Purpose and Environment

The purpose of this test is to verify the UE has implemented properly the feature for indicating that the UE is entering or leaving the proximity of one or more CSG member cells based on proximity detection with an autonomous search function, as defined by the requirements in Section 6.4.

The test case consists of three successive segments: Test Preparation, Negative Test, and Positive Test. The test scenario comprises of three E-UTRAN FDD cells on different carriers. Cell 1 represents the serving cell in the proximity of the CSG cell, Cell 2 the CSG cell, and Cell 3 the serving cell not in the proximity of the CSG cell. The description of the test procedure is shown in Table A.8.21-1. The general test parameters and cell specific test parameters are presented in Table A.8.21-2 and Table A.8.21-3 respectively.

Table A.8.21-1: Description of the test procedures

Parameter	Cell Status	Comment
		Test Preparation
Initial Condition	Cell 1 is active	Clean up the UE memory to be free from previously stored cell information for proximity detection.  Turn on the UE and allow sufficient time for the UE to select to Cell 1.
Time duration T1	Cell 1 and Cell 2 are active	Turn on Cell 2 at the start of T1.  Perform manual CSG selection towards Cell 2. The UE is expected to store necessary information for later proximity detection.
End condition		Turn off the UE. Turn off Cell 1 and Cell 2.
		Negative Test
Initial Condition	Cell 3 is active	Turn on Cell 3. Turn on the UE and set up the UE in connected mode with Cell 3
Time duration T2	Cell 3 is active	Configure the UE with proximity indication control by sending the Reconfiguration message with ReportProximityConfig at the start of T2. The UE is not expected to report "entering" proximity in the negative test.
End condition		Turn off the UE. Turn off Cell 3.
		Positive Test
Initial Condition	Cell 1 is active	Turn on Cell 1. Turn on the UE and set up the UE in connected mode with Cell 1.
Time duration T3	Cell 1 and Cell 2 are active	Turn on Cell 2 at the start of T3.  Configure the UE with proximity indication control by sending the Reconfiguration message with reportProximityConfig at the start of T3. The UE is expected to report "entering" proximity before end of T3.
End condition		Turn off the UE. Turn off Cell 1 and Cell 2.

Table A.8.21-2: General test parameters for E-UTRAN FDD-FDD inter frequency cell proximity detection test case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PDSCH allocation	$n_{PRB}$	2—3	13—36
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
A3-Offset	dB	-4	
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		off	As specified in section A.3.3
PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information	-	Not sent	No additional delays in random access procedure
Time offset between cells		3 ms	Asynchronous cells
Gap pattern configuration Id		0	As specified in Table 8.1.2.1-1 started before T1 starts
Time duration T1	S	[10]	Defined to give enough time for the UE to complete the manual reselection to Cell 2.
Time duration T2	S	[360]	Defined to be longer enough to see whether the UE will report enter "proximity" indication.
Time duration T3 Note 1	S	[<=360]	The time duration for a UE to report enters "proximity" when the UE is near a CSG cell.

Note 1: The maximum allowed time duration for the UE to decide either entering or leaving "proximity" is 360s.

To reduce test time, T3 may end once UE reports entering "proximity".

The test case assumes an environment where CSG proximity detection results not being impact by non-Note 2: 3GPP signals, such as GPS and WiFi. When the test case is being executed, the UE may ignore any radio signals which are not provided by the test setup which it would otherwise use in proximity estimation.

Table A.8.21-3: Cell specific test parameters for E-UTRAN FDD-FDD inter frequency cell proximity detection test case

Parameter	Unit	Cell 1				Cell 2	
		T1	T2	Т3	T1	T2	Т3
E-UARFCN			Channel 1		Channel 2		
CSG indicator			False		True	N/A	True
Physical cell global		1	1	1	2	N/A	2
identity							
CSG identity			Not sent		Sent	N/A	Sent
BW <sub>channel</sub>	MHz	10			10		
OCNG Patterns		OP.1 FDD	N/A	OP.2 FDD	OP.2	N/A	OP.2
defined in A.3.2.1.1					FDD		FDD
(OP.1 FDD) and in							
A.3.2.1.2 (OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0		0		
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$\hat{E}_s/I_{ot}$	dB	0	-inf	4	7	-inf	7
$N_{oc}^{ m Note~2}$	dBm/15 kHz		-98			-98	
$\hat{E}_s/N_{oc}$	dB	0	-inf	4	7	-inf	7
RSRP Note 3	dBm/15 KHz	-98	-inf	-94	-91	-inf	-91
Propagation Condition			AWGN			AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.21-4: Cell specific test parameters for E-UTRAN FDD-FDD inter frequency cell proximity detection test case (Cell 3)

Parameter	Unit			
		T1	T2	T3
E-UARFCN		Channel 1		
CSG indicator			False	
Physical cell global			3	
identity				
CSG identity			Not sent	
BW <sub>channel</sub>	MHz		10	
OCNG Patterns			N/A	
defined in A.3.2.1.1				
(OP.1 FDD) and in				
A.3.2.1.2 (OP.2 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB	0		
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB		-inf	
N <sub>oc</sub> Note 2	dBm/15 kHz		-98	
$\hat{E}_s/N_{oc}$	dB		-inf	
RSRP Note 3	dBm/15 KHz		-inf	
Propagation Condition			AWGN	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as

AWGN of appropriate power for  $\,N_{oc}\,$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves

### A.8.21.2 Test Requirements

The UE shall not send an "entering" proximity indication in T2 during Negative Test.

The UE shall send an "entering" proximity indication in T3 during Positive Test.

### A.8.22 E-UTRAN Discovery Signal Measurements

# A.8.22.1 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

### A.8.22.1.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.6.2.1.1.

The test parameters are given in Tables A.8.22.1.1-1, A.8.22.1.1-2, A.8.22.1.1-3 and A.8.22.1.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.1.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	1	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.1.1-3
T1	S	5	
T2	S	10	

Table A.8.22.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Ce	II 1	Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel		1			1	
Number						
BW <sub>channel</sub>	MHz	1	0	10		
Measurement	11	13-	-37	1	13-37	
bandwidth	$n_{{\it PRB}}$					
PDSCH parameters:		R.0	FDD		-	
DL Reference						
Measurement Channel						
PCFICH/PDCCH/PHIC		R.6	FDD	R.	6 FDD	
H parameters:						
DL Reference						
Measurement Channel						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OP	.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB	(	)	0		
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}^{\text{Note 2}}$	dBm/15 KHz			-98		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{st}$	dB	4	-1.46	-Infinity	-1.46	
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94	
lo Note 3	dBm/9MHz	-64.76	-62.42		columns for Cell 1	
Propagation Condition		ETU			TU30	
Correlation Matrix and			Low		2 Low	
Antenna Configuration		TAZ LOW				
Timing offset to Cell 1	μs	- 2.3 (CP/2)				
Note 1: OCNC shall be used such that both cells are fully allocated and a constant total transmitted power						

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 3: Es/lot, RSRP and SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.1.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.1.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.22.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 4864ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.22.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

### A.8.22.2.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.6.2.1.1.

The test parameters are given in Tables A.8.22.2.1-1, A.8.22.2.1-2, A.8.22.2.1-3 and A.8.22.2.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.2.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	2	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.2.1-3
T1	S	5	
T2	S	10	

Table A.8.22.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel			1		1	
Number						
BW <sub>channel</sub>	MHz		0	10		
Measurement	$n_{\scriptscriptstyle PRB}$	13	-37	1	3-37	
bandwidth	**PRB					
PDSCH parameters:		R.0	TDD		-	
DL Reference						
Measurement Channel						
PCFICH/PDCCH/PHIC		R.6	TDD	R.	6 TDD	
H parameters:						
DL Reference						
Measurement Channel						
OCNG Patterns						
defined in A.3.2.2.1		OP.1	TDD	OP OP	.2 TDD	
(OP.1 TDD) and in						
A.3.2.2.2 (OP.2 TDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB	0		0		
PHICH_RA	dB					
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
Noc Note 2	dBm/15 KHz			-98		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
$\hat{E}_{s}/I_{ot}$	dB	4	-1.46	-Infinity	-1.46	
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94	
SCH RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94	
lo Note 3	dBm/9MHz	-64.76	-62.42		columns for Cell 1	
Propagation Condition		ET	J30		TU30	
Correlation Matrix and			Low		2 Low	
Antenna Configuration						
Timing offset to Cell 1	μs	,	-	2.3	(CP/2)	
					· /	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 3: Es/lot, RSRP and SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.22.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 4864ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.22.3 E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

#### A.8.22.3.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the FDD-FDD inter-frequency measurement requirements in clause 8.6.2.2.1.

The test parameters are given in Tables A.8.22.3.1-1, A.8.22.3.1-2, A.8.22.3.1-3 and A.8.22.3.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. Entire discovery signal occasion should be contained in the measurement gap. The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.22.3.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2	Two FDD carrier frequencies are used.
Number			
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Gap Offset		9	As specified in TS 36.331 clause 6.3.5
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	1	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent	No additional delays in random access procedure.
DRX		ON	DRX related parameters are defined in Table A.8.22.3.1-3
T1	S	5	
T2	S	10	

Table A.8.22.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2		
		T1	T2	T1	T2	
E-UTRA RF Channel		,	1		2	
Number						
BW <sub>channel</sub>	MHz	1	0	10		
Measurement	n	13-	-37	1	13-37	
bandwidth	$n_{{\scriptscriptstyle PRB}}$					
PDSCH parameters:		R.0	FDD		-	
DL Reference						
Measurement Channel						
PCFICH/PDCCH/PHIC		R.6	FDD	R.	6 FDD	
H parameters:						
DL Reference						
Measurement Channel						
OCNG Patterns					<u> </u>	
defined in A.3.2.1.1		OP.1	FDD	OP	2.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB	0		0		
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB	1				
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}$ Note 2	dBm/15 kHz			-98		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
$\hat{E}_{s}/I_{ot}$	dB	4	4	-Infinity	7	
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
SCH RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
lo Note 3	dBm/9MHz	-64.76	-64.76	-70.22	-62.43	
Propagation Condition			J30		TU30	
Correlation Matrix and			Low		(2 Low	
Antenna Configuration		.,,,				
Timing offset to Cell 1	μs		-		3	
11.5 5.15 5.15	μο			1	- · · · · · · · · · · · · · · · · · · ·	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 3: Es/lot, RSRP and SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment	
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331	
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.	

### A.8.22.3.2 Test Requirements

UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

# A.8.22.4 E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

### A.8.22.4.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the FDD-FDD inter-frequency measurement requirements in clause 8.6.2.2.1.

The test parameters are given in Tables A.8.22.4.1-1, A.8.22.4.1-2, A.8.22.4.1-3 and A.8.22.4.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. Entire discovery signal occasion should be contained in the measurement gap. The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.22.4.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1, 2	Two TDD carrier frequencies are used.
Number			
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Gap Offset		9	As specified in TS 36.331 clause 6.3.5
Uplink-downlink		1	As specified in table 4.2-2 in TS 36.211.
configuration			The same configuration in both cells
Special subframe		6	As specified in table 4.2-1 in TS 36.211.
configuration			The same configuration in both cells
DMTC period	ms	160	As specified in IE MeasDS-Config in TS
			36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS
			36.331
Discovery signal occasion	ms	2	As specified in IE MeasDS-Config in TS
duration			36.331
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent	No additional delays in random access
_			procedure.
DRX		ON	DRX related parameters are defined in
			Table A.8.22.4.1-3
T1	S	5	
T2	S	10	

Table A.8.22.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2		
		T1 T2		T1	T2	
E-UTRA RF Channel		1			2	
Number				_		
BW <sub>channel</sub>	MHz	1	0		10	
Measurement	10	13	-37	1	3-37	
bandwidth	$n_{{\it PRB}}$					
PDSCH parameters:		R.0	TDD	-		
DL Reference						
Measurement Channel						
PCFICH/PDCCH/PHIC		R.6	TDD	R.	6 TDD	
H parameters:						
DL Reference						
Measurement Channel						
OCNG Patterns						
defined in A.3.2.2.1		OP.1	TDD	OP	.2 TDD	
(OP.1 TDD) and in						
A.3.2.2.2 (OP.2 TDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB	(	)	0		
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}$ Note 2	dBm/15 kHz			-98		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	
$\hat{E}_{s}/I_{ot}$	dB	4 4		-Infinity	7	
I RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91	
SCH RP Note 3	dBm/15 kHz	-94 -94		-Infinity	-91	
lo Note 3	dBm/9MHz			-70.22	-62.43	
Propagation Condition	-	ETU30			TU30	
Correlation Matrix and		1x2 Low 1x2 Low				
Antenna Configuration						
Timing offset to Cell 1	μs		-	3 (Synch	ronous cells)	
11.5 5.15 5.15				3 (3).1011		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled

Note 3: Es/lot, RSRP and SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.4.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.4.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment	
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331	
or Configurday	0	For further information see clause 6.3.2 in TS 36.331 and	
sr-ConfigIndex	U	section10.1 in TS 36.213.	

### A.8.22.4.2 Test Requirements

UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.8.22.5 E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX based on CSI-RS based discovery signal

### A.8.22.5.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.6.3.1.1.2.

The test parameters are given in Tables A.8.22.5.1-1, A.8.22.5.1-2, A.8.22.5.1-3 and A.8.22.5.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.5.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Value	Comment
		Test 1	
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.1
		Channel R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel		1	One FDD carrier frequency is used.
Number			
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion	ms	1	
duration			
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in
			Table A.8.22.5.1-3
Time offset between cells		2.3 μs	CP/2 or Synchronous cells
T1	S	5	
T2	S	10	

Table A.8.22.5.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Cell 1			Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel Number		1			1	
BW <sub>channel</sub>	MHz	10		10		
Measurement	n <sub>PRB</sub>		·37		13-37	
bandwidth	IIFKD	10	01	10 0.		
PDSCH parameters		DI Reference	Measurement	DI Referen	DL Reference Measurement	
1 Deer parameters			0 FDD as in	Channel R.0 FDD as in		
		A.3.		A.3.1.1.1		
PCFICH/PDCCH/PHIC			Measurement	DL Reference Measurement		
H parameters			6 FDD as in	Channel R.6 FDD as in		
,		A.3.1			A.3.1.2.1	
Correlation Matrix and		1x2		1x2 Low		
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OF	P.2 FDD	
(OP.1 FDD) and in						
A.3.2.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB			0		
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB	(	)			
PHICH_PB	dB					
PDCCH_RA	dB					
PDCCH_PB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB	_				
p-C-r10 [2]	dB	6	6	6	6	
N <sub>oc</sub> Note 3	dBm/15 KHz	-6		98		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
CRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-1.46	-Infinity	-1.46	
CSI-RS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	10	4.54	-Infinity	4.54	
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
lo	dBm/9 MHz	-60	-60	Specied in	columns for cell1	
CSI reference signal		2	2		4	
configurations [16]						
CSI-RS subframe		(	)		0	
offset						
CSI-RS individual	dB	0			0	
offset [2]						
CSI-RS muting		Enable		Enable		
Propagation Condition		ETU30		ETU30		
Timing offset to cell 1	us	t both cells are fi	-		3 (CP/2)	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.5.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.22.5.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5632ms ( $T_{identify\_intra\_SCE\_DRX} + T_{Measurement\_Period\_intra\_FDD\_CSI-RS\_DRX} = 16* max { <math>T_{DMTC\_periodicity}$ , DRX cycle length} +  $3*Max\{T_{DMTC\_periodicity}$ , DRX cycle length} +  $3*Max\{T_{DMTC\_periodicity}$ , DRX cycle length} =  $22*Max\{T_{DMTC\_periodicity}$ , DRX cycle length}) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.8.22.6 E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX based on CSI-RS based discovery signal

#### A.8.22.6.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.6.3.1.2.2.

The test parameters are given in Tables A.8.22.6.1-1, A.8.22.6.1-2, A.8.22.6.1-3 and A.8.22.6.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.6.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Value	Comment	
		Test 1		
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.2	
		Channel R.0 TDD		
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2	
parameters		Channel R.6 TDD		
Active cell		Cell 1		
Neighbour cell		Cell 2	Cell to be identified.	
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.	
DMTC period [2]	ms	160		
DMTC period offset [2]	ms	10		
Discovery signal occasion	ms	2		
duratuion				
A3-Offset	dB	-6		
CP length		Normal		
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.	
			The same configuration in both cells	
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.	
			The same configuration in both cells	
Hysteresis	dB	0		
Time To Trigger	S	0		
Filter coefficient		0	L3 filtering is not used	
DRX		ON	DRX related parameters are defined in	
			Table A.8.22.6.1-3	
T1	S	5		
T2	S	10		

Table A.8.22.6.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Ce	Cell 1		Cell 2
		T1	T2	T1	T2
E-UTRA RF Channel		,	1		1
Number	NAL I—	10			40
BW <sub>channel</sub>	MHz		10 10 13-37 13-37		
Measurement	n <sub>PRB</sub>	13	-37	1	13-37
bandwidth		DI Deference	Magauramant	DI Deferen	aa Maaauramant
DDCCII maramatara			Measurement		ce Measurement
PDSCH parameters			0 TDD as in		R.0 TDD as in
			1.1.2 Measurement		3.1.1.2 ce Measurement
DCEICH/DDCCH/DHIC					
PCFICH/PDCCH/PHIC			6 TDD as in		R.6 TDD as in
H parameters			1.2.2		3.1.2.2
Correlation Matrix and		1X2	Low	1)	k2 Low
Antenna Configuration					
OCNG Patterns		00.4	TDD	0.5	O TOD
defined in A.3.2.1.1		OP.1	TDD	OF	P.2 TDD
(OP.1 TDD) and in					
A.3.2.1.2 (OP.2 TDD)	ID.				
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB			0	
SSS_RA	dB				
PCFICH_RB	dB		2		
PHICH_RA	dB	(	0		
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
p-C-r10 [2]	dB	6	6	6	6
$N_{oc}$ Note 3	dBm/15 KHz			-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
1	4D	4	4.40	In the ite.	4.40
CRS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	4	-1.46	-Infinity	-1.46
CSI-RS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	10	4.54	-Infinity	4.54
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88
lo	dBm/9 MHz	-60	-57		columns for cell1
SCH_RP Note 4	dBm/15 KHz	-94 -94		-Infinity	-94
Propagation Condition	. <u> </u>			TU30	<del>-</del> <del>-</del> -
CSI reference signal			2		4
configurations [16]		_			•
CSI-RS subframe		0			0
offset		J			•
CSI-RS individual	dB	0			0
offset [2]					<del>-</del>
CSI-RS muting		Enable		ble Enable	
Timing offset to cell 1	us	0			3 (CP/2)
Note 1: OCNG shall b					

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.6.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS
TimeAlignmentTimer	51500	36.331
		For further information see
sr-ConfigIndex	0	clause 6.3.2 in TS 36.331 and
_		section10.1 in TS 36.213.

### A.8.22.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5632 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.8.22.7 E-UTRAN FDD-FDD Inter-frequency event triggered reporting in DRX based on CSI-RS based discovery signal

### A.8.22.7.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the FDD-FDD inter-frequency cell search in DRX requirements in clause 8.6.3.2.1.2.

The test parameters are given in Tables A.8.22.7.1-1, A.8.22.7.1-2, A.8.22.7.1-3 and A.8.22.7.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.7.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Value	Comment
		Test 1	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel		1,2	Two FDD carrier frequency is used.
Number			
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion	ms	1	
duration			
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in
			Table A.8.22.7.1-3
T1	S	5	
T2	S	10	

Table A.8.22.7.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Се	II 1	(	Cell 2	
		T1	T2	T1	T2	
E-UTRA RF Channel		,			2	
Number						
BW <sub>channel</sub>	MHz	10			10	
Measurement	n <sub>PRB</sub>	13-	-37	13-37		
bandwidth						
PDSCH parameters		DL Reference	Measurement	DL Referen	ce Measurement	
•			0 FDD as in		R.0 FDD as in	
		A.3.1	1.1.1	A.	.3.1.1.1	
PCFICH/PDCCH/PHIC		DL Reference	Measurement		ce Measurement	
H parameters		Channel R.	6 FDD as in	Channel	R.6 FDD as in	
·		A.3.	1.2.1	Α.	3.1.2.1	
Correlation Matrix and			Low		x2 Low	
Antenna Configuration						
OCNG Patterns						
defined in A.3.2.1.1		OP.1	FDD	OF	P.2 FDD	
(OP.1 FDD) and in						
À.3.2.1.2 (ÓP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB			0		
PCFICH_RB	dB					
PHICH_RA	dB	(	)			
PHICH_PB	dB					
PDCCH_RA	dB					
PDCCH_PB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
p-C-r10 [2]	dB	6	6	6	6	
	dBm/15 KHz	0	_	98	0	
$N_{oc}$ Note 3	ubili/13 KHZ		_	30		
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	
$E_s/W_{oc}$						
CRS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	4	-1.46	-Infinity	-1.46	
CSI-RS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	10	4.54	-Infinity	4.54	
	ID (45.14)	2.4		1.6.7		
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94	
lo	dBm/9 MHz	-60	-60		ified for cell 1	
Propagation Condition				U30		
CSI reference signal		2 4		4		
configurations [16]						
CSI-RS subframe		0			0	
offset						
CSI-RS individual	dB	(	0		0	
offset [2]						
CSI-RS muting		Ena	able	E	Enable	
Timing offset to cell 1	us		-		3us	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted						

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.7.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.7.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	For further information see
TimeAlignmentTimer	\$1500	clause 6.3.2 in TS 36.331.
		For further information see
sr-ConfigIndex	0	clause 6.3.2 in TS 36.331 and
_		section10.1 in TS 36.213

### A.8.22.7.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5888ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

# A.8.22.8 E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation condition in DRX based on CSI-RS based discovery signal

### A.8.22.8.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the TDD-TDD inter-frequency cell search in DRX requirements in clause 8.6.3.2.2.2.

The test parameters are given in Tables A.8.22.8.1-1, A.8.22.8.1-2, A.8.22.8.1-3 and A.8.22.8.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.8.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Test 1	Comment
		Value	
E-UTRA RF Channel		1, 2	Two TDD carrier frequencies are used.
Number			
Channel Bandwidth	MHz	10	
(BW <sub>channel</sub> )			
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink		1	As specified in TS 36.211 clause 4.2 Table
configuration			4.2-2
Special subframe		6	As specified in table 4.2-1 in TS 36.211.
configuration			The same configuration in both cells
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion	ms	2	
duration			
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
PRACH configuration		4	As specified in table 5.7.1-3 in TS 36.211
Access Barring Information	- T	Not Sent	No additional delays in random access
			procedure.
DRX		ON	DRX related parameters are defined in
			Table A.8.22.8.1-3
T1	s	5	
T2	S	10	

Table A.8.22.8.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

T1	Parameter	Unit	Ce	II 1		Cell 2
Number			T1	T2	T1	T2
BW   Description   BR   BR   BR   BR   BR   BR   BR   B	E-UTRA RF Channel		1			2
Measurement	Number					
Dandwidth	BW <sub>channel</sub>	MHz	10			10
Dandwidth		n <sub>PRB</sub>	13-	-37	13-37	
Channel R.O TDD as in A.3.1.1.2	bandwidth					
Channel R.O TDD as in A.3.1.1.2			DL Reference	Measurement	DL Referen	ce Measurement
A.3.1.1.2	'					
H parameters						
H parameters	PCFICH/PDCCH/PHIC		DL Reference	Measurement	DL Referen	ce Measurement
Note   Correlation Matrix and Antenna Configuration   National Configuration	H parameters		Channel R.	6 TDD as in	Channel	R.6 TDD as in
Note   Correlation Matrix and Antenna Configuration   National Configuration	·		A.3.1	.2.2.	Α.	3.1.2.2.
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)	Correlation Matrix and					
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)	Antenna Configuration					
(OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)         A.B           ASEL RA         dB           PBCH_RA         dB           PBCH_RB         dB           PSS_RA         dB           PSS_RA         dB           PCFICH_RB         dB           PHICH_RA         dB           PDCCH_RA         dB           PDCCH_PB         dB           PDSCH_RA         dB           PDSCH_RB         dB           OCNG_RA <sup>NOIG 1</sup> dB           OCNG_RA <sup>NOIG 1</sup> dB           OCNG_RA <sup>NOIG 1</sup> dB           OCNG_RB <sup>NOIG 2</sup> dB           6 6         6           6 7         O           PS         J           Moc         dB           4 4         -Infinity           4 5         -Infinity           4 6         -94           4 6         -94           4 6         -94     <						
A.3.2.1.2 (ÔP.2 TDD)	defined in A.3.2.1.1		OP.1	TDD	OF	P.2 TDD
PBCH_RA	(OP.1 TDD) and in					
PBCH_RB	À.3.2.1.2 (ÓP.2 TDD)					
PSS_RA		dB				
PSS_RA	PBCH_RB	dB				
SSS_RA		dB			0	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						
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PDCCH_PB						
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			6	6	6	6
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		-	, , ,	_	_	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	N <sub>oc</sub> Note 5	dBill/10 Ril2			50	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\hat{F}/N$	dB	4	4	-Infinity	4
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					-	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	crs Ê /I	dB	4	-1.46	-Infinity	-1.46
RSRP   Note 4   dBm/15 KHz   -94   -94   -94   -94   -94						
RSRP Note 4         dBm/15 KHz         -94         -94         -Infinity         -94           CSI-RSRP Note 4         dBm/15 KHz         -88         -88         -Infinity         -88           SCH_RP Note 4         dBm/15 KHz         -94         -94         -Infinity         -94           Io         dBm/9 MHz         -60         -60         As specificed for cell1           Propagation Condition         ETU30         ETU30           CSI reference signal configurations [16]         2         4           CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable	CSI-RS Ê./I	dB	10	4.54	-Infinity	4.54
CSI-RSRP Note 4         dBm/15 KHz         -88         -88         -Infinity         -88           SCH_RP Note 4         dBm/15 KHz         -94         -94         -Infinity         -94           Io         dBm/9 MHz         -60         -60         As specificed for cell1           Propagation Condition         ETU30           CSI reference signal configurations [16]         2         4           CSI-RS subframe offset         0         0           Offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable		dDm/15 KUz	0.4	0.4	Infinity	0.4
SCH_RP Note 4         dBm/15 KHz         -94         -94         -Infinity         -94           Io         dBm/9 MHz         -60         -60         As specificed for cell1           Propagation Condition         ETU30           CSI reference signal configurations [16]         2         4           CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable	Noto 4		_			
Io         dBm/9 MHz         -60         -60         As specificed for cell1           Propagation Condition         ETU30           CSI reference signal configurations [16]         2         4           CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable	COLL DD Note 4					
Propagation Condition         ETU30           CSI reference signal configurations [16]         2         4           CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable			_			
CSI reference signal configurations [16]         2         4           CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable		abm/9 MHZ	-60			liced for cell i
configurations [16]         0         0           CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         0         0           CSI-RS muting         Enable         Enable					030	
CSI-RS subframe offset         0         0           CSI-RS individual offset [2]         dB         0         0           CSI-RS muting         Enable         Enable			2 4		4	
offset         0         0           CSI-RS individual offset [2]         0         0           CSI-RS muting         Enable         Enable		1			0	
CSI-RS individual dB 0 0 0 offset [2] Enable Enable			U			U
offset [2] CSI-RS muting Enable Enable		-15				
CSI-RS muting Enable Enable		aR	0			U
		<del> </del>	_		<u> </u>	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted	Timing offset to cell 1	us		-	<u> </u>	3

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.8.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	36.331
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.8.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.22.8.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5888ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.8.22.9 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

#### A.8.22.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] when CRS based discovery signal is configured within the requirements stated in clause 8.7.2.4.1.

The test parameters are given in Tables A.8.22.9.1-1 and A.8.22.9.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.9.1-1: General test parameters for E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

	Parameter	Unit	Value	Comment
E-U1	RA RF Channel		4.0	Two radio channels are used for this test
Num	ber		1, 2	
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.
Conf	igured deactivated		Cell 2	Configured deactivated secondary cell on
SCe			Geil 2	RF channel number 2.
Neig	hbour cell		Cell 3	Neighbor cell to be identified on RF
				channel number 2.
	ength		Normal	
DRX			OFF	Continuous monitoring of primary cell
DMT	C period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc	-PeriodOffset for cells 2	ms	10	As specified in IE MeasDS-Config in TS
and	3			36.331
Disc	overy signal occasion	ms	1	As specified in IE MeasDS-Config in TS
dura			-	36.331
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm		Actual RSRP threshold for event A2.
			-93	Needs to take absolute accuracy tolerance
			88	in clause 9.1.14.2 into account plus
				margin.
	Time To Trigger	S	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB		Offset parameter for evaluation of event
			-6	A6. Needs to take relative accuracy
				tolerance in clause 9.1.14.2 into account
	Descrit on Leave		E-I	plus margin.
	Report on leave	_	False	
Call	Time To Trigger individual offset for cells	s dB	0	Individual effect for calle or primary
	F channel number 1	ав	0	Individual offset for cells on primary
	individual offset for cells	dB		component carrier.  Individual offset for cells on secondary
on RF channel number 2		uБ	0	component carrier.
	Filter coefficient		0	L3 filtering is not used
	I measurement cycle	ms		Lo intering is not used
(mes	asCycleSCell)	1112	320	
T1	100,01000011	S	10	
T2		S	10	
T3		S	5	
10		3	5	

NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.22.9.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

Parameter	Unit		Cell 1			Cell 2		Cell 3			
		T1	T2	Т3	T1	T2	Т3	T1	T1 T2 T3		
E-UTRA RF Channel			1			2			2		
Number											
BW <sub>channel</sub>	MHz		10			10			10		
Measurement	$n_{PRB}$		13-37			13-37			13-37		
bandwidth	PRB										
PDSCH parameters:			R.0 FDD			-			-		
DL Reference											
Measurement Channel			D o EDD			D 0 EDD		_	0.0.500		
PCFICH/PDCCH/PHIC			R.6 FDD			R.6 FDD		F	R.6 FDD		
H parameters:											
DL Reference											
Measurement Channel											
OCNG Patterns								_			
defined in A.3.2.1.1		(	OP.1 FDD		(	OP.2 FDD		0	P.2 FDD		
(OP.1 FDD) and in											
A.3.2.1.2 (OP.2 FDD)											
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB		0			0			0		
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG_RB <sup>Note 1</sup>	dB										
N <sub>oc</sub> Note 2	dBm/15 kHz		-101				-10	1			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3	
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76	
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104	
SCH RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104	
lo Note 3	dBm/9MHz	-54.16	-54.16	-	-54.16	-51.18	-	Specifie		nns for	
				71.45			70.20		Cell 2		
Propagation Condition		ETU30			ETU30			ETU30			
Correlation Matrix and			1x2 Low			1x2 Low			1x2 Low		
Antenna Configuration											
Timing offset to Cell 1	μs		-		0			-			
Time alignment error	μs		_		U ≤ TAE			N/A			
relative to cell 1 Note 5	μδ		-			> IAC			IN/A		
Timing offset to Cell 2	μS					_			2.3 (CP/2)		
<u> </u>		t all cells a	re fully allo	cated and	d a constar	d a constant total transmitted power s					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

#### A.8.22.9.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 5.12s  $(13 \times measCycleSCell + T_{measure\_scc\_CRS})$  from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than  $480~(3\times T_{DMTC\_periodicity})$  ms from beginning of time T3.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: Es/lot, RSRP and SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.22.10 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

### A.8.22.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] when CRS based discovery signal is configured within the requirements stated in clause 8.7.2.4.1.

The test parameters are given in Tables A.8.22.10.1-1 and A.8.22.10.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.10.1-1: General test parameters for E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

	Parameter	Unit	Value	Comment			
E-U7	RA RF Channel		1, 2	Two radio channels are used for this test			
Num	ber		•				
Activ	e PCell		Cell 1	Primary cell on RF channel number 1.			
Conf	igured deactivated		Cell 2	Configured deactivated secondary cell on			
SCe			Cell 2	RF channel number 2.			
Neig	hbour cell		Cell 3	Neighbor cell to be identified on RF			
			Cell 3	channel number 2.			
	ength		Normal				
	cial subframe		6	As specified in table 4.2.1 in TS 36.211.			
	guration		6	The same configuration applies to all cells.			
Uplir	k-downlink		1				
	guration		·				
DRX			OFF	Continuous monitoring of primary cell			
DMT	C period	ms	160	As specified in IE MeasDS-Config in TS			
				36.331			
	-PeriodOffset for cells 2	ms	10	As specified in IE MeasDS-Config in TS			
and				36.331			
	overy signal occasion	ms	2	As specified in IE MeasDS-Config in TS			
dura				36.331			
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.			
	Threshold RSRP	dBm		Actual RSRP threshold for event A2.			
			-93	Needs to take absolute accuracy tolerance			
			-93	in clause 9.1.14.2 into account plus			
				margin.			
	Time To Trigger	S	0				
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.			
	Offset	dB		Offset parameter for evaluation of event			
			-6	A6. Needs to take relative accuracy			
			9	tolerance in clause 9.1.14.2 into account			
				plus margin.			
	Report on leave		False				
	Time To Trigger	S	0				
	individual offset for cells	dB	0	Individual offset for cells on primary			
	F channel number 1			component carrier.			
	individual offset for cells	dB	0	Individual offset for cells on secondary			
	F channel number 2			component carrier.			
	coefficient		0	L3 filtering is not used			
	I measurement cycle	ms	320				
	sCycleSCell)						
T1		S	10				
T2		S	10				
T3		S	5				

NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.22.10.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

Parameter	Unit		Cell 1			Cell 2		Cell 3			
		T1	T2	Т3	T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel					2				2		
Number			1		2			2			
BW <sub>channel</sub>	MHz		10			10			10		
Measurement	10		40.07			40.07			40.07		
bandwidth	$n_{PRB}$		13-37			13-37			13-37		
PDSCH parameters:			R.0 TDD			-			-		
DL Reference											
Measurement Channel											
PCFICH/PDCCH/PHIC			R.6 TDD			R.6 TDD		F	R.6 TDD		
H parameters:											
DL Reference											
Measurement Channel											
OCNG Patterns											
defined in A.3.2.2.1		(	OP.1 TDD		(	OP.2 TDD		0	P.2 TDD		
(OP.1 TDD) and in											
A.3.2.2.2 (OP.2 TDD)											
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB		0			0			0		
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG_RB <sup>Note 1</sup>	dB										
N <sub>oc</sub> Note 2	dBm/15 kHz		-101				-10	1			
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3	
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76	
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104	
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104	
lo Note 3	dBm/9MHz	-54.16	-54.16	-	-54.16	-51.18	-	Specified	d in colur	nns for	
				71.45			70.20		Cell 2		
Propagation Condition		ETU30			ETU30			ETU30			
Correlation Matrix and			1x2 Low			1x2 Low		1	x2 Low		
Antenna Configuration											
Timing offset to Cell 1	μS	-		0			-				
Time alignment error	μS		-		≤ TAE			N/A			
relative to cell 1 Note 5	F										
Timing offset to Cell 2	μs		-			-		2.3 (CP/2)			
Note 1: OCNG shall b	a used such that	t all colle a	re fully alle	cated and	d a constar	at total tran	emitted n	ower coest	ral danci	tv. ic	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

#### A.8.22.10.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 5.12s  $(13 \times measCycleSCell + T_{measure\_scc\_CRS})$  from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 ( $3\times T_{DMTC\_periodicity}$ ) ms from beginning of time T3.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N<sub>oc</sub> to be fulfilled.

Note 3: Es/lot, RSRP and SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.22.11 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CSI-RS based discovery signal

### A.8.22.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.7.3.4.1.

The test parameters are given in Tables A.8.22.11.1-1 and A.8.22.11.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.11.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

	Parameter	Unit	Value	Comment			
E-U	TRA RF Channel		1, 2	Two radio channels are used for this test			
Num	ber		1, 2				
	e PCell		Cell 1	Primary cell on RF channel number 1.			
Conf	figured deactivated		Cell 2	Configured deactivated secondary cell on			
	SCell		Oeii 2	RF channel number 2.			
Neig	hbour cell		Cell 3	Neighbor cell to be identified on RF channel number 2.			
DMT	C period	ms		As specified in IE MeasDS-Config in TS			
	•	1113	160	36.331			
dmtd	-PeriodOffset for cells 2	ms	10	As specified in IE MeasDS-Config in TS			
and				36.331			
	overy signal occasion	ms	1	As specified in IE MeasDS-Config in TS			
dura			-	36.331			
	ength		Normal				
DRX			OFF	Continuous monitoring of primary cell			
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.			
	Threshold RSRP	dBm		Actual RSRP threshold for event A2.			
			-93	Needs to take absolute accuracy tolerance			
				in clause 9.1.11.1 into account plus			
	<del></del>			margin.			
4.0	Time To Trigger	S	0				
A6	Hysteresis Offset	dB	0	Hysteresis for evaluation of event A6.			
	Offset	dB		Offset parameter for evaluation of event			
			-6	A6. Needs to take relative accuracy			
				tolerance in clause 9.1.11.2 into account			
	Papart on Japan		False	plus margin.			
	Report on leave Time To Trigger	S	0				
Call	individual offset for cells	dB	U	Individual offset for cells on primary			
	F channel number 1	uБ	0	component carrier.			
	individual offset for cells	dB		Individual offset for cells on secondary			
	F channel number 2	uD	0	component carrier.			
	r coefficient		0	L3 filtering is not used			
	Il measurement cycle	ms	-				
	(measCycleSCell)		320				
T1		s	10				
T2		S	10				
T3		S	5				

NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.22.11.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Parameter	Unit		Cell 1			Cell 2		Cell 3		
		T1	T2	Т3	T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel Number			1			2			2	
BW <sub>channel</sub>	MHz		10			10			10	
Measurement	n <sub>PRB</sub>		13-37		13-37				13-37	
bandwidth	TIPRB		13-31			13-31			13-31	
PDSCH parameters		DI	L Referenc	Α.	DI	Reference	ج	DI	Reference	:e
1 Door parameters			ment Char			ment Chan			ement Ch	
			as in A.3.1			as in A.3.1			as in A.	
PCFICH/PDCCH/PHIC			L Referenc			Reference			Reference	
H parameters			ment Char			ment Chan		Measur	ement Ch	nannel
•			as in A.3.1			as in A.3.1			as in A.	
Correlation Matrix and			1x2 Low			1x2 Low		,	1x2 Low	
Antenna Configuration										
OCNG Patterns										
defined in A.3.2.1.1		(	OP.1 FDD		(	OP.2 FDD		0	P.2 FDD	
(OP.1 FDD) and in										
A.3.2.1.2 (OP.2 FDD)										
PBCH_RA	dB									
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB		0			0			0	
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 1</sup>	dB									
OCNG_RB <sup>Note 1</sup>	dB									
Note 2	dBm/15 kHz		-101	1			-10			
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
CSI-RSRP Note 3	dBm/15 kHz	-76	-76	-98	-76	-76	-98	-infinity	-76	-98
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3
CRS Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
CSI-RS Ê <sub>s</sub> /I <sub>ot</sub>	dB	25	25	3	25	5.95	1.24	-infinity	5.95	1.24
CSI-RS resource			2			4			6	
configurations [16]	dB		6			6			6	
p-C-r10 [2] CSI-RS subframe	UD	6			<u>6</u> 0			<u>6</u> 0		
offset		0			U			U		
CSI-RS individual	[dB]	0			0		<del>                                     </del>	0		
offset [2]	[ub]		U			U			U	
CSI-RS muting			Enable			Enable			Enable	
Propagation Condition			ETU30			ETU30		Enable ETU30		
Time offset to cell 1	us		0			0		2.3 (CP/2)		
Time alignment error	us		-		0 ≤ TAE		2.3 (CP/2) N/A			
relative to cell1 Note 5	43					- 171			1 1// 1	
Note 1: OCNG shall b	e used such that	ed such that all cells are fully allocated and a constant total transmitted power spectral density is								

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.8.22.11.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.08s  $(T_{identify\_scc\_SCE} + T_{measure\_scc\_CSI-RS} = 13*measCycleSCell + T_{measure\_scc\_CSI-RS} = 13*measCycleSCell + 3*measCycleSCell)$  from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 ms ( $3*T_{DMTC\_periodicity}$ ) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.22.12 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CSI-RS based discovery signal

### A.8.22.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.7.3.4.1.

The test parameters are given in Tables A.8.22.12.1-1 and A.8.22.12.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.12.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Numb	RA RF Channel			
			1, 2	Two radio channels are used for this test
Active	er		1, 2	
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
	bour cell		Cell 3	Neighbor cell to be identified on RF channel number 2.
DMTC	period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc- and 3	PeriodOffset for cells 2	ms	10	As specified in IE MeasDS-Config in TS 36.331
Disco durati	very signal occasion on	ms	1	As specified in IE MeasDS-Config in TS 36.331
Chanr (BW <sub>ch</sub>	nel Bandwidth	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP le			Normal	
	al subframe juration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink	c-downlink		1	
config	uration		ı	
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	S	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	S	0	
	ndividual offset for cells channel number 1	dB	0	Individual offset for cells on primary component carrier.
	ndividual offset for cells channel number 2	dB	0	Individual offset for cells on secondary component carrier.
	coefficient		0	L3 filtering is not used
SCell (meas	measurement cycle CycleSCell)	ms	320	
T1		S	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		S	≤12	UE should report Event A6 within 6.08s
T2				(19xscellMeasCycle)

NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.22.12.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Parameter	Unit		Cell 1		Cell 2			Cell 3		
		T1	T2	Т3	T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel			1			2			2	
Number										
BW <sub>channel</sub>	MHz		10		10				10	
Measurement	<b>n</b> <sub>PRB</sub>		13-37			13-37			13-37	
bandwidth										
PDSCH parameters			L Reference			Reference			Reference	
			ment Chan	-		ment Chan	-		ement Cl	
POEIGUI/PROGUI/PUI/O			As in A.3.1			<u>As in A.3.1</u>		R.0 TDD		
PCFICH/PDCCH/PHIC			L Reference			Reference			Reference	
H parameters			ment Chan			ment Chan			ement Cl	
Connelation Matrix and		טטו	as in A.3.1	.2.2		as in A.3.1	.2.2		as in A.	3.1.2.2
Correlation Matrix and			1x2 Low			1x2 Low			1x2 Low	
Antenna Configuration										
OCNG Patterns defined in A.3.2.1.1			OP.1 TDD			OP.2 TDD			P.2 TDD	
(OP.1 TDD) and in		'	OP.I IDD			טר.ב וטט			ר.ב וטט	
A.3.2.1.2 (OP.2 TDD)										
PBCH_RA	dB									
PBCH_RB	dB dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB		0			0			0	
PDCCH_RA	dB		U			U			U	
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA <sup>Note 1</sup>	dB									
OCNG_RB <sup>Note 1</sup>	dB									
N <sub>oc</sub> Note 2	dBm/15 kHz		-101		-10			<u> </u> 		
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	-3	19	19	-3	-infinity	19	-3
CRS Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
CSI-RS Ê <sub>s</sub> /I <sub>ot</sub>	dB	25	25	3	25	5.95	1.24	-infinity	5.95	1.24
Propagation Condition	<u> </u>					ETU70			0.00	
CSI-RS resource			0			2			4	
configurations [16]			Ü			_			•	
CSI-RS subframe		0			0			0		
offset		J			•			•		
CSI-RS individual	[dB]	0			0		0			
offset [2]	' '									
CSI-RS muting			Enable			Enable			Enable	
p-C-r10 [2]	dB		6			6			6	
Time offset to cell 1	us		0			0		2.3 (CP/2)		
Time alignment error	us		-			≤TAE		N/A		
relative to cell1 Note 5								1.9/1		
relative to cell1 Note 5		II II.			<u> </u>		20. 1	<u> </u>		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of

carrier aggregation.

#### A.8.22.12.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.08s  $(T_{identify\_scc\_SCE} + T_{measure\_scc\_CSI-RS} = 13*measCycleSCell + T_{measure\_scc\_CSI-RS} = 13*measCycleSCell + 3*measCycleSCell)$  from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 ms ( $3*T_{DMTC\_periodicity}$ ) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to  $2 \times TTI_{DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.8.23 E-UTRAN Dual Connectivity Measurements

### A.8.23.1 E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

### A.8.23.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of intra frequency measurement. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.8.2 and 8.8.3.

The test parameters are given in Table A.8.23.1.1-1, A.8.23.1.1-2, A.8.23.1.1-3 and A.8.23.1.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A1 (PCell and PSCell) and A2 (PCell and PSCell) is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired. Immediately at beginning of T2 the transmission powers of Cell1 and Cell2 are reduced below a threshold value of event A2 and this shall result in reporting of Event A2 for PCell and PSCell, respectively. Immediately after receiving the reporting of event A2 for both PCell and PSCell, PDCCH indicating a new transmission on Cell1 shall be sent continuously to ensure that the UE would not enter the DRX state on MCG throughout T3. At beginning of T3 the transmission powers of Cell1 and Cell2 are increased above a threshold value of event A1 and this shall result in reporting of Event A1 for PCell and PSCell, respectively.

When MCG DRX is used, the uplink time alignment of Cell1 is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting in Cell1. When SCG DRX is used, the UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell2. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.1.1-1: General test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

	Parameter	Unit	Value	Comment
E-UTR Numbe	RA RF Channel er		1, 2	Two radio channels are used for this test.
Active	Active PCell		Cell1	PCell on RF channel number 1.
Config	gured PSCell	Cell2		PSCell on RF channel number 2.
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-95	Actual RSRP threshold for event A1.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	S	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-99	Actual RSRP threshold for event A2.  Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	S	0	
CP len	ngth		Normal	
DRX			ON	DRX related parameters are defined in Table A.8.23.1.1-3
	dividual offset for n RF channel er 1	dB	0	Individual offset for cells on primary component carrier.
cells o	Cell-individual offset for cells on RF channel number 2		0	Individual offset for cells on carrier frequency of Cell2.
Filter o	coefficient		0	L3 filtering is not used
T1		S	2	_
T2		S	10	
T3		S	1	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: A UE capable of both synchronous and asynchronous DC operations is not required to pass this test case in accordance with the principle defined in section A.3.6.11.

Table A.8.23.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit		Cell 1		Cell 2				
		T1	T2	T3	T1	T2	T3		
E-UTRA RF Channel			1			2			
Number									
BW <sub>channel</sub>	MHz		$MHz: N_{RB,c} =$		5MHz: N <sub>RB,c</sub> = 25				
		10MHz: $N_{RB,c} = 50$			$10MHz: N_{RB,c} = 50$				
			$MHz: N_{RB,c} =$			$MHz: N_{RB,c} =$			
PDSCH parameters:			MHz: R.5 FD			MHz: R.5 FD			
DL Reference			OMHz: R.0 FI			OMHz: R.0 FI			
Measurement Channel		20	MHz: R.4 F	טט	20	OMHz: R.4 F	טט		
PCFICH/PDCCH/PHICH		51	MHz: R.11 F	DD	51	MHz: R.11 F	DD		
parameters:		10	MHz: R.6 F	DD	10	MHz: R.6 F	DD		
DL Reference		20	MHz: R.10 F	DD	20	MHz: R.10 F	DD		
Measurement Channel OCNG Patterns		EN.	1Hz: OP.15 F	DD	EN.	1Hz: OP.15 F	DD		
OCING Patterns						MHz: OP.15 F			
			10MHz: OP.1 FDD 20MHz: OP.11 FDD			мп2. ОР.1 Г ИНz: ОР.11 Г			
PBCH_RA	dB	201	vii 12. OF . I I I	טט	201	vii 12. OF . FF F	טט		
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB				0				
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_PB	dB		0						
PDCCH_RA	dB		Ü						
PDCCH_PB	dB								
PDSCH RA	dB								
PDSCH_RB	dB								
OCNG_RA <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
$N_{oc}$ Note 2	dBm/15		-104		-104				
IV oc	KHz					104			
$\hat{E}_s/N_{oc}$	dB	16	-2.5	20	16	-2.5	20		
$\hat{E}_{s}/I_{ot}$	dB	16	-2.5	20	16	-2.5	20		
RSRP Note 3	dBm/15	-88	-106.5	-84	-88	-106.5	-84		
Note 3	KHz					<u> </u>			
SCH_RP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84		
lo Note 3	dBm/Ch	-60.11	-74.28	-56.18	-60.11	-74.28	-56.18		
	BW	+10log	+10log	+10log	+10log	+10log	+10log		
		(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)		
Propagation Condition	+	750)	ETU70	700)	/50)	ETU70	700)		
Correlation Matrix and	+								
Antenna Configuration			1x2 Low			1x2 Low			
Receive Time offset to cell1 Note 5	μs		-			33			
Note 1. OCNC shall be a		.4  4 1 -				4			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 3: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission in Cell1 are assigned to the UE prior to the start of time period T3.

Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.1.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf1280	sf80	
shortDRX	disable	disable	

Table A.8.23.1.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.23.1.2 Test Requirements

The UE shall send one Event A2 triggered report for PCell on PCell with a measurement reporting delay less than 6.4s (5\*MCG\_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A2 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5\*SCG\_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PCell on PCell with a measurement reporting delay less than 200ms from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5\*SCG\_DRX cycle) from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.23.2 E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

#### A.8.23.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of intra frequency measurement. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.8.2 and 8.8.3.

The test parameters are given in Table A.8.23.2.1-1, A.8.23.2.1-2, A.8.23.2.1-3 and A.8.23.2.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A1 (PCell and PSCell) and A2 (PCell and PSCell) is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

Immediately at beginning of T2 the transmission powers of Cell1 and Cell2 are reduced below a threshold value of event A2 and this shall result in reporting of Event A2 for PCell and PSCell, respectively. Immediately after receiving the reporting of event A2 for both PCell and PSCell, PDCCH indicating a new transmission on Cell1 shall be sent continuously to ensure UE would not enter DRX state on MCG throughout T3. At beginning of T3 the transmission powers of Cell1 and Cell2 are increased above a threshold value of event A1 and this shall result in reporting of Event A1 for PCell and PSCell, respectively.

When MCG DRX is used, the uplink time alignment of Cell1 is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting in Cell1. When SCG DRX is used, the UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell2. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.2.1-1: General test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

	Parameter	Unit	Value	Comment
E-UTR Numbe	A RF Channel er		1, 2	Two radio channels are used for this test.
Active	PCell		Cell1	PCell on RF channel number 1.
Config	ured PSCell		Cell2	PSCell on RF channel number 2.
A1	Hysteresis	dB 0		Hysteresis for evaluation of event A1.
	Threshold RSRP			Actual RSRP threshold for event A1.
		dBm	-95	Needs to take absolute accuracy
		abm	-95	tolerance in clause 9.1.11.1 and 9.1.11.2
				into account plus margin.
	Time To Trigger	S	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP			Actual RSRP threshold for event A2.
		dBm	00	Needs to take absolute accuracy
		иын	-99	tolerance in clause 9.1.11.1 and 9.1.11.2
				into account plus margin.
	Time To Trigger	S	0	
CP len	gth		Normal	
DRX			ON	DRX related parameters are defined in
			ON	Table A.8.23.2.1-3
Cell-ind	dividual offset for			Individual offset for cells on primary
cells or	n RF channel	dB	0	component carrier.
numbe	r 1			
Cell-ind	dividual offset for			Individual offset for cells on carrier frequency
cells or	n RF channel	dB	0	of Cell2.
numbe	number 2			
Filter c	Filter coefficient		0	L3 filtering is not used
T1		S	2	
T2		S	10	
T3	·	S	1	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.

Table A.8.23.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Parameter	Unit	Cell 1			Cell 2			
		T1	T2	Т3	T1	T2	Т3	
E-UTRA RF Channel			1			2		
Number								
			$MHz: N_{RB,c} =$			MHz: N <sub>RB,c</sub> =		
BW <sub>channel</sub>	MHz		MHz: N <sub>RB,c</sub> =			$MHz: N_{RB,c} =$		
			MHz: N <sub>RB,c</sub> =			MHz: N <sub>RB,c</sub> =		
PDSCH parameters:			MHz: R.5 FD			MHz: R.5 FD		
DL Reference			MHz: R.0 FI			OMHz: R.0 F[ OMHz: R.4 F[		
Measurement Channel			MHz: R.4 FI	טכ	20	JIVINZ. R.4 FL	טכ	
PCFICH/PDCCH/PHICH parameters:		51	MHz: R.11 F[	DD	51	MHz: R.11 F[	DD	
DL Reference		10	MHz: R.6 FI	DD	10	DMHz: R.6 FI	DD	
Measurement Channel		20	MHz: R.10 F	DD	20	MHz: R.10 F	DD	
Weastrement Onarmer		5M	1Hz: OP.15 F	חח	5M	1Hz: OP.15 F	חח	
OCNG Patterns			MHz: OP.1 F			MHz: OP.1 F		
CONC Lationic			лнг. ОР.11 F			инт <u>г</u> . ОР.11 Г		
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS RA	dB				0			
PCFICH_RB	dB							
PHICH RA	dB							
PHICH_PB	dB		0					
PDCCH_RA	dB							
PDCCH_PB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}^{ m Note~2}$	dBm/15		-104		-104			
1 voc	KHz							
$\hat{E}_s/N_{oc}$	dB	16	-2.5	20	16	-2.5	20	
$\hat{E}_{s}/I_{ot}$	dB	16	-2.5	20	16	-2.5	20	
RSRP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84	
SCH_RP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84	
lo Note 3	dBm/Ch	-60.11	-74.28	-56.18	-60.11	-74.28	-56.18	
	BW	+10log	+10log	+10log	+10log	+10log	+10log	
		(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	
		/50)	/50)	/50)	/50)	/50)	/50)	
Propagation Condition		ETU70				ETU70	•	
Correlation Matrix and						1x2 Low		
Antenna Configuration			1x2 Low			IXZ LOW		
Receive Time offset to cell1 Note 5	μs		-			500		

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission in Cell1 are assigned to the UE prior to the start of time period T3. Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE

antenna connector including time alignment error between the two cells.

Table A.8.23.2.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf1280	sf80	
shortDRX	disable	disable	

Table A.8.23.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.23.2.2 Test Requirements

The UE shall send one Event A2 triggered report for PCell on PCell with a measurement reporting delay less than 6.4s (5\*MCG\_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A2 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5\*SCG\_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PCell on PCell with a measurement reporting delay less than 200ms from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5\*SCG\_DRX cycle) from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.8.23.3 E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

#### A.8.23.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of intra frequency measurement. This test will partly verify the TDD intra-frequency cell search requirements in clause 8.8.2 and 8.8.3.

The test parameters are given in Table A.8.23.3.1-1, A.8.23.3.1-2, A.8.23.3.1-3 and A.8.23.3.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A1 (PCell and PSCell) and A2 (PCell and PSCell) is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

Immediately at beginning of T2 the transmission powers of Cell1 and Cell2 are reduced below a threshold value of event A2 and this shall result in reporting of Event A2 for PCell and PSCell, respectively. Immediately after receiving the reporting of event A2 for both PCell and PSCell, PDCCH indicating a new transmission on Cell1 shall be sent continuously to ensure UE would not enter DRX state on MCG throughout T3. At beginning of T3 the transmission powers of Cell1 and Cell2 are increased above a threshold value of event A1 and this shall result in reporting of Event A1 for PCell and PSCell, respectively.

When MCG DRX is used, the uplink time alignment of Cell1 is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting in Cell1. When SCG DRX is used, the UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell2. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.3.1-1: General test parameters for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

	Parameter	Unit	Value	Comment
E-UTF	E-UTRA RF Channel		1, 2	Two radio channels are used for this test.
Number		1, 2		
Active	PCell		Cell1	PCell on RF channel number 1.
Config	gured PSCell		Cell2	PSCell on RF channel number 2.
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP			Actual RSRP threshold for event A1.
		dBm	0.E	Needs to take absolute accuracy
		abiii	-95	tolerance in clause 9.1.11.1 and 9.1.11.2
				into account plus margin.
	Time To Trigger	S	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP			Actual RSRP threshold for event A2.
		dBm	-99	Needs to take absolute accuracy
		abiii	-99	tolerance in clause 9.1.11.1 and 9.1.11.2
				into account plus margin.
	Time To Trigger	S	0	
CP le	ngth		Normal	
Speci	al subframe		6	As specified in table 4.2-1 in TS 36.211.
	uration		0	The same configuration in both cells
Uplink	k-downlink		1	As specified in table 4.2-2 in TS 36.211.
config	uration		I	The same configuration in both cells
DRX			ON	DRX related parameters are defined in
DKX			ON	Table A.8.23.3.1-3
Cell-ir	ndividual offset for			Individual offset for cells on primary
cells o	on RF channel	dB	0	component carrier.
numb	er 1			
Cell-individual offset for				Individual offset for cells on carrier frequency
cells on RF channel		dB	0	of Cell2.
numb	er 2			
	coefficient		0	L3 filtering is not used
T1		S	5	
T2		S	10	
T3		S	1	
NOTE	. This took would not	ha DDM sass	. مرج مرح احجاز اجراء أجاري المرج ممرح مراز	dent of channel bandwidth and is norfermed

NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.23.3.1-2: Cell specific test parameters for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

E-UTRA RF Channel Number	Parameter	Unit	Cell 1			Cell 2		
Number   NHz			T1	T2	T3	T1	T2	Т3
Number   BW_channel   BW_chan	E-UTRA RF Channel			1			2	
10MHz: N <sub>RB,c</sub> = 50								
Description	BW <sub>channel</sub>	MHz						
PDSCH parameters:								
DL Reference   Measurement Channel   20MHz: R.0 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.3 TDD   20MHz: R.11 TDD   10MHz: R.6 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: OP.9 TDD   10MHz: OP.9 TDD   10MHz: OP.1 TDD   20MHz: OP.1 TDD   20MHz: OP.7 TDD   20MHz: R.10 TDD   20								
Measurement Channel   20MHz: R.3 TDD   20MHz: R.3 TDD     PCFICH/PDCCH/PHICH parameters:   5MHz: R.11 TDD   10MHz: R.6 TDD   20MHz: R.10 TDD     DL Reference Measurement Channel   20MHz: R.10 TDD   20MHz: R.10 TDD     OCNG Patterns   5MHz: OP.9 TDD   10MHz: OP.1 TDD   20MHz: OP.7 TDD   10MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD     PBCH_RA								
DCFICH/PDCCH/PHICH parameters:								
Darameters:   DL Reference   20MHz: R.11 IDD   20MHz: R.6 TDD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: R.10 DD   20MHz: OP.1 DD   10MHz: OP.1 DD   10MHz: OP.1 DD   20MHz: OP.7 DD   20MHz: O		++	20	JMHZ: R.3 TL	טט	20	JMHZ: R.3 IL	טכ
DL Reference   20MHz: R.6 IDD   20MHz: R.6 IDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: R.10 TDD   20MHz: OP.9 TDD   10MHz: OP.1 TDD   20MHz: OP.1 TDD   20MHz: OP.7 TDD			51	MHz: R.11 T	DD	51	MHz: R.11 T	DD
Measurement Channel   20MHz: R.10 IDD   20MHz: R.10 IDD								
OCNG Patterns         5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.1 TDD 20MHz: OP.1 TDD 20MHz: OP.7 TDD         5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD           PBCH_RA PBCH_RB dB			20	MHz: R.10 T	DD	20	MHz: R.10 T	DD
10MHz: OP.1 TDD   20MHz: OP.1 TDD   20MHz: OP.1 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.7 TDD   20MHz: OP.1 TDD   20MHz: OP.		<del>                                     </del>		ALL- OD O T	20		ALL- OD O T	20
20MHz: OP.7 TDD   20MHz: OP.7 TDD	OCNG Patterns							
PBCH_RA								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	DRCH DA	4B	20	IVITIZ. UP./ I	טט	20	IVITIZ. UP./ I	טט
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				O				
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG RA <sup>Note 1</sup>							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG RB <sup>Note 1</sup>							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Note 2			-104			-104	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	IV <sub>oc</sub>							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\hat{\mathbf{r}}$ /N		16	-2.5	20	16	-2.5	20
RSRP Note 3 dBm/15 -88 -106.5 -84 -88 -106.5 -8		<u></u>	. •			. •		
RSRP Note 3 dBm/15 -88 -106.5 -84 -88 -106.5 -8	$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16	-2.5	20	16	-2.5	20
	RSRP Note 3		-88	-106.5	-84	-88	-106.5	-84
	Note 3							
KHz	SCH_RP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
	lo Notē 3		-60.11	-74.28	-56.18	-60.11		-56.18
		BW		_			_	+10log
			$(N_{RB,c})$ $(N_{RB,c})$ $(N_{RB,c})$					(N <sub>RB,c</sub>
/50) /50) /50) /50) /50) /50)		<b></b>	/50)			/50)		/50)
Propagation Condition ETU70 ETU70				ETU70			ETU70	
Correlation Matrix and 1x2 Low 1x2 Low				1x2 I ow			1x2 Low	
Antenna Configuration		<b></b>	1XZ LOW 1XZ LOW					
Receive Time offset to cell Note 5 - 33	cell1 Note 5			-				

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission in Cell1 are assigned to the UE prior to the start of time period T3.

Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.3.1-3: DRX-Configuration for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
Field	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf1280	sf80	
shortDRX	disable	disable	

Table A.8.23.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
i ieiu	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.23.3.2 Test Requirements

The UE shall send one Event A2 triggered report for PCell on PCell with a measurement reporting delay less than 6.4s (5\*MCG\_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A2 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5\*SCG\_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PCell on PCell with a measurement reporting delay less than 200ms from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5\*SCG\_DRX cycle) from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.23.4 E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

#### A.8.23.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of inter frequency measurement. This test will partly verify the FDD inter-frequency cell search requirements in clause 8.8.4.

The test parameters are given in Table A.8.23.4.1-1, A.8.23.4.1-2, A.8.23.4.1-3 and A.8.23.4.1-4 below. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is PSCell and Cell3 is a neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A3 (PCell) is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. During T1 the UE shall not have any information on Cell3.

Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

In this test, UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell1. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.4.1-1: General test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

	Parameter	Unit	Value	Comment
E-UTRA RF Channel			1 2 2	Three radio channels are used for this
Numb	er		1, 2, 3	test.
Active	PCell		Cell1	PCell on RF channel number 1.
Confi	gured PSCell		Cell2	PSCell on RF channel number 2.
Neigh	bour cell		Cell3	Neighbour cell on RF channel number 3.
A3	Hysteresis	dB	0	Hysteresis for evaluation of event A3.
	A3-offset	dB	-6	
	Time To Trigger	S	0	
CP lei	ngth		Normal	
DRX			ON	DRX related parameters are defined in Table A.8.23.4.1-3
Meas	urement gap pattern		0	
	ndividual offset for on RF channel er 1	dB	0	Individual offset for cells on primary component carrier.
	ndividual offset for on RF channel er 2	dB	0	Individual offset for cells on carrier frequency of Cell2.
	ndividual offset for on RF channel er 3	dB	0	Individual offset for cells on carrier frequency of Cell3.
Filter	coefficient		0	L3 filtering is not used
T1		S	5	
T2		S	5	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: A UE capable of both synchronous and asynchronous DC operations is not required to pass this test case in accordance with the principle defined in section A.3.6.11.

Table A.8.23.4.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit	Cell1		Cell2		Cell3		
		T1	T2	T1 T2		T1		
E-UTRA RF Channel			1	2		3		
Number								
BW <sub>channel</sub>	MHz		$N_{RB,c} = 25$		$I_{RB,c} = 25$		$I_{RB,c} = 25$	
			$N_{RB,c} = 50$		$N_{RB,c} = 50$		$N_{RB,c} = 50$	
DDCCII regressetere:			$N_{RB,c} = 100$ R.5 FDD		I <sub>RB,c</sub> = 100 R.5 FDD	20MHZ: N	$I_{RB,c} = 100$	
PDSCH parameters: DL Reference			R.0 FDD		R.0 FDD			
Measurement Channel			R.4 FDD		R.4 FDD			
PCFICH/PDCCH/PHICH								
parameters:			R.11 FDD		R.11 FDD		2.11 FDD	
DL Reference			R.6 FDD R.10 FDD		R.6 FDD R.10 FDD		R.6 FDD R.10 FDD	
Measurement Channel		ZUIVINZ.	K. 10 FDD	ZUIVINZ. I	X. 10 FDD	ZUIVINZ. I	X.10 FDD	
OCNG Patterns			P.15 FDD		P.15 FDD		P.16 FDD	
		-	OP.1 FDD	-	OP.1 FDD		OP.2 FDD	
	<b>_</b>	20MHz: C	)P.11 FDD	20MHz: C	P.11 FDD	20MHz: O	P.12 FDD	
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA SSS_RA	dB dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_PB	dB		0	0		0		
PDCCH_RA	dB	U				`		
PDCCH_PB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}$ Note 2	dBm/15	-1	01	-1	01	N/A	-101	
	KHz	·	-	'	-	14/71	101	
$\hat{E}_s/N_{oc}$	dB	4	4	4	4	-infinity	7	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	4	4	-infinity	7	
RSRP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94	
SCH_RP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94	
lo Note 3	dBm/Ch	-67.76	-67.76	-67.76	-67.76		-65.43	
	BW	+10log	+10log	+10log	+10log		+10log	
		$(N_{RB,c})$	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	N/A	(N <sub>RB,c</sub>	
		/50)	/50)	/50)	/50)		/50)	
Propagation Condition		ET	U70	ET	U70	ETI	J70	
Correlation Matrix and		1x2	Low	1x2	Low	1x2	Low	
Antenna Configuration		1,7,2		1,72		IXE		
Receive Time offset to cell1 Note 4	μs		-	3	33	-		
Time offset to cell1	μs		-		-	:	3	
Note 1: CONC shall be used such that both calls are fully allocated and a constant total transmitted power								

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.4.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
Field	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf1280	
shortDRX	disable	disable	

Table A.8.23.4.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.23.4.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3 on PCell, with a measurement reporting delay less than 3.84s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.23.5 E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

#### A.8.23.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of inter frequency measurement. This test will partly verify the FDD inter-frequency cell search requirements in clause 8.8.4.

The test parameters are given in Table A.8.23.5.1-1, A.8.23.5.1-2, A.8.23.5.1-3 and A.8.23.5.1-4 below. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is PSCell and Cell3 is a neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A3 (PCell) is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. During T1 the UE shall not have any information on Cell3. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

In this test, UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell1. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.5.1-1: General test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

	Parameter		Value	Comment
E-UTR	E-UTRA RF Channel		1, 2, 3	Three radio channels are used for this
Number			1, 2, 3	test.
Active	PCell		Cell1	PCell on RF channel number 1.
Config	ured PSCell		Cell2	PSCell on RF channel number 2.
Neighb	our cell		Cell3	Neighbour cell on RF channel number 3.
А3	Hysteresis	dB	0	Hysteresis for evaluation of event A3.
	A3-offset	dB	-6	
	Time To Trigger	S	0	
CP len	gth		Normal	
DRX			ON	DRX related parameters are defined in
			ON	Table A.8.23.4.1-3
Measu	Measurement gap pattern		0	
ld			0	
Cell-in	Cell-individual offset for			Individual offset for cells on primary
cells o	n RF channel	dB	0	component carrier.
numbe	number 1			
	dividual offset for			Individual offset for cells on carrier frequency
	n RF channel	dB	0	of Cell2.
number 2				
Cell-individual offset for				Individual offset for cells on carrier frequency
cells on RF channel		dB	0	of Cell3.
number 3				
	oefficient		0	L3 filtering is not used
T1		S	5	
T2		S	5	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.

Table A.8.23.5.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Parameter	Unit	Cell1		Cell2		Cell3	
		T1 T2		T1 T2		T1	T2
E-UTRA RF Channel Number		1		2		3	
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100		5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100		5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100	
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	
PBCH_RA PBCH_RB PSS_RA	dB dB dB						
SSS_RA PCFICH_RB PHICH_RA	dB dB dB	0		0		0	
PHICH_PB	dB						
PDCCH RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}^{ m Note  2}$	dBm/15 KHz	-101		-101		N/A	-101
$\hat{E}_s/N_{oc}$	dB	4	4	4	4	-infinity	7
$\hat{E}_{s}/I_{ot}$	dB	4	4	4	4	-infinity	7
RSRP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
SCH_RP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
To Note 3	dBm/Ch BW	-67.76 +10log (N <sub>RB,c</sub> /50)	-67.76 +10log (N <sub>RB,c</sub> /50)	-67.76 +10log (N <sub>RB,c</sub> /50)	-67.76 +10log (N <sub>RB,c</sub> /50)	N/A	-65.43 +10log (N <sub>RB,c</sub> /50)
Propagation Condition		ETU70		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
Receive time offset to cell1 Note 4	μs	-		500		-	
Time offset to cell1	μs	μs 400					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power							

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.5.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
rieid	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf1280	
shortDRX	disable	disable	

Table A.8.23.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
rieiu	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

### A.8.23.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3 on PCell, with a measurement reporting delay less than 3.84s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.23.6 E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

#### A.8.23.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of inter frequency measurement. This test will partly verify the TDD inter-frequency cell search requirements in clause 8.8.4.

The test parameters are given in Table A.8.23.6.1-1, A.8.23.6.1-2, A.8.23.6.1-3 and A.8.23.6.1-4 below. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is PSCell and Cell3 is a neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A3 (PCell) is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. During T1 the UE shall not have any information on Cell3. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

In this test, UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell1. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.6.1-1: General test parameters for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

	Parameter	Unit	Value	Comment
E-UTR Numbe	RA RF Channel er		1, 2, 3	Three radio channels are used for this test.
Active	PCell		Cell1	PCell on RF channel number 1.
Configured PSCell			Cell2	PSCell on RF channel number 2.
Neighb	Neighbour cell		Cell3	Neighbour cell on RF channel number 3.
A3			0	Hysteresis for evaluation of event A3.
	A3-offset	dB	-6	
	Time To Trigger	S	0	
CP len	ngth		Normal	
Specia configu	al subframe uration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink- configu	-downlink uration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DRX			ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measu Id	rement gap pattern		0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
	dividual offset for n RF channel er 3	dB	0	Individual offset for cells on carrier frequency of Cell3.
Filter coefficient		0	L3 filtering is not used	
T1		S	5	
T2		S	5	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.23.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit	Cell1		Ce	ell2	Cell3 T1 T2		
		T1	T2	T1	T1 T2		T2	
E-UTRA RF Channel Number			1		2	3	3	
BW <sub>channel</sub>	MHz	10MHz:	$N_{RB,c} = 25$ $N_{RB,c} = 50$ $N_{RB,c} = 100$	10MHz: I	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$		5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100	
PDSCH parameters: DL Reference Measurement Channel		5MHz: 10MHz:	R.4 TDD R.0 TDD R.3 TDD	5MHz: I 10MHz:	R.4 TDD R.0 TDD R.3 TDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		10MHz:			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		10MHz: 0	P.10 TDD OP.2 TDD OP.8 TDD	
PBCH_RA PBCH_RB	dB dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH RB	dB							
PHICH_RA	dB							
PHICH_PB	dB		0		0		)	
PDCCH RA	dB				-			
PDCCH_PB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
$N_{oc}^{ m Note 2}$	dBm/15 KHz	-1	01	-1	01	N/A	-101	
$\hat{E}_s/N_{oc}$	dB	4	4	4	4	-infinity	7	
$\hat{E}_{s}/I_{ot}$	dB	4	4	4	4	-infinity	7	
RSRP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94	
SCH_RP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94	
lo Note 3	dBm/Ch BW	-67.76 +10log (N <sub>RB,c</sub> /50)	-67.76 +10log (N <sub>RB,c</sub> /50)	-67.76 +10log (N <sub>RB,c</sub> /50)	-67.76 +10log (N <sub>RB,c</sub> /50)	N/A	-65.43 +10log (N <sub>RB,c</sub> /50)	
Propagation Condition		ET	U70	ET	U70	ETI	J70	
Correlation Matrix and Antenna Configuration		1x2	Low	1x2	Low	1x2	Low	
Receive Time offset to cell1 Note 4	μs		-	3	33		-	
Time offset to cell1	μs		-		-	3	3	
Note 1: OCNG shall be u		at hoth calls	are fully alloc	rated and a c	onstant total			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP, SCH\_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.6.1-3: DRX-Configuration for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
Field	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS
drx-InactivityTimer	psf1	psf1	36.331
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf1280	
shortDRX	disable	disable	

Table A.8.23.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment			
rieiu	Value	Value				
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331			
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.			

## A.8.23.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3 on PCell, with a measurement reporting delay less than 3.84s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

# A.8.23.7 E-UTRAN FDD-FDD Addition and Release Delay of known PSCell in Synchronous DC

### A.8.23.7.1 Test Purpose and Environment

The purpose of this test is to verify that the PSCell addition and release delays under synchronous dual connectivity are within the requirements stated in section 7.14 for the case when the PSCell is known by the UE at the time of addition.

The test parameters are given in Tables A.8.23.7.1-1 and cell-specific parameters in A.8.23.7.1-2 below. The test consists of five successive time periods with duration of T1, T2, T3, T4 and T5 respectively. There are two carriers each with one cell. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. During T1 only Cell1 is known to the UE.

Before the start of T2 it is indicated to the UE in the measurement control information that event-triggered reporting with Event A4 is configured for neighbour cell (Cell2). Before the start of T2 the UE is configured with the measurement gaps (gap pattern Id # 0). The Cell2 becomes known to the UE during T2. Therefore during T2 the UE shall report Event A4. After receiving the Event A4, the test system shall send a RRC message to the UE to release the measurement gaps.

The test system shall send a RRC message to the UE to add PSCell (Cell 2) on radio channel 2. The RRC message (to add PSCell) also includes a request for the UE to start periodic CSI reporting for the PSCell after the PSCell has been successfully added. The RRC message to add PSCell shall be sent to the UE during period T2, after the measurement gaps are released by the test system. The point in time at which the RRC message to add PSCell (Cell2) is received at the UE antenna connector defines the start of time period T3.

The test system shall observe the periodic reporting of CSI for PSCell during T4. The point in time at which the UE has sent PRACH to the PSCell (Cell 2) defines the start of time period T4.

The test system shall send a RRC message to the UE to release PSCell (Cell 2) on radio channel 2. The RRC message to release PSCell (Cell2) shall be sent to the UE during time period T4, after the UE has sent at least one CQI report with non-zero CQI index for PSCell (Cell 2). The point in time at which the RRC message to release PSCell (Cell2) is received at the UE antenna connector defines the start of time period T5.

Table A.8.23.7.1-1: General test parameters for known PSCell addition and release case

P	arameter	Unit	Value	Comment
E-UTRA RF (	Channel Number		1, 2	Two radio channels are used for this test
Initial	Active PCell		Cell1	PCell on RF channel number 1.
Condition	Neighbour cell		Cell2	Neighbour cell on RF channel number 2.
Final	Active PCell		Cell1	PCell on RF channel number 1.
Condition	PSCell		Cell2	PSCell on RF channel number 2.
A4	Hysteresis	dB	0	Hysteresis for evaluation of event A4.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A4. Needs to
				take absolute accuracy tolerance in section
				9.1.11.1 into account plus margin.
	Time To Trigger	S	0	
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Measuremen	t gap pattern Id		0	Gaps are configured before T2 and released
				before T3.
	odicity and offset		0	CQI reporting for PSCell every second
	index on cell2		0	subframe
	al offset for cells on	dB	0	Individual offset for cells on primary component
RF channel n		uD.	0	carrier.
	al offset for cells on	dB	0	Individual offset for cells on carrier frequency of
RF channel n	umber 2	ub.		cell2.
T1		S	5	During this time the PCell shall be known and
				cell2 shall be unknown.
T2		S	≤ 5	During this time the UE shall identify neighbour
				cell (cell2) and report event A4.
T3		S	1	During this time the UE adds the PSCell.
T4		S	1	During this time the UE sends CSI reports for
				PSCell.
T5		S	1	During this time the UE releases the PSCell.

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 2: A UE capable of both synchronous and asynchronous DC operations is not required to pass this test case in accordance with the principle defined in section A.3.6.11.

Table A.8.23.7.1-2: Cell specific test parameters for E-UTRAN FDD known PSCell addition and release

Parameter	Unit			Cell 1					Cell 2		
		T1	T2	Т3	T4	T5	T1	T2	Т3	T4	T5
E-UTRA RF Channel Number				1					2		
BW <sub>channel</sub>	MHz		5MI	Hz: N <sub>RB,c</sub>	= 25			5MH	lz: N <sub>RB,c</sub> =	= 25	
				IHz: N <sub>RB,c</sub>					Hz: N <sub>RB,c</sub>		
				Hz: N <sub>RB,c</sub>				20MH	lz: N <sub>RB,c</sub> =	= 100	
PDSCH parameters:				Hz: R.5 F					-		
DL Reference				/lHz: R.0							
Measurement			201	//Hz: R.4	FDD						
Channel				L D 44	EDD			<b>53.41</b>	D 44 F		
PCFICH/PDCCH/PHI				Hz: R.11					lz: R.11 F		
CH parameters: DL				//Hz: R.6					Hz: R.6 F		
Reference			20IV	lHz: R.10	טטזי			ZUIVIF	Hz: R.10	FUU	
Measurement Channel											
OCNG Patterns			5ML	Iz: OP.15	FDD			5MH-	z: OP.16	FDD	
JOING FAILERING				Hz: OP.1					z: OP.2		
				Hz: OP.1					z: OP.12		
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB			0					0		
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG_RB <sup>Note 1</sup>	dB										
Noc Note 2	dBm/15			-101			N/A		-8	35	
A 1	kHz	4.0	1.0	1.0	1.0	- 10					
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	19	19	19	-infinity	0	0	0	0
Ê <sub>s</sub> /I <sub>ot</sub> RSRP Note 3	dB	19	19	19	19	19	infinity	0	0	0	0
RSRP	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
SCH_RP Note 3	dBm/15	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
SCH_RF	kHz	-02	-02	-02	-02	-02	-irillility	-00	-00	-00	-00
To Note 3	dBm/C	-54.16	-54.16	-54.16	-54.16	-54.16	N/A	-54.21	-54.21	-54.21	-54.21
10	h BW	+10log	+10log	+10log	+10log	+10log		+10log	+10log	+10log	+10log
	""	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>		(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>
		/50)	/50)	/50)	/50)	/50)		/50)	/50)	/50)	/50)
Propagation Condition				AWGN					AWGN		
Antenna Configuration				1x2					1x2		
Receive time offset to cell1 Note 4	μs			_					33		
	F			4							
PRACH configuration Index <sup>Note 5</sup>				4					2		
Note 1: OCNG shall	00.0000	ob that al	l collo ore	fully alla	noted on	d a aanat	l ant total tra	nomittad	nower o	no otrol de	anaitu ia

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Note 5: As specified in table 5.7.1-2 in TS 36.211.

Note 6: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T4.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: Ê<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.8.23.7.2 Test Requirements

The UE shall transmit the PRACH to PSCell at latest 115 ms into T3.

The UE shall send at least one CSI report for PSCell with non-zero CQI index during T4.

The UE shall stop sending CSI reports for PSCell in at latest 16ms into T5.

All of the above test requirements shall be fulfilled in order for the observed PSCell addition delay and PSCell release delay to be counted as correct. The rate of correct observed PSCell addition delay and PSCell release delay during repeated tests shall be at least 90%.

NOTE: The PSCell addition delay can be expressed as follows as specified in Clause 7.14.2:

$$T_{config\ PSCell} = 15ms + T_{activation\ time} + 50ms + T_{PCell\ DU} + T_{PSCell\ DU}$$

Where:

Tactivation\_time = 20 ms (cell2 is known to the UE);

 $T_{PCell\_DU} = 0$  (due to PRACH configurations in cell1 and cell2 being orthogonal in time, i.e. non-overlapping in time);

 $T_{PSCell\ DU} = 30 \text{ ms}$  (delay due to PRACH transmission to cell2).

This gives a total of 115 ms.

# A.8.23.8 E-UTRAN FDD-FDD Addition and Release Delay of known PSCell in Asynchronous DC

## A.8.23.8.1 Test Purpose and Environment

The purpose of this test is to verify that the PSCell addition and release delays under asynchronous dual connectivity are within the requirements stated in section 7.14 for the case when the PSCell is known by the UE at the time of addition.

The test parameters are given in Tables A.8.23.8.1-1 and cell-specific parameters in A.8.23.8.1-2 below. The test consists of five successive time periods with duration of T1, T2, T3, T4 and T5 respectively. There are two carriers each with one cell. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. During T1 only Cell1 is known to the UE.

Before the start of T2 it is indicated to the UE in the measurement control information that event-triggered reporting with Event A4 is configured for neighbour cell (Cell2). Before the start of T2 the UE is configured with the measurement gaps (gap pattern Id # 0). The Cell2 becomes known to the UE during T2. Therefore during T2 the UE shall report Event A4. After receiving the Event A4, the test system shall send a RRC message to the UE to release the measurement gaps.

The test system shall send a RRC message to the UE to add PSCell (Cell 2) on radio channel 2. The RRC message (to add PSCell) also includes a request for the UE to start periodic CSI reporting for the PSCell after the PSCell has been successfully added. The RRC message to add PSCell shall be sent to the UE during period T2, after the measurement gaps are released by the test system. The point in time at which the RRC message to add PSCell (Cell2) is received at the UE antenna connector defines the start of time period T3.

The test system shall observe the periodic reporting of CSI for PSCell during T4. The point in time at which the UE has sent PRACH to the PSCell (Cell 2) defines the start of time period T4.

The test system shall send a RRC message to the UE to release PSCell (Cell 2) on radio channel 2. The RRC message to release PSCell (Cell2) shall be sent to the UE during time period T4, after the UE has sent at least one CQI report with non-zero CQI index for PSCell (Cell 2). The point in time at which the RRC message to release PSCell (Cell2) is received at the UE antenna connector defines the start of time period T5.

Table A.8.23.8.1-1: General test parameters for known PSCell addition and release case

Para	ameter	Unit	Value	Comment
E-UTRA RF C	hannel Number		1, 2	Two radio channels are used for this test
Initial	Active PCell		Cell1	PCell on RF channel number 1.
Condition	Neighbour cell		Cell2	Neighbour cell on RF channel number 2.
Final	Active PCell		Cell1	PCell on RF channel number 1.
Condition	PSCell		Cell2	PSCell on RF channel number 2.
A4	Hysteresis	dB	0	Hysteresis for evaluation of event A4.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A4. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	Ø	0	
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Measurement	gap pattern Id		0	Gaps are configured before T2 and released before T3.
CQI/PMI period configuration is	odicity and offset index on cell2		0	CQI reporting for PSCell every second subframe
	offset for cells	dB	0	Individual offset for cells on primary component carrier.
Cell-individual on RF channe	offset for cells I number 2	dB	0	Individual offset for cells on carrier frequency of cell2.
T1		s	5	During this time the PCell shall be known and cell2 shall be unknown.
T2		s	≤ 5	During this time the UE shall identify neighbour cell (cell2) and report event A4.
T3		S	1	During this time the UE adds the PSCell.
T4		s	1	During this time the UE sends CSI reports for PSCell.
T5		S	1	During this time the UE releases the PSCell.

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in

Note 2: accordance with the principle defined in section A.3.11.

Table A.8.22.8.1-2: Cell specific test parameters for E-UTRAN FDD known PSCell addition and release

Parameter	Unit			Cell 1					Cell 2		
		T1	T2	T3	T4	T5	T1	T2	Т3	T4	T5
E-UTRA RF Channel				1					2		
Number											
BW <sub>channel</sub>	MHz		5MI	Hz: N <sub>RB,c</sub>	= 25			5MH	Iz: N <sub>RB,c</sub> :	= 25	
				IHz: N <sub>RB,0</sub>				10MI	Hz: N <sub>RB,c</sub>	= 50	
				Hz: N <sub>RB,c</sub>				20MF	łz: N <sub>RB,c</sub> :	= 100	
PDSCH parameters: DL			5M	IHz: R.5 I	FDD				-		
Reference			10N	//Hz: R.0	FDD						
Measurement Channel			201	//Hz: R.4	FDD						
PCFICH/PDCCH/PHIC			5MI	Hz: R.11	FDD			5MH	lz: R.11 l	FDD	
H parameters: DL			10N	//Hz: R.6	FDD			10M	IHz: R.6 I	FDD	
Reference			20M	IHz: R.10	FDD			20MI	Hz: R.10	FDD	
Measurement Channel											
OCNG Patterns				lz: OP.15					z: OP.16		
				Hz: OP.1					Hz: OP.2		
			20M	Hz: OP.1	1 FDD			20MH	lz: OP.12	P FDD	
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB			0					0		
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA <sup>Note 1</sup>	dB										
OCNG_RB <sup>Note 1</sup>	dB										
N <sub>oc</sub> Note 2	dBm/15			-101			N/A		-8	35	
••00	kHz						,, .		`	,,	
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	19	19	19	_	0	0	0	0
_s, 100	u.D					10	infinity				
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	19	19	19	infinity	0	0	0	0
RSRP Note 3	dBm/15	-82	-82	-82	-82	-82	-	-85	-85	-85	-85
	kHz	02	02	02	02	02	infinity	00			
SCH_RP Note 3	dBm/15	-82	-82	-82	-82	-82	-	-85	-85	-85	-85
	kHz	02	02	02	02	02	infinity	00			
lo Note 3	dBm/C	-54.16	-54.16	-54.16	-54.16	-54.16	N/A	-54.21	-54.21	-54.21	-54.21
.6	h BW	+10log	+10log	+10log	+10log	+10log		+10log	+10log	+10log	+10log
		(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>		(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>
		/50)	/50)	/50)	/50)	/50)		/50)	/50)	/50)	/50)
Propagation Condition				AWGN					AWGN		
Antenna Configuration				1x2					1x2		
Receive time offset to	II.e			_					500		
cell1 Note 4	μs								500		
PRACH configuration			· <u> </u>	4				· <u> </u>	2	·	
Index <sup>Note 5</sup>											
Note 1: OCNG shall be	vuond auch	that all a	ollo oro f	ممالم بالب	otod ond	o constan	t total tran	omittod i	2011/01 00	ootrol do	:4::-

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: Ê<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Note 5: As specified in table 5.7.1-2 in TS 36.211

Note 6: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T4.

### A.8.23.8.2 Test Requirements

The UE shall transmit the PRACH to PSCell at latest 115 ms into T3.

The UE shall send at least one CSI report for PSCell with non-zero CQI index during T4.

The UE shall stop sending CSI reports for PSCell in at latest 16ms into T5.

All of the above test requirements shall be fulfilled in order for the observed PSCell addition delay and PSCell release delay to be counted as correct. The rate of correct observed PSCell addition delay and PSCell release delay during repeated tests shall be at least 90%.

NOTE: The PSCell addition delay can be expressed as follows as specified in Clause 7.14.2:

$$T_{config\_PSCell} = 15ms + T_{activation\_time} + 50ms + T_{PCell\_DU} + T_{PSCell\_DU}$$

Where:

Tactivation\_time = 20 ms (cell2 is known to the UE);

 $T_{PCell\_DU} = 0$  (due to PRACH configurations in cell1 and cell2 being orthogonal in time, i.e. non-overlapping in time);

 $T_{PSCell\_DU} = 30 \text{ ms}$  (delay due to PRACH transmission to cell2).

This gives a total of 115 ms.

## A.8.23.9 E-UTRAN TDD Addition and Release Delay of known PSCell in Synchronous DC

### A.8.23.9.1 Test Purpose and Environment

The purpose of this test is to verify that the PSCell addition and release delays under synchronous dual connectivity are within the requirements stated in section 7.14 for the case when the PSCell is known by the UE at the time of addition.

The test parameters are given in Tables A.8.23.9.1-1 and cell-specific parameters in A.8.23.9.1-2 below. The test consists of five successive time periods, with duration of T1, T2, T3, T4 and T5 respectively. There are two carriers each with one cell. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. During T1 only Cell1 is known to the UE.

Before the start of T2 it is indicated to the UE in the measurement control information that event-triggered reporting with Event A4 is configured for neighbour cell (Cell2). Before the start of T2 the UE is configured with the measurement gaps (gap pattern Id # 0). The Cell2 becomes known to the UE during T2. Therefore during T2 the UE shall report Event A4. After receiving the Event A4, the test system shall send a RRC message to the UE to release the measurement gaps.

The test system shall send a RRC message to the UE to add PSCell (Cell 2) on radio channel 2. The RRC message (to add PSCell) also includes a request for the UE to start periodic CSI reporting for the PSCell after the PSCell has been successfully added. The RRC message to add PSCell shall be sent to the UE during period T2, after the measurement gaps are released by the test system. The point in time at which the RRC message to add PSCell (Cell2) is received at the UE antenna connector defines the start of time period T3.

The test system shall observe the periodic reporting of CSI for PSCell during T4. The point in time at which the UE has sent PRACH to the PSCell (Cell 2) defines the start of time period T4.

The test system shall send a RRC message to the UE to release PSCell (Cell 2) on radio channel 2. The RRC message to release PSCell (Cell2) shall be sent to the UE during time period T4, after the UE has sent at least one CQI report with non-zero CQI index for PSCell (Cell 2). The point in time at which the RRC message to release PSCell (Cell2) is received at the UE antenna connector defines the start of time period T5.

Table A.8.23.9.1-1: General test parameters for known PSCell addition and release case

Pa	rameter	Unit	Value	Comment
E-UTRA RF (	Channel Number		1, 2	Two radio channels are used for this test
Initial	Active PCell		Cell1	PCell on RF channel number 1.
Condition	Neighbour cell		Cell2	Neighbour cell on RF channel number 2.
Final	Active PCell		Cell1	PCell on RF channel number 1.
Condition	PSCell		Cell2	PSCell on RF channel number 2.
A4	Hysteresis	dB	0	Hysteresis for evaluation of event A4.
	Threshold	dBm	-93	Actual RSRP threshold for event A4. Needs to
	RSRP			take absolute accuracy tolerance in section
				9.1.11.1 into account plus margin.
	Time To	S	0	
	Trigger		U	
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Measuremen	t gap pattern Id		0	Gaps are configured before T2 and released
				before T3.
Special subfra	ame configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downli	nk configuration		1	As specified in table 4.2-2 in TS 36.211
PRACH confi	guration on cell2		53	As specified in table 5.7.1-3 in TS 36.211
CQI/PMI peri	odicity and offset		0	CQI reporting for PSCell every uplink subframe
configuration	index on cell2		U	
Cell-individua	I offset for cells on	dB	0	Individual offset for cells on primary component
RF channel n	umber 1	uБ	O	carrier.
Cell-individua	I offset for cells on	dB	0	Individual offset for cells on carrier frequency of
RF channel n	umber 2	uБ	U	cell2.
T1		s	5	During this time the PCell shall be known and
		3	5	cell2 shall be unknown.
T2		S	≤ 5	During this time the UE shall identify neighbour
		3	1 0	cell (cell2) and report event A4.
T3		S	1	During this time the UE adds the PSCell.
T4		S	1	During this time the UE sends CSI reports for
		3	· · · · · · · · · · · · · · · · · · ·	PSCell.
T5		S	1	During this time the UE releases the PSCell.
Note 1: Th	is test verifies the RF	RM requii	ement which is	s independent of channel bandwidth and is

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.11.

Table A.8.23.9.1-2: Cell specific test parameters for E-UTRAN TDD known PSCell addition and release

Parameter	Unit			Cell 1					Cell 2		
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel				1					2		
Number											
BW <sub>channel</sub>	MHz			Hz: N <sub>RB,c</sub>					łz: N <sub>RB,c</sub> :		
				IHz: N <sub>RB,c</sub>					Hz: N <sub>RB,c</sub>		
				Hz: N <sub>RB,c</sub>				20MF	Iz: N <sub>RB,c</sub> :	= 100	
PDSCH parameters: DL				IHz: R.4 <sup>-</sup>					-		
Reference				//Hz: R.0							
Measurement Channel	1			//Hz: R.3							
PCFICH/PDCCH/PHIC				Hz: R.11					lz: R.11		
H parameters: DL				//Hz: R.6					IHz: R.6		
Reference			20M	IHz: R.10	TDD			20M	Hz: R.10	TDD	
Measurement Channel											
OCNG Patterns				Hz: OP.9					z: OP.10		
				Hz: OP.1					Hz: OP.2		
	1		20M	Hz: OP.7	' TDD		20MHz: OP.8 TDD				
PBCH_RA	dB	]									
PBCH_RB	dB	]									
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB	1									
PHICH_RB	dB			0					0		
PDCCH_RA	dB			-					•		
PDCCH_RB	dB	1									
PDSCH_RA	dB	1									
PDSCH_RB	dB	-									
OCNG_RA <sup>Note 1</sup>	dB	1									
OCNG RR <sup>Note 1</sup>	dB	1									
N <sub>oc</sub> Note 2	dBm/15			-101			N/A			35	
Noc	kHz			-101			IN/A		-(	55	
Ê <sub>s</sub> /N <sub>oc</sub>	dB	19	19	19	19	19	_	0	0	0	0
Ls/Noc	uБ	19	19	19	19	19	infinity	U	U	U	U
Ê <sub>s</sub> /I <sub>ot</sub>	dB	19	19	19	19	19		0	0	0	0
RSRP Note 3		-82	-82	-82	-82	-82	infinity -	-85	-85	-85	-85
KSKP	dBm/15	-82	-82	-82	-82	-82		-85	-85	-85	-85
SCH_RP Note 3	kHz	00	00	00	00	00	infinity	0.5	0.5	0.5	0.5
SCH_RP	dBm/15	-82	-82	-82	-82	-82	infinit.	-85	-85	-85	-85
To Note 3	kHz	-54.16	-54.16	-54.16	-54.16	-54.16	infinity N/A	-54.21	-54.21	-54.21	-54.21
10	dBm/C	+10log	+10log	+10log	+10log	+10log	IN/A	+10log	+10log	+10log	+10log
	h BW	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB.c</sub>		(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>	(N <sub>RB,c</sub>
		/50)	/50)	/50)	/50)	/50)		/50)	/50)	/50)	/50)
Propagation Condition			· · · · · · · · · · · · · · · · · · ·	AWGN					AWGN		
Antenna Configuration				1x2					1x2		
Receive time offset to											
Receive lime ousel to	μs			-					33		
cell1 Note 4	,						1		EΩ		
cell1 Note 4 PRACH configuration	ļ.			56					50		
cell1 Note 4		at all cells	are fully a		nd a consta	ant total tra	nsmitted p	ower spec		y is achiev	ed for al
Cell1 Note 4  PRACH configuration Index Note 5  Note 1: OCNG shall be to OFDM symbols.	used such th		-	llocated ar					tral densit		
cell1 Note 4 PRACH configuration IndexNote 5 Note 1: OCNG shall be a	used such th	and noise	sources n	llocated ar	d in the te	st is assum			tral densit		

Note 3: E<sub>s</sub>/I<sub>ot</sub>, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.23.9.2 Test Requirements

The UE shall transmit the PRACH to PSCell at latest 115 ms into T3.

The UE shall send at least one CSI report for PSCell with non-zero CQI index during T4.

Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Note 5: As specified in table 5.7.1-3 in TS 36.211

Note 6: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T4.

The UE shall stop sending CSI reports for PSCell in at latest 16ms into T5.

All of the above test requirements shall be fulfilled in order for the observed PSCell addition delay and PSCell release delay to be counted as correct. The rate of correct observed PSCell addition delay and PSCell release delay during repeated tests shall be at least 90%.

NOTE: The PSCell addition delay can be expressed as follows as specified in Clause 7.14.2:

$$T_{config\ PSCell} = 15ms + T_{activation\ time} + 50ms + T_{PCell\ DU} + T_{PSCell\ DU}$$

Where:

Tactivation\_time = 20 ms (cell2 is known to the UE);

 $T_{PCell\_DU} = 0$  (due to PRACH configurations in cell1 and cell2 being orthogonal in time, i.e. non-overlapping in time);

 $T_{PSCell\ DU} = 30 \text{ ms}$  (delay due to PRACH transmission to cell2).

This gives a total of 115 ms.

## A.8.24 Proximity-based Services

# A.8.24.1 E-UTRAN FDD - Initiation/Cease of SLSS Transmission with ProSe Direct Discovery

The purpose of this test is to verify the requirements related to the maximum evaluation time allowed to initiate and cease SLSS transmissions defined in clause 8.10.2.1. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN. This test is applicable for a UE capable of ProSe Direct Discovery and also SLSS transmission and reception (indicated using *disc-SLSS*).

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.8.24.1.1-1. Table A.8.24.1.1-2 and Table A.8.24.1.1-3 below. There is one active cell (PCell) in this test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the RSRP of the PCell is above *syncTxThreshIC* and the UE is not expected to be transmitting SLSS. During T2, the RSRP of the PCell is lowered below *syncTxThreshIC* and the UE is expected to initiate SLSS transmissions. During T3, the RSRP of the PCell is increased back to be above *syncTxThreshIC* and the UE is expected to cease SLSS transmissions.

### A.8.24.1.1 Test Purpose and Environment

Table A.8.24.1.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
Layer 3 filtering		Disabled	L3 filtering is not used
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
T1	S	3	
T2	S	5.24	
T3	s	5.24	

Table A.8.24.1.1-2: ProSe Direct Discovery configuration for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	UL carrier frequency
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-1 (Configuration #1)	IE values unless specified otherwise in this test.
networkControlledSyncTx		Not configured	
syncTxThreshIC	dBm/15 kHz	-95	In SIB19

Table A.8.24.1.1-3: Cell specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit		Cell 1				
Parameter	Onit	T1	T2	Т3			
E-UTRA RF Channel Number			1				
BW <sub>channel</sub>	MHz						
OCNG Pattern (defined in clause A.3.2)			OP.16 FDD				
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB	dB		0				
PDCCH_RA							
PDCCH_RB							
PDSCH_RA							
PDSCH_RB							
OCNG_RA <sup>Note 1</sup>							
OCNG_RB <sup>Note 1</sup>							
$N_{_{OC}}$ Note2	dBm/15 kHz		-95				
$\hat{E}_s/N_{oc}$	dB	4.5	-4.5	4.5			
RSRP Note3	dBm/15 kHz	-90.5	-99.5	-90.5			
SCH_RP Note 3	dBm/15 kHz	-90.5	-99.5	-90.5			
Propagation Condition		i	AWGN	•			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

### A.8.24.1.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 2.24 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 2.24 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: T<sub>evaluate,SLSS</sub> + *discPeriod*,

Where:

 $T_{evaluate,SLSS}$  is the evaluation time for initiate/cease of SLSS, and is 1.92 sec (see Table 8.10.2.1-1 in

clause 8.10.2.1) for the parameters in this test;

discPeriod is the discovery period (set as 320ms in this test).

# A.8.24.2 E-UTRAN TDD - Initiation/Cease of SLSS Transmission with ProSe Direct Discovery

The purpose of this test is to verify the requirements related to the maximum evaluation time allowed to initiate and cease SLSS transmissions defined in clause 8.10.2.1. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN. This test is applicable for a UE capable of ProSe Direct Discovery and also SLSS transmission and reception (indicated using *disc-SLSS*).

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.8.24.2.1-1. Table A.8.24.2.1-2 and Table A.8.24.2.1-3 below. There is one active cell (PCell) in this test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the RSRP of the PCell is above *syncTxThreshIC* and the UE is not expected to be transmitting SLSS. During T2, the RSRP of the PCell is lowered below *syncTxThreshIC* and the UE is expected to initiate SLSS transmissions. During T3, the RSRP of the PCell is increased back to be above *syncTxThreshIC* and the UE is expected to cease SLSS transmissions.

## A.8.24.2.1 Test Purpose and Environment

Table A.8.24.2.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN TDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
Active cell		Cell 1	E-UTRA TDD Cell1 on RF channel number 1
Uplink/Downlink Configuration		Config 0	
Special Subframe Configuration		6	
CP length of Cell 1		Normal	
Layer 3 filtering		Disabled	L3 filtering is not used
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
T1	S	3	
T2	S	5.24	
T3	S	5.24	

Table A.8.24.1.1-2: ProSe Direct Discovery configuration for initiation/cease of SLSS transmissions test for E-UTRAN TDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-3 (Configuration #3)	IE values unless specified otherwise in this test.
networkControlledSyncTx		Not configured	
syncTxThreshIC	dBm/15 kHz	-95	In SIB19

Table A.8.24.2.1-3: Cell specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN TDD

Parameter	Unit	Cell 1				
Parameter	Unit	T1 T2 T3				
E-UTRA RF Channel Number			1			
BW <sub>channel</sub>	MHz	5				
OCNG Pattern (defined in clause A.3.2)		OP.10 TDD				
PBCH_RA						
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB	dB		0			
PDCCH_RA						
PDCCH_RB						
PDSCH_RA						
PDSCH_RB						
OCNG_RA <sup>Note 1</sup>						
OCNG_RB <sup>Note 1</sup>						
$N_{_{OC}}$ Note2	dBm/15 kHz		-95			
$\hat{E}_s/N_{oc}$	dB	4.5	-4.5	4.5		
RSRP Note3	dBm/15 kHz	-90.5	-99.5	-90.5		
SCH_RP Note 3	dBm/15 kHz	-90.5	-99.5	-90.5		
Propagation Condition			AWGN			

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

## A.8.24.2.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 2.24 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 2.24 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: T<sub>evaluate,SLSS</sub> + *discPeriod*,

#### Where:

 $T_{\text{evaluate,SLSS}}$  is the evaluation time for initiate/cease of SLSS, and is 1.92 sec (see Table 8.10.2.1-1 in clause 8.10.2.1) for the parameters in this test;

discPeriod is the discovery period (set as 320ms in this test).

## A.8.24.3 E-UTRAN FDD - Initiation/Cease of SLSS Transmission with ProSe Direct Communication

The purpose of this test is to verify that the ProSe UE meets the requirements related to the maximum evaluation time allowed to initiate and cease SLSS transmissions defined in clause 8.10.2.2. This test is applicable for a UE capable of ProSe Direct CommunicationIn the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A.8.24.3.1-1, Table A.8.24.3.1-2 and Table A.8.24.3.1-3 below. There is one active cell (PCell) in this test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the RSRP of the PCell is above *syncTxThreshIC* and the UE is not expected to be transmitting SLSS. During T2, the RSRP of the PCell is lowered below *syncTxThreshIC* and the UE is expected to initiate SLSS transmissions. During T3, the RSRP of the PCell is increased back to be above *syncTxThreshIC* and the UE is expected to cease SLSS transmissions.

### A.8.24.3.1 Test Purpose and Environment

Table A.8.24.3.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	Only one FDD carrier
E-OTRA RE Charmer Number		ļ	frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5 or 10	According to principle
Channel)	IVII IZ	3 01 10	defined in clause A.3.12.3
Active cell		Cell 1	E-UTRA FDD Cell1 on RF
Active cell		Cell I	channel number 1
CP length of Cell 1		Normal	
Layer 3 filtering		Disabled	L3 filtering is not used
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
T1	S	3	7
T2	S	5.24	
T3	s	5.24	

Table A.8.24.3.1-2: ProSe Direct Communication configuration for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	UL carrier frequency
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5 or 10	According to principle defined in clause A.3.12.3
ProSe Direct Communication configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test.
networkControlledSyncTx		Not configured	
syncTxThreshIC	dBm/15 kHz	-95	In SIB18

Table A.8.24.3.1-3: Cell specific test parameters for initiation/cease of SLSS transmissions test for E-**UTRAN FDD** 

Parameter	Unit	Cell 1			
Farameter	Offic	T1	T2	T3	
E-UTRA RF Channel Number			1		
BW <sub>channel</sub> Note 4	MHz		5 or 10		
OCNG Patterns defined in A.3.2.1.2 Note 4			5MHz: OP.16 FD		
		10 MHz: OP.2 FDD			
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB	dB		0		
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note 1</sup>					
OCNG_RB <sup>Note 1</sup>					
$N_{oc}^{}$ Note2	dBm/15 kHz	-95			
$\hat{E}_s/N_{oc}$	dB	4.5	-4.5	4.5	
RSRP Note3	dBm/15 kHz	-90.5	-99.5	-90.5	
SCH_RP Note 3	dBm/15 kHz	-90.5 -99.5 -90.5			
Propagation Condition		AWGN			
Note 1: OCNG shall be used such that cell is	s fully allocated and a c	onstant total tra	ansmitted power	spectral	
density is achieved for all OFDM syr			•	•	

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- This test is according to the principle defined in section A.3.12.3. Note 4:

#### A.8.24.3.2 **Test Requirements**

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 1.96 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 1.96 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: Tevaluate, SLSS + SLSS period,

#### Where:

is the evaluation time for initiate/cease of SLSS, and is 1.92 sec (see Table 8.10.2.1-1 in T<sub>evaluate,SLSS</sub> clause 8.10.2.1) for the parameters in this test;

SLSS period is set to 40ms.

## A.9 Measurement Performance Requirements

Unless explicitly stated otherwise:

- Reported measurements shall be within defined range of accuracy limits defined in Clause 9 for at least 90 % of the reported cases. If multiple measurement performance requirements are verified in the same test, the reported measurements for each requirement shall be within defined range of accuracy limits of the corresponding requirement defined in Clause 9 for at least 90% of the reported cases.
- Cell 1 is the PCell.
- Measurements are performed in RRC\_CONNECTED state.
- The reference channels assume transmission of PDSCH with a maximum number of 5 HARQ transmissions unless otherwise specified.

## A.9.1 RSRP

## A.9.1.1 FDD Intra frequency case

## A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.1 and 9.1.2.2 for FDD intra frequency measurements.

## A.9.1.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.1.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.1.2-1: RSRP FDD Intra frequency test parameters

В	Parameter		Unit Test 1		Test 2		Test 3	
		Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
	hannel Number			-	1		1	
BW <sub>channel</sub>		MHz		0	10		10	
Measurement		$n_{{\scriptscriptstyle PRB}}$		–27	22-	–27		–27
PDSCH Reference	ence measurement ed in A.3.1.1.1		R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH alloca		$n_{PRB}$	13—36	-	13—36	-	13—36	-
measurement A.3.1.2.1	CH/PHICH Reference channel defined in		R.6	FDD	R.6	FDD	R.6	FDD
(OP.1 FDD) ar FDD)	s defined in A.3.2.1.1 nd A.3.2.1.2 (OP.2		OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA								
SSS_RA PCFICH_RB PHICH_RA								
PHICH_RB PDCCH_RA PDCCH_RB		dB	0	0	0	0	0	0
PDSCH_RA	<del>-</del>							
PDSCH_RB	PDSCH_RB							
OCNG_RA <sup>Note</sup>	1							
OCNG_RB <sup>Note</sup>							1	16
	Bands DD_A Bands FDD_C						-116 -115	
Note2	Bands FDD_D			-106	-88	-88		4.5
$N_{oc}^{$	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-106					14
	Bands FDD_G Note 7						-113	
	Bands FDD_H						-11	2.5
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	2.5	-6	2.5	-6	0.46	-5.76
	Bands FDD_A						-113	-117
	Bands FDD_C						-112	-116
RSRP <sup>Note3</sup>	Bands FDD_D Bands FDD_E,	dBm/15 kHz	-100	-105	-82	-87	-111.5	-115.5
	FDD F Note 5						-111	-115
	Bands FDD_G Note 7 Bands FDD_H						-110 -109.5	-114 -113.5
	Bands FDD_A						-109.5	
	Bands FDD_C							.43
Note2	Bands FDD_D						-80	.93
Io <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/9 MHz	-70.27	-70.27	-52.27	52.27 -52.27	-80	.43
	Bands FDD_G Note 7							.43
	Bands FDD_H						-78	.93
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation co	ondition	-	AW	GN	AW	GN	AW	GN

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

## A.9.1.1.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.2.1 and 9.1.2.2.

## A.9.1.2 TDD Intra frequency case

## A.9.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.1 and 9.1.2.2 for TDD intra frequency measurements.

## A.9.1.2.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.2.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.2.2-1: RSRP TDD Intra frequency test parameters

Por	rameter	Unit Test 1		Test 2		Test 3		
		Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Ch	nannel Number		,			1		1
BW <sub>channel</sub>		MHz	1	0	1	0	1	0
Special subfran	ne			3	6		6	
configuration <sup>Not</sup>	Note1							
Uplink/downlink	configuration Note1		,	•		1		1
Measurement b	pandwidth	$n_{PRB}$	22-	–27	22-	–27	22-	–27
PDSCH Refere	nce measurement		R.0	_	R.0	_	R.0	_
channel defined	d in A.3.1.1.2		TDD		TDD		TDD	
PDSCH allocat	ion	$n_{{\scriptscriptstyle PRB}}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFIC	H/PHICH							
Reference mea	surement channel		R.6	TDD	R.6	TDD	R.6	TDD
defined in A.3.1								
OCNG Patterns			OP.1	OP.2	OP.1	OP.2	OP.1	OP.2
A.3.2.2.1 (OP.1			TDD	TDD	TDD	TDD	TDD	TDD
A.3.2.2.2 (OP.2	(טטו)							
PBCH_RA								
PBCH_RB								
PSS_RA SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB		dB	0	0	0	0	0	0
PDCCH RA		ub.		U		U		U
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG RA <sup>Note2</sup>								
OCNG_RB <sup>Note2</sup>								
	Bands TDD_A						-1	16
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-106	-106	-88	-88	-1	15
	Bands TDD_E						-1	14
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB	2.5	-6	2.5	-6	0.5	-5.76
	Bands TDD_A						-113	-117
RSRP <sup>Note4</sup>	Bands TDD_X	dBm/15 kHz	-100	-105	-82	-87	-112	-116
	Bands TDD_E					0.	-111	-115
Bands TDD_A								2.43
lo <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-70.27	-70.27	-52.27	-52.27	-81	.43
	Bands TDD_E							0.43
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
	a altera a	GD.	_		_		_	-
Propagation co	ndition	-		GN		GN		'GN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

## A.9.1.2.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.2.1 and 9.1.2.2.

## A.9.1.3 FDD—FDD Inter frequency case

## A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for FDD—FDD inter frequency measurements.

## A.9.1.3.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP interfrequency measurements are tested by using the parameters in Table A.9.1.3.2-1 In all test cases, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.3.2-1: RSRP FDD—FDD Inter frequency test parameters

		1114	Tes	st 1	Tes	st 2
Pa	arameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2
	hannel Number		1	2	1	2
BW <sub>channel</sub>		MHz	10	10	10	10
Gap Pattern Id	<u> </u>		0 -		0	-
Measurement		$n_{\scriptscriptstyle PRB}$		<b>–27</b>		<b>–27</b>
PDSCH Refer	ence measurement ed in A.3.1.1.1		R.0 FDD	-	R.0 FDD	-
PDSCH alloca	ition	$n_{PRB}$	13—36	-	13—36	-
PDCCH/PCFI			<b>D</b> 0	<b></b>	Б.0	
defined in A.3	asurement channel		R.6	FDD	R.6	FDD
	OCNG Patterns defined in		00.4	00.0	00.4	00.0
	A.3.2.1.1 (OP.1 FDD) and		OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
A.3.2.1.2 (OP.	2 FDD)		100	100	100	100
PBCH_RA						
PBCH_RB		_				
PSS_RA SSS_RA		_				
PCFICH_RB		-				
PHICH_RA		-				
PHICH_RB		dB	0	0	0	0
PDCCH RA						
PDCCH_RB	_					
PDSCH_RA		1				İ
PDSCH_RB						
OCNG_RANo	OCNG_RANote1					
OCNG_RBNo	te					
	Bands FDD_A		-88.65		$(N_{oc}$ for Channel 2 +8dB)	-117
	Bands FDD_C	1		-88.65		-116
A 7 Note?	Bands FDD_D	1				-115.5
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 5	dBm/15 kHz				-115
	Bands FDD G					
	Note 7					-114
÷ /r	Bands FDD_H					-113.5
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	10	10	13	-4
	Bands FDD_A	1				-121
	Bands FDD_C					-120
	Bands FDD_D	<u> </u>			(RSRP	-119.5
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-78.65	-78.65	for Cell 2	-119
	Bands FDD_G	1			+25dB)	-118
	Bands FDD H	†				-117.5
	Bands FDD_A					-87.76
	Bands FDD_C	†				-86.76
	Bands FDD_D	1			(lo for	-86.26
lo <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/9 MHz	-50.45	45 -50.45	Channel 2 +19.75d	-85.76
	Bands FDD_G Note 7				B)	-84.76
	Bands FDD_H	†				-84.26
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation cor		-		'GN	AW	
Note 1: OC	NG shall be used suc	h that both calle a	ra fully alla	catad and	a constant	total

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of

appropriate power for  $N_{oc}$  to be fulfilled.

Note 3:	
	purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and
	noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of assigned E-
	UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

## A.9.1.3.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

## A.9.1.4 TDD—TDD Inter frequency case

## A.9.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for TDD—TDD inter frequency measurements.

## A.9.1.4.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP interfrequency measurements are tested by using the parameters in Table A.9.1.4.2-1 for TDD configuration 1 and in Table A.9.1.4.2-2 for TDD configuration 0. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.4.2-1: RSRP TDD—TDD Inter frequency test parameters for TDD configuration 1

Por	ameter	Unit	Tes	st 1	Tes	st 2
		Onit	Cell 1	Cell 2	Cell 1	Cell 2
	Channel Number		1	2	1	2
BV	V <sub>channel</sub>	MHz	10	10	10	10
Special subtran	ne configuration Note1 k configuration Note1		-	<u>3</u> 1		-
	Pattern Id		0	-	0	_
·			-	I.		
	ent bandwidth	$n_{PRB}$		<b>–27</b>	22-	-21
	ence measurement ined in A.3.1.1.2		R.0 TDD	-	R.0 TDD	-
PDSCH	H allocation	$n_{PRB}$	13—36	-	13—36	-
measurement	H/PHICH Reference channel defined in 3.1.2.2		R.6	TDD	R.6	TDD
	defined in A.3.2.2.1		OP.1	OP.2	OP.1	OP.2
	A.3.2.2.2 (OP.2 TDD) CH RA		TDD	TDD	TDD	TDD
	CH_RA CH_RB					
	SS_RA			0		
SS	SS_RA	- - - -				
	ICH_RB					
	CH_RA CH_RB					0
	CH RA	dB	0	0	0	0
	CH_RB					
	CH_RA					
PDS	SCH_RB					
OCNO	G_RA <sup>Note2</sup> G_RB <sup>Note2</sup>	-				
OCN	_					
	Bands TDD_A			-88.65	( $N_{oc}$	-117
$N_{oc}^{$	Bands TDD_C	dBm/15 kHz	-88.65		for Channel	-116
	Bands TDD_E				2 +8dB)	-115
Ê	$I_{ m ot}/I_{ m ot}$	dB	10	10	13	-4
	Bands TDD_A				(RSRP	-121
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-78.65	-78.65	for Cell 2	-120
	Bands TDD_E				+25dB)	-119
	Bands TDD_A				(lo for Channel	-87.76
lo <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-50.45	45 -50.45	2	-86.76
	Bands TDD_E				+19.75d B)	-85.76
	$/N_{oc}$	dB	10	10	13	-4
Propagat	tion condition	-	AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of

appropriate power for  $N_{\it oc}$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

Table A.9.1.4.2-2: RSRP TDD—TDD Inter frequency test parameters for TDD configuration 0

Parameter		Unit	Tes	st 1	Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
BV	V <sub>channel</sub>	MHz	10	10	10	10
Special subtran	ne configuration <sup>Note1</sup> k configuration <sup>Note1</sup>		-	<u>3</u> )	(	-
	Pattern Id		0	-	0	-
	ent bandwidth	10	-		22-	27
		$n_{PRB}$		-21		-21
	ence measurement ned in A.3.1.1.2		R.5 TDD	-	R.5 TDD	-
	d allocation	$n_{PRB}$	13—36	-	13—36	=
measurement	H/PHICH Reference channel defined in 3.1.2.2		R.6	TDD	R.6	TDD
	defined in A.3.2.2.1		OP.1	OP.2	OP.1	OP.2
	A.3.2.2.2 (OP.2 TDD) CH RA		TDD	TDD	TDD	TDD
	CH RB					
	SS_RA					
	SS_RA			0		
	ICH_RB		0		0	0
	CH_RA CH_RB					
	CH RA	dB				
	CH_RB					
	CH_RA					
PDS	SCH_RB					
OCNO	G_RA <sup>Note2</sup> G_RB <sup>Note2</sup>					
OCN	_					
3.T. Novo	Bands TDD_A			-88.65	$(N_{oc})$	-117
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-88.65		for Channel	-116
	Bands TDD_E				2 +8dB)	-115
Ê	$I_{ m ot}/I_{ m ot}$	dB	10	10	13	-4
	Bands TDD_A				(RSRP	-121
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-78.65	-78.65	for Cell 2	-120
	Bands TDD_E				+25dB)	-119
	Bands TDD_A				(lo for Channel	-87.76
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-50.45	-50.45	2	-86.76
	Bands TDD_E				+19.75d B)	-85.76
	$/N_{oc}$	dB	10	10	13	-4
Propagat	ion condition	-	AWGN		AW	GN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of

appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

## A.9.1.4.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

## A.9.1.5 FDD—TDD Inter frequency case

#### A.9.1.5.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for FDD—TDD inter frequency measurements.

#### A.9.1.5.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP inter frequency measurements are tested by using the parameters in Table A.9.1.5.2-1 and Table A.9.1.5.2-2. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell. Cell 1 is FDD cell and Cell 2 is TDD cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.5.2-1: RSRP FDD—TDD Inter frequency test parameters (FDD Cell1)

Parameter	Unit		st 1		st 2	
	Onit		II 1		II 1	
E-UTRA RF Channel Number			1	1		
BW <sub>channel</sub>	MHz	1	0	10		
Gap Pattern Id		(	)	(	)	
Measurement bandwidth	$n_{PRB}$	22-	<b>–27</b>	22-	<b>–27</b>	
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0	FDD	R.0	R.0 FDD	
PDSCH allocation	$n_{PRB}$	13-	-36	13-	<b>–</b> 36	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6	FDD	R.6	FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)		OP.1	FDD	OP.1	FDD	
PBCH_RA						
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB	dB	0	0	0	0	
PDCCH_RA						
PDCCH_RB						
PDSCH_RA						
PDSCH_RB						
OCNG_RANote1						
OCNG_RBNote						
$N_{oc}^{ m Note2}$	dBm/15 kHz	-88	3.65	-1	04	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1	0	1	3	
RSRP <sup>Note3</sup>	dBm/15 kHz	-78	3.65	-9	91	
Io <sup>Note3</sup>	dBm/9 MHz	-50	.45	-63	3.01	
$\hat{E}_s/N_{oc}$	dB		0		3	
Propagation condition	-	AW	'GN	AWGN		
Note 1: OCNG shall be used such	h that both cells ar					

transmitted power spectral density is achieved for all OFDM symbols.

appropriate power for  $N_{\it oc}$  to be fulfilled.

RSRP and lo levels have been derived from other parameters for information Note 3: purposes. They are not settable parameters themselves.

Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of

Table A.9.1.5.2-2: RSRP FDD—TDD Inter frequency test parameters (TDD cell2)

Parameter	Unit	Test 1 Cell 2	Test 2 Cell 2			
E-UTRA RF Channel Number		Cell 2	2 Cell 2			
BW <sub>channel</sub>	MHz	10	10			
Special subframe	IVII IZ	10	10			
configuration Note1		6	6			
Uplink-downlink configuration Note1		1	1			
Gap Pattern Id		-	-			
Measurement bandwidth	$n_{PRB}$	22—27	22—27			
PDSCH Reference measurement channel defined in A.3.1.1.2	TRD	-	-			
PDSCH allocation	$n_{PRB}$	-	-			
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2	THE	R.6 TDD	R.6 TDD			
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD			
PBCH_RA						
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB	dB	0	0			
PDCCH_RA						
PDCCH_RB						
PDSCH_RA PDSCH_RB	_					
OCNG_RA <sup>Note2</sup>	_					
OCNG_RB <sup>Note2</sup>						
$N_{oc}^{\text{Note3}}$	dBm/15 kHz	-88.65	-112			
$\hat{E}_{s}/I_{ot}$	dB	10	-4			
RSRP <sup>Note4</sup>	dBm/15 kHz	-78.65	-116			
Io <sup>Note4</sup>	dBm/9 MHz	-50.45	-82.76			
$\hat{E}_s/N_{oc}$	dB	10	-4			
	Propagation condition - AWGN AWGN					
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.  Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.						
Note 3: Interference from other cells and noise sources not specified in the test is assumed						

Interference from other cells and noise sources not specified in the test is assumed Note 3: to be constant over subcarriers and time and shall be modelled as AWGN of

appropriate power for  $\frac{N_{oc}}{N_{oc}}$  to be fulfilled. RSRP and lo levels have been derived from other parameters for information Note 4: purposes. They are not settable parameters themselves.

RSRP minimum requirements are specified assuming independent interference and Note 5: noise at each receiver antenna port.

#### A.9.1.5.3 **Test Requirements**

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

## A.9.1.6 FDD RSRP for E-UTRAN Carrier Aggregation

## A.9.1.6.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2. The test will also verify the primary and secondary component carrier relative RSRP accuracy requirement defined in Clause 9.1.11.3.

## A.9.1.6.2 Test parameters

In this set of cases cell1 is PCell on the primary component carrier, cell2 is SCell on the secondary component carrier and activated, and cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.6.2-1.

Table A.9.1.6.2-1: RSRP FDD carrier aggregation test parameters

Parameter		Unit	Test 1			
			Cell 1	Cell 2	Cell3	
E-UTRA RF Ch	nannei Number	MHz	1 10	10	2 10	
BW <sub>channel</sub>	coll1		-	0	3	
Timing offset to cell1  Time alignment error between cell 2 and cell 1		<u>µ</u> ѕ	-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	-	
Measurement b	oandwidth	$n_{PRB}$		22—27		
PDSCH Refere	ence measurement d in A.3.1.1.1		R.0 FDD	R.0 FDD	-	
PDSCH allocat		$n_{PRB}$	13—36	13—36	-	
defined in A.3.1	asurement channel 1.2.1	TKD		R.6 FDD		
OCNG Patterns A.3.2.1.1 (OP.1 A.3.2.1.2 (OP.2	1 FDD) and		OP.1 FDD	OP.1 FDD	OP.2 FDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RANote	e	dB	0	0	0	
$N_{oc}^{$	Bands FDD_A Bands FDD_C		-117 -116 -115.5 -115 -114 -113.5	( $N_{oc}$ for Ch	annel 1 +1dB)	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-4	0.46	-5.76	
RSRP <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H	dBm/15 kHz	-121 -120 -119.5 -119 -118 -117.5	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)	
Io <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H	dBm/9 MHz	-87.76 -86.76 -86.26 -85.76 -84.76 -84.26	(lo for Chanr	nel 1 +5.33dB)	
$\hat{E}_s/N_{oc}$		dB	-4	3	-1	
Propagation co	ndition			AWGN		
Note 1: OCN	NG shall be used such	that both cells a	re fully allocat	ed and a cons	tant total	

Note 2:	transmitted power spectral density is achieved for all OFDM symbols.  Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of
	appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 6:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

## A.9.1.6.3 Test Requirements

In the test, the performance of RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

## A.9.1.7 TDD RSRP for E-UTRAN Carrier Aggregation

The test case in this clause are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

## A.9.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the absolute RSRP accuracy on PCell defined in clause 9.1.11.1, the absolute RSRP accuracy on Scell defined in clause 9.1.11.2, the relative RSRP accuracy between SCell and Cell 3 defined in clause 9.1.11.2, and the relative RSRP accuracy between PCell and SCell defined in clause 9.1.11.3.

### A.9.1.7.2 Test parameters

In this set of test cases there are three cells on two carrier frequencies. Cell 1 is PCell on channel 1, Cell 2 is activated SCell on channel 2, and Cell 3 is neighbour cell which is also on channel 2. The parameters for the test are listed in Table A.9.1.7.2-1.

Table A.9.1.7.2-1: Carrier aggregation RSRP test parameters for TDD

		Unit		Test 1	
P	Parameter		Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	,	2
BW <sub>channel</sub>		MHz		10	
Special subframe configuration Note1				6	
Uplink/downlink cor	nfiguration <sup>Note1</sup>			1	
Timing offset to Cel		μs	-	0	3
Time alignment erro		-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	•	
Measurement band	width	$n_{PRB}$		22—27	
PDSCH Reference defined in A.3.1.1.2	measurement channel		R.0 TDD	R.0 TDD	-
PDSCH allocation		$n_{PRB}$	13—36	13—36	-
PDCCH/PCFICH/P				R.6 TDD	
	nel defined in A.3.1.2.2				
	ined in A.3.2.2.1 (OP.1		OP.1 TDD	OP.1 TDD	OP.2 TDD
TDD) and A.3.2.2.2 PBCH_RA	(OP.2 1DD)				
PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA <sup>Note2</sup> OCNG_RB <sup>Note2</sup>		dB	0	0	0
Note3	Bands TDD_A	-ID /4.5 L-L-	-117	$(N_{oc}$ for	Channel 1
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-116		dB)
^ /	Bands TDD_E		-115	+10	עם) 
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-4	0.5	-5.76
RSRP <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-121 -120 -119	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
lo <sup>Note4</sup> Bands TDD_C Bands TDD_E		dBm/9 MHz	-87.76 -86.76 -85.76	(lo for C +5.3	
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
Propagation conditi		-		AWGN	
	ial subframe and uplink-dow	nlink configuration	ons see Table		1.2-2 in TS

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power

for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: The selection of the bands for testing depends on the configuration of the carrier

	aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is
	performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

## A.9.1.7.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3

## A.9.1.8 FDD RSRP under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

## A.9.1.8.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for FDD intra-frequency RSRP measurements under timedomain measurement resource restriction with non-MBSFN ABS configured in the aggressor cell.

## A.9.1.8.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.8.2-1 and A.9.1.8.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.8.2-1: General test parameters for E-UTRAN FDD RSRP intra frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are selected
		!=0	randomly so that the condition is met
ABS pattern		'10000000100000001000 0000100000001000000	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'10000000100000001000 0000100000001000000	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'01000000010000000100 00000100000001000000	Configured for measurements on Cell 1.

Table A.9.1.8.2-2: Cell-specific test parameters for E-UTRAN FDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

_			Tes	st 1	Tes	st 2	Tes	st 3	
Pa	arameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2	
E-UTRA RF Ch	nannel Number		1		1				
BW <sub>channel</sub>		MHz	10		10		10		
Measurement b		$n_{PRB}$		22—27		22—27		22—27	
PDSCH Refere	ence measurement d in A.3.1.1.1		R.0 FDD	-	R.0 FDD	-	R.0 FDD	-	
PDSCH allocat		$n_{PRB}$	13—36	-	13—36	-	13—36	-	
measurement of	CH/PHICH Reference channel defined in		R.6	FDD	R.6	FDD	R.6	FDD	
(OP.5 FDD) an	s defined in A.3.2.1.5 d A.3.2.1.6 (OP.6		OP.5 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	
FDD) PBCH_RA			100	100	100	100	100	100	
PBCH_RB									
PCFICH_RB	_								
PHICH_RA									
PHICH_RB									
PDCCH_RA		dB	Note 6	0	Note 6	0	Note 6	0	
PDCCH_RB									
PDSCH_RA									
PDSCH_RB									
OCNG_RA	OCNG_RA <sup>Note1</sup>								
OCNG_RB <sup>Note1</sup>									
PSS_RA		dB	-4	0	-4	0	-4	0	
SSS_RA		dB	-4	0	-4	0	-4	0	
	Bands FDD_A							16	
	Bands FDD_C							15	
$N_{oc}^{ m Note2}$	Bands FDD_D	.= /.=			_		-11	4.5	
- · oc	Bands FDD_E, FDD_F Note 7	dBm/15 kHz	-106		-88		-1	14	
	Bands FDD_G Note 9						-113		
	Bands FDD_H						-11	2.5	
CRS $\hat{E}_s / N_{oc}$		dB	5	-2	5	-4	5	-4	
CRS $(\hat{E}_{s}/I_{ot})$	Note 5 meas	dB	2.88	-2	3.54	-4	3.54	-4	
SCH $\hat{E}_{s}/I_{ot}$		dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54	
	Bands FDD_A						-111	-120	
	Bands FDD_C						-110	-119	
	Bands FDD_D						-109.5	-118.5	
RSRP Note3,4,5	Bands FDD_E, FDD_F Note 7	dBm/15 kHz	-101	-108	-83	-92	-109	-118	
	Bands FDD_G Note 9						-108	-117	
	Bands FDD_H						-107.5	-116.5	
	Bands FDD_A						-81.63	-85.37	
	Bands FDD_C						-80.63	-84.37	
( )	Bands FDD_D						-80.13	-83.87	
$(Io)_{meas}^{Note 3}$	Bands FDD_E, FDD_F Note 7	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-79.63	-83.37	
	Bands FDD_G Note 9						-78.63	-82.37	
	Bands FDD_H						-78.13	-81.87	
Propagation co	ndition		AW	GN	AW	GN	AW	GN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	Applies to all subframes. RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	Applies to restricted measurement subframes of the respective cell.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

## Note 9: Except Band 29 and Band 32.

E-UTRA operating band groups are as defined in Section 3.5.

## A.9.1.8.3 Test Requirements

Note 8:

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

## A.9.1.9 TDD RSRP under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

### A.9.1.9.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for TDD intra-frequency RSRP measurements under time-domain measurement resource restriction with non-MBSFN ABS configured in the aggressor cell.

## A.9.1.9.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.9.2-1 and A.9.1.9.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.9.2-1: General test parameters for E-UTRAN TDD RSRP intra frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Also the aggressor cell.
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe
			configurations see Table 4.2-1 in [16].
Uplink/downlink subframe		1	For Cell 1 and Cell 2. For uplink-downlink
configuration			subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are randomly
		!=0	selected so that the condition is met
ABS pattern		'0000000010000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'0000000010000000001'	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'100000000100000000'	Configured for Cell 1 measurements.

Table A.9.1.9.2-2: Cell-specific test parameters for E-UTRAN TDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Doromotor	Linit	Tes	st 1	Tes	st 2	Test 3	
Parameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	•	-		1
BW <sub>channel</sub>	MHz	1	0	1	0	1	0
Measurement bandwidth	$n_{\scriptscriptstyle PRB}$	22-	<b>–27</b>	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation	$n_{\scriptscriptstyle PRB}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6	TDD	R.6	TDD	R.6	TDD
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RBNote1	dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA	dB	-4	0	-4	0	-4	0
SSS_RA	dB	-4	0	-4	0	-4	0
N <sub>oc</sub> Note 2 Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-1	06	-8	38	-116 -115 -114	
CRS $\hat{E}_s/N_{oc}$	dB	5	-2	5	-4	5	-4
CRS $(\hat{E}_s/I_{ot})_{meas}$ Note 5	dB	2.88	-2	3.54	-4	5	-4
SCH $\hat{E}_s/I_{ot}$	dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54
RSRP Note3,4,5 Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-101	-108	-83	-92	-111 -110 -109	-120 -119 -118
(Io) <sub>meas</sub> Note 3 Bands TDD_C Bands TDD_E	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-81.6 -80.6 -79.6	-85.4 -84.4 -83.4
Propagation condition			'GN	AW			'GN
Note 1: OCNG shall be used such	n that both cells a	re fully allo	cated and	a constant	total trans	mitted now	/er

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.
- Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
- Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Applies to restricted measurement subframes of the respective cell.
- Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
- Note 7: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.1.9.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

## A.9.1.10 FDD RSRP under Time-Domain Measurement Resource Restriction with MBSFN ABS

#### A.9.1.10.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for FDD intra-frequency RSRP measurements under time-domain measurement resource restriction with MBSFN ABS configured in the aggressor cell.

#### A.9.1.10.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.10.2-1 and A.9.1.10.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. MBSFN ABS pattern is configured in Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.10.2-1: General test parameters for E-UTRAN FDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6 =0, PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met
ABS pattern		'0100000010000001000 00000010000001000000	MBSFN ABS pattern. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1.  The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. All ABS subframes are MBSFN subframes.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'01000000100000001000 00000010000001000000	Configured for Cell 2 measurements by measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'00010000000100000001 00000001000000010000'	Configured for measurements on Cell 1.

Table A.9.1.10.2-2: Cell-specific test parameters for E-UTRAN FDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

_			Test 1		Tes	Test 2		Test 3		
	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2		
E-UTRA RF Ch	annel Number			•		1		•		
BW <sub>channel</sub>		MHz		0		0		0		
Measurement b	andwidth	$n_{PRB}$	22–	–27	22–	<b>–27</b>	22–	–27		
PDSCH Reference channel defined	nce measurement I in A.3.1.1.1		R.0 FDD	-	R.0 FDD	-	R.0 FDD	-		
PDSCH allocati		$n_{PRB}$	13—36	-	13—36	-	13—36	-		
	H/PHICH Reference				_					
measurement c A.3.1.2.1	hannel defined in		R.6	FDD	R.6	FDD	R.6	FDD		
	defined in A.3.2.1.8		27.			27.0	27.			
	d A.3.2.1.6 (OP.6		OP.8 FDD	OP.6 FDD	OP.8 FDD	OP.6 FDD	OP.8 FDD	OP.6 FDD		
FDD)			100	100	100	100	100	100		
PBCH_RA PBCH_RB										
PCFICH_RB										
PHICH_RA										
PHICH_RB										
PDCCH_RA		dB	Note 6	0	Note 6	0	Note 6	0		
PDCCH_RB PDSCH_RA										
PDSCH_RB										
OCNG_RA <sup>Note1</sup>										
OCNG_RB Note1			_			_				
PSS_RA		dB	-4	0	-4	0	-4	0		
SSS_RA	Bands FDD_A	dB	-4	0	-4	0	-4 -1	0 16		
	Bands FDD_C							15		
Note 2	Bands FDD_D	_					-11	4.5		
$N_{oc}^{ m Note  2}$	Bands FDD_E, FDD_F Note 8	dBm/15 kHz	-1	06	-8	38	-1	14		
	Bands FDD_G Note							13		
	Bands FDD_H					ı	-11	2.5		
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-4	5	-4		
CRS $(\hat{E}_s/Iot)_n$	Note 5, 7 in the 1 <sup>st</sup>	dB	2.88	-8.19	3.54	-10.19	3.54	-10.19		
OFDM symbol	Note E									
	<sub>neas</sub> Note 5 in OFDM	dB	2.88	-2	3.54	-4	3.54	-4		
symbols 4,7,11		ID.		<i></i>		7.5.		7		
SCH $\hat{E}_s/I_{ot}$	T <b>-</b> . == -	dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54		
	Bands FDD_A						-111	-120		
	Bands FDD_C Bands FDD_D						-110 -109.5	-119 -118.5		
RSRP Note 3,4	Bands FDD_E, FDD_F Note 8	dBm/15 kHz	-101	-108	-83	-92				
NONE	FDD_F Note 8  Bands FDD_G Note		-101	-100	-03	-92	-109	-118		
	10						-108	-117		
	Bands FDD_A						-107.5	-116.5		
	Bands FDD_A Bands FDD_C						-81.63 -80.63	-85.37 -84.37		
(IO) Note 3	Bands FDD_D						-80.13	-83.87		
$(Io)_{meas}^{\text{Note 3}}$ in the 1 <sup>st</sup> OFDM	Bands FDD_E, FDD_F Note 8	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-79.63	-83.37		
symbol	Bands FDD_G Note						-78.63	-82.37		
	Bands FDD_H						-78.13	-81.87		
(Io) Note 3	Bands FDD_A	dBm/0 MU~	71 11	76.00	E2 62	E0 76	-81.63	-86.76		
$(Io)_{meas}$ Note 3	Bands FDD_C	dBm/9 MHz	-71.41	-76.09	-53.63	-58.76	-80.63	-85.76		

in OFDM	Bands FDD_D				-80.13	-85.26
symbols other than the 1 <sup>st</sup>	Bands FDD_E, FDD_F Note 8				-79.63	-84.76
one	Bands FDD_G Note				-78.63	-83.76
	Bands FDD_H				-78.13	-83. 26
Propagation cor	ndition		AWGN	AWGN	AW	'GN
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power						ver

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled. Applies to all subframes.
- Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
- Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Applies to restricted measurement subframes of the respective cell.
- Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
- Note 7: In the 1<sup>st</sup> OFDM symbol, Cell 2 is not expected to meet the Es/lot side condition in 9.1.2.3 and 9.1.2.4.
- Note 8: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 9: E-UTRA operating band groups are as defined in Section 3.5.
- Note 10: Except Band 29 and Band 32.

#### A.9.1.10.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

## A.9.1.11 TDD RSRP under Time-Domain Measurement Resource Restriction with MBSFN ABS

#### A.9.1.11.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for TDD intra-frequency RSRP measurements under time-domain measurement resource restriction with MBSFN ABS configured in the aggressor cell.

#### A.9.1.11.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.11.2-1 and A.9.1.11.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. MBSFN ABS pattern is configured in Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.11.2-1: General test parameters for E-UTRAN TDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe
			configurations see Table 4.2-1 in [16].
Uplink/downlink subframe		1	For Cell 1 and Cell 2. For uplink-downlink
configuration			subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are selected
		=0, PCI <sub>cell1</sub> not equal to	randomly so that the condition is met
		PCI <sub>cell2</sub>	
ABS pattern			MBSFN ABS pattern. TDD ABS Pattern Info IE,
		'0000100000000100000'	as defined in TS 36.423 [28], clause 9.2.54.
			Configured in Cell 1.
			The first/leftmost bit corresponds to the
			subframe #0 of a radio frame satisfying SFN
			mod x = 0, where x is the size of the bit string
			(20) divided by 10. All ABS subframes are
			MBSFN subframes.
Time-domain measurement			Configured for Cell 2 measurements by
resource restriction pattern for		'0000100000000100000'	measSubframePatternNeigh IE in
neighbour cell measurements on			measSubframePatternConfigNeigh, as defined
RF Channel 1			in TS 36.331 [2], clause 6.3.5.
			measSubframeCellList contains Cell 2.
Time-domain measurement			Configured for measurements on Cell 1.
resource restriction pattern for		'100000000100000000'	
serving cell measurements			

Table A.9.1.11.2-2: Cell-specific test parameters for E-UTRAN TDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Doro	Parameter		Tes	st 1	Tes	st 2	Test 3	
		Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
	E-UTRA RF Channel Number		,		,			1
BW <sub>channel</sub>		MHz		0	10		10	
Measurement bar		$n_{PRB}$	22-	–27	22-	–27		<del></del> 27
PDSCH Reference channel defined in			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation	1	$n_{PRB}$	13—36	-	13—36	-	13— 36	-
measurement cha A.3.1.2.2			R.6	TDD	R.6	TDD	R.6	TDD
(OP.5 TDD) and A	efined in A.3.2.2.5 A.3.2.2.2 (OP.2		OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
$N_{oc}^{$	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-1	06	3-	38	-1	16 15 14
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-4	5	-4
CRS $(\hat{E}_s/Iot)_{mea}$ 1st OFDM symbol		dB	2.88	-8.19	3.54	-10.19	3.54	-10.19
CRS $(\hat{E}_s/Iot)_{mea}$ symbols 4,7,11	s note 5 in OFDM	dB	2.88	-2	3.54	-4	3.54	-4
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54
RSRP Note 3,4	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-101	-108	-83	-92	-111 -110 -109	-120 -119 -118
$(Io)_{meas}^{\text{Note 3}}$ in the 1 <sup>st</sup> OFDM symbol	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-81.63 -80.63 -79.63	-85.37 -84.37 -83.37
$(Io)_{meas}^{Note 3}$ in OFDM	Bands TDD_A Bands TDD_C	dBm/9 MHz	-71.41	-76.09	-53.63	-58.76	-81.63 -80.63	-86.76 -85.76
	1	I	1				70.00	04.76
symbols other than the 1 <sup>st</sup> one Propagation cond	Bands TDD_E			'GN	AW		-79.63	-84.76 /GN

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	Applies to all subframes. RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port
Note 5:	Applies to restricted measurement subframes of the respective cell.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
Note 7:	In the 1 <sup>st</sup> OFDM symbol, Cell 2 is not expected to meet the Es/lot side condition in 9.1.2.3 and 9.1.2.4.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

### A.9.1.11.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

### A.9.1.12 FDD RSRP for E-UTRAN Carrier Aggregation for 20MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.12.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.6.1.

#### A.9.1.12.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.12.2-1 will replace the values of corresponding parameters in Tables A.9.1.6.2-1.

Table A.9.1.12.2-1: RSRP FDD carrier aggregation test parameters

Do	Parameter			Test 1	
	ameter	Unit	Cell 1	Cell 2	Cell 3
BW <sub>channel</sub> Note 1		MHz	20 20		20
Measurement b	pandwidth	$n_{PRB}$		47—52	
PDSCH Refere	nce measurement d in A.3.1.1.1		R.4 FDD	R.4 FDD	N/A
PDSCH allocat	ion	$n_{PRB}$	38—61	38—61	N/A
PDCCH/PCFIC Reference mea defined in A.3.1	surement channel			R.10 FDD	
A.3.2.1.11 (OP	OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and A.3.2.1.12 (OP.12 FDD)		OP.11 FDD	OP.11 FDD	OP.12 FDD
	Bands FDD_A Note 5		-84.75		
	Bands FDD_C Note 5		-83.75		
lo <sup>Note2</sup>	Bands FDD_D Note 5	dBm/18 MHz	-83.25	(lo for Channel 1 +5.33dB	
10	Bands FDD_E		-82.75	(10 for Chanr	iei i +5.330b)
Bands FDD_G  Bands FDD_H  Note 5			-81.75		
			-81.25		
	test verifies the RRM	•	•		l bandwidth

- and is performed according to the principle defined in section A.3.6.1.
- Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 3: See Table A.9.1.6.2-1 for the other parameters.
- E-UTRA operating band groups are as defined in Section 3.5. Note 4:
- Note 5: The test applies for E-UTRA operating bands in this band group which are

supporting 20 MHz channel bandwidth.

#### A.9.1.12.3 **Test Requirements**

The test requirements defined in section A.9.1.6.3 shall apply to this test case.

### A.9.1.13 TDD RSRP for E-UTRAN Carrier Aggregation for 20MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.13.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

#### A.9.1.13.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.13.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.13.2-1: Carrier aggregation RSRP test parameters for TDD

Parameter		Unit		Test 1		
	Parameter	Unit	Cell 1	Cell 2	Cell 3	
BW <sub>channel</sub> Note 1		MHz		20		
Measurement ban	dwidth	$n_{PRB}$	47—52			
PDSCH Reference defined in A.3.1.1	e measurement channel 2		R.3 TDD	R.3 TDD	N/A	
PDSCH allocation		$n_{PRB}$	38—61	38—61	N/A	
PDCCH/PCFICH/ measurement cha	PHICH Reference nnel defined in A.3.1.2.2			R.10 TDD		
OCNG Patterns d TDD) and A.3.2.2	efined in A.3.2.2.7 (OP.7 8 (OP.8 TDD)		OP.7 TDD	OP.7 TDD	OP.8 TDD	
lo <sup>Note2</sup>	Bands TDD_A Note 5 Bands TDD_C Note 5 Bands TDD_E Note 5	dBm/18 MHz	-84.75 -83.75 -82.75	`	hannel 1 3dB)	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.  Note 2: lo levels have been derived from other parameters for information purposes. They are no settable parameters themselves.						
<ul> <li>Note 3: See Table A.9.1.7.2-1 for the other parameters.</li> <li>Note 4: E-UTRA operating band groups are as defined in Section 3.5.</li> <li>Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 2 MHz channel bandwidth.</li> </ul>						

#### A.9.1.13.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

## A.9.1.14 FDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.9.1.14.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.5 and 9.1.2.6 for FDD intra-frequency RSRP measurements under time-domain measurement resource restriction with CRS Assistance Information and non-MBSFN ABS configured in the aggressor cells.

#### A.9.1.14.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.14.2-1 and A.9.1.14.2-2.

In the tests there are three synchronous cells, Cell 1, Cell2 and Cell 3, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 3. Cell 2 is the neighbour aggressor cell without CRS colliding to Cell 3. Cell 3 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 3 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 and Cell 2 during the test.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided via RRC to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.1.14.2-1: General test parameters for FDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 3
Neighbour cell		Cell 2	The aggressor cell to Cell 3
Neighbour cell		Cell 3	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length		Normal	For three cells in the test
DRX			OFF
Cell 2 time offset with respect to Cell 1		0μs	Synchronous cells
Cell 3 time offset with respect to Cell 1		-2.5 μs	Synchronous cells
Physical cell ID PCI		Colliding CRS: (PCI <sub>cell1</sub> – PCI <sub>cell3</sub> )mod6=0, PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub> Non-colliding CRS: (PCI <sub>cell2</sub> – PCI <sub>cell3</sub> )mod6 !=0	Cell PCIs for three cells are selected randomly so that all conditions are met
ABS pattern		'1000000010000001000 00001000000010000000	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the Pcell subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'10000000100000001000 0000100000001000000	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5.  Configured before the measurements start. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'0100000010000000100 00000100000001000000	Configured for measurements on Cell 1.
CRS physCellId		see PCI conditions above	The CRS assistance information is provided for
assistance antennaPortsC		1	Cell 2 only in CRS-AssistanceInfo. It includes a
information ount			single MBSFN-SubframeConfig element with
mbsfn- SubframeConfi gList		oneFrame = '000000'	subframe allocation one Frame='000000'.

Table A.9.1.14.2-2: Cell-specific test parameters for FDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Par	ameter	Unit		Test 1			Test 2			Test 3	
		Onic	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
BW <sub>channel</sub>	hannel Number	MHz	1 10			1 10		1 10			
Measurement	handwidth			22—27			22—27			22—27	
PDSCH Refere		$n_{PRB}$		22 21				1		22 21	1
	channel defined in		R.0 FDD	1	1	R.0 FDD	-	-	R.0 FDD	-	-
PDSCH alloca		$n_{PRB}$	13—36	-	-	13—36	-	-	13—36	-	-
PDCCH/PCFIC Reference mea channel define	asurement			R.6 FDD			R.6 FDD			R.6 FDD	
OCNG Pattern A.3.2.1.5 (OP.8 A.3.2.1.6 (OP.8	s defined in 5 FDD) and		OP.5 FDD	OP.6 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.6 FDD
PBCH_RA	0 FDD)										
PBCH_RB PSS_RA											
SSS_RA											
PCFICH_RB											
PHICH_RA				Note							
PHICH_RB		dB	Note 6	6	0	Note 6	Note 6	0	Note 6	Note 6	0
PDCCH_RA											
PDCCH_RB PDSCH_RA											
PDSCH_RB											
OCNG_RA <sup>Note</sup>	1										
OCNG_RB <sup>Note</sup>	1										
	Bands FDD_A						•	•		-116	•
	Bands FDD_C									-115	
Note2	Bands FDD_D	ID /45						-114.5			
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 7	dBm/15 kHz		-106			-88			-114	
	Bands FDD_G Note 9									-113	
	Bands FDD_H						1	1		-112.5	1
CRS $\hat{E}_s / N_{oc}$		dB	4	2	-1.5	4	2	-4	4	2	-4
CRS $(\hat{E}_s/I_{ot})$		dB	-1.18	-0.32	-6.96	-0.75	0.54	-9.46	-0.75	0.54	-9.46
	Bands FDD_A Bands FDD_C								-112 -111	-114 -113	-120 -119
	Bands FDD_D								-110.5	-112.5	- 118.5
RSRP Note3,4,5	Bands FDD_E, FDD_F Note 7	dBm/15 kHz	-102	-104	- 107.5	-84	-86	-92	-110	-112	-118
	Bands FDD_G Note 9								-109	-111	-117
	Bands FDD_H								-108.5	-110.5	- 116.5
	Bands FDD_A								-80.82	-85.	
	Bands FDD_C								-79.82	-84.	
(I <sub>O</sub> ) Note 3,5	Bands FDD_D Bands FDD_F	dBm/9							-79.32	-83.	
$(Io)_{meas}^{\text{Note 3,5}}$	Bands FDD_E, FDD_F Note 7 Bands FDD_G	MHz	-70.58	-74	.43	-52.82	-57.	04	-78.82	-83.	
	Note 9								-77.82	-82.	
Dropagation of	Bands FDD_H			AWGN			AMCN		-77.32	-81. AWGN	54
Propagation co	חומונוטוו			AVVGIV			AWGN			AVVGN	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled. Applies to all subframes.
- Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
- Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
- Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
- Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 8: E-UTRA operating band groups are as defined in Section 3.5.
- Note 9: Except Band 29 and Band 32.

#### A.9.1.14.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.5 and 9.1.2.6, respectively.

## A.9.1.15 TDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.9.1.15.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.5 and 9.1.2.6 for TDD intra-frequency RSRP measurements under time-domain measurement resource restriction with CRS Assistance Information and non-MBSFN ABS configured in the aggressor cells.

#### A.9.1.15.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.15.2-1 and A.9.1.15.2-2.

In the tests there are three synchronous cells, Cell 1, Cell2 and Cell 3, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 3. Cell 2 is the neighbour aggressor cell without CRS colliding to Cell 3. Cell 3 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 3 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 and Cell 2 during the test.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided via RRC to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.1.15.2-1: General test parameters for TDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 3
Neighbour cell		Cell 2	The aggressor cell to Cell 3
Neighbour cell		Cell 3	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length		Normal	For three cells in the test
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DRX			OFF
Cell 2 time offset with respect to Cell 1		0μs	Synchronous cells
Cell 3 time offset with respect to Cell 1		-2.5 μs	Synchronous cells
Physical cell ID PCI		Colliding CRS: (PCI <sub>cell1</sub> – PCI <sub>cell3</sub> )mod6=0, PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub> Non-colliding CRS: (PCI <sub>cell2</sub> – PCI <sub>cell3</sub> )mod6 !=0	Cell PCIs for three cells are selected randomly so that all conditions are met
ABS pattern		'0000000010000000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.  The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes.  Provided to the UE for Cell 1 and Cell 2 before the measurements start.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'000000001000000001'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Configured before the measurements start. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'1000000001000000000'	Configured for Cell 1 measurements.
CRS physCellId		see PCI conditions above	The CRS assistance information is provided for
assistance antennaPortsC ount		1	Cell 2 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with
mbsfn- SubframeConfi gList		oneFrame = '000000'	subframe allocation one Frame='000000'.

Table A.9.1.15.2-2: Cell-specific test parameters for TDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Davamatan	I I m ! £		Test 1		Test 2			Test 3		
Parameter	Unit	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1			1			1	
BW <sub>channel</sub>	MHz		10			10		10		
Measurement bandwidth	$n_{PRB}$		22—27			22—27			22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	-	-	R.0 TDD	-	-	R.0 TDD	-	-
PDSCH allocation	$n_{PRB}$	13—36	-	-	13—36	-	-	13—36	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		F	R.6 TDD		R.6 TDD			R.6 TDD		
OCNG Patterns defined in A.3.2.2.5 (OP.5 TDD) and A.3.2.2.6 (OP.6 TDD)		OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA										
PCFICH_RB PHICH_RA	-		0						•	
PHICH_RB PDCCH_RA PDCCH_RB	dB	Note	9 6	0	Not	te 6	0	Not	ie 6	0
PDSCH_RA PDSCH_RB OCNG_RA <sup>Note1</sup> OCNG_RB <sup>Note1</sup>										
N <sub>oc</sub> Note2 Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz		-106			-88		-116 -115 -114		
CRS $\hat{E}_s / N_{oc}$	dB	4	2	-1.5	4	2	-4	4	2	-4
CRS $(\hat{E}_s/I_{ot})_{meas}$ Note 5	dB	-1.18	-0.32	-6.96	-0.75	0.54	-9.46	-0.75	0.54	-9.46
RSRP Note3,4,5 Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-102	-104	- 107.5	-84	-86	-92	-112 -111 -110	-114 -113 -112	-120 -119 -118
(Io) <sub>meas</sub> Note 3, 5 Bands TDD_A Bands TDD_C Bands TDD_E	dBm/9 MHz	-70.58	-74	.43	-52.82	-57.	04	-80.82 -79.82 -78.82	-85. -84. -83.	04
Propagation condition			AWGN			AWGN			AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled. Applies to all subframes.

Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.

Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 5: Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.

Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.

Note 7: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.1.15.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.5 and 9.1.2.6, respectively.

### A.9.1.16 FDD Intra frequency case for 5MHz Bandwidth

### A.9.1.16.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.1 and 9.1.2.2 for FDD intra frequency measurements.

#### A.9.1.16.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.16.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.16.2-1: RSRP FDD Intra frequency test parameters for 5MHz Bandwidth

D	arameter	Unit	Tes		Test 2		Test 3	
		Offic	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
	hannel Number			1	•			1
BW <sub>channel</sub>		MHz	į	5		5	5	
Measurement	bandwidth	$n_{PRB}$	10–	<b>–15</b>	10—15		10—15	
	ence measurement ed in A.3.1.1.1-1		R.5 FDD	ı	R.5 FDD	-	R.5 FDD	•
PDSCH alloca	tion	$n_{PRB}$	7—17	-	7-17	-	7-17	-
measurement A.3.1.2.1-1	CH/PHICH Reference channel defined in	0.002	R.11 FDD		R.11	FDD	R.11	FDD
OCNG Pattern A.3.2.1.15 (OF A.3.2.1.16 (OF	P.15 FDD) and		OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA	1	dB	0	0	0	0	0	0
$N_{oc}^{Note2}$	Bands FDD_N	dBm/15 kHz	dBm/15 kHz -103		-83		-109.5	
						I		T
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	T	dB	2.46	-5.97	2.46	-5.97	0.46	-5.76
RSRP <sup>Note3</sup>	Bands FDD_N	dBm/15 kHz	-97	-102	-77	-82	-106.5	-110.5
lo <sup>Note3</sup>	Bands FDD_N	dBm/4.5 MHz	-70	.28	-50	).28	-78	3.94
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation co	ondition	-	AW	'GN	AW	'GN	AWGN	
Note 1: OCI	NG shall be used such to ctral density is achieved			cated and	a constant	total trans	mitted pov	/er

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

### A.9.1.16.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.2.1 and 9.1.2.2.

Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

### A.9.1.17 FDD—FDD Inter frequency case for 5MHz Bandwidth

### A.9.1.17.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for FDD—FDD inter frequency measurements.

#### A.9.1.17.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP interfrequency measurements are tested by using the parameters in Table A.9.1.17.2-1 In all test cases, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.17.2-1: RSRP FDD—FDD Inter frequency test parameters for 5MHz Bandwidth

Do	romotor	Unit	Tes	st 1	Tes	st 2
Pa	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Ch	nannel Number		1	2	1	2
BW <sub>channel</sub>		MHz	5	5	5	5
Gap Pattern Id			0	-	0	-
Measurement I	oandwidth	$n_{\scriptscriptstyle PRB}$	10–	<b>–</b> 15	10–	–15
PDSCH Refere	ence measurement d in A.3.1.1.1		R.5 FDD	-	R.5 FDD	-
PDSCH allocat	ion	$n_{PRB}$	7—17	-	7-17	1
PDCCH/PCFIC Reference mea defined in A.3.	asurement channel		R.11	FDD	R.11	FDD
A.3.2.1.15 (OP	OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)		OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RA OCNG_RA Note OCNG_RB	1	dB	0	0	0	0
$N_{oc}^{ m Note2}$	Cell 2: Bands FDD_N	dBm/15 kHz	-85.65	-85.65	-102.5	-110.5
$\hat{E}_{s}/I_{ot}$		dB	10	10	13	-4
RSRP <sup>Note3</sup>	Cell 2: Bands FDD_N	dBm/15 kHz	-75.65	-75.65	-89.5	-114.5
Io <sup>Note3</sup>	Cell 2: Bands FDD_N	dBm/4.5 MHz	-50.46	-50.46	-64.52	-84.27
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation con		-		'GN	AW	
Note 1: OCN	JG shall be used suc	h that both cells ar	e fully allo	cated and	a constant	total

OCNG shall be used such that both cells are fully allocated and a constant total Note 1: transmitted power spectral density is achieved for all OFDM symbols.

Interference from other cells and noise sources not specified in the test is assumed Note 2: to be constant over subcarriers and time and shall be modelled as AWGN of

appropriate power for  $N_{oc}$  to be fulfilled.

RSRP and lo levels have been derived from other parameters for information Note 3: purposes. They are not settable parameters themselves.

RSRP minimum requirements are specified assuming independent interference and Note 4: noise at each receiver antenna port.

For Band 26, the tests shall be performed with the assigned E-UTRA channel Note 5:

bandwidth within 865-894 MHz.

Note 6: This test is only applicable for testing inter-frequency requirements for Bands FDD\_N. Cell 2 is on the Band under test, and Cell 1 is on another band supported by the UE.

Table A.9.1.17.2-1: Void

#### A.9.1.17.3 **Test Requirements**

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

### A.9.1.18 FDD RSRP for E-UTRAN Carrier Aggregation for 10MHz + 5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.18.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.6.1.

#### A.9.1.18.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.18.2-1 will replace the values of corresponding parameters in Tables A.9.1.6.2-1.

Table A.9.1.18.2-1: RSRP FDD carrier aggregation test parameters

Parameter		l lmit		Test 1	
		Unit	Cell 1	Cell 2	Cell 3
BW <sub>channel</sub> Note	1	MHz	10		5
Measuremen	t bandwidth	$n_{PRB}$	22-27	10	-15
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.5 FDD	N/A
PDSCH alloc	ation	$n_{PRB}$	13-36	7-17	N/A
Reference m	DCCH/PCFICH/PHICH eference measurement channel efined in A.3.1.2.1		R.6 FDD	R.11	FDD
OCNG Patterns defined in A.3.2.1 (FDD)			OP.1 FDD	OP.15 FDD	OP.16 FDD
lo <sup>Note2</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Bands FDD_G Bands FDD_H	dBm/9 MHz	-87.76 -86.76 -86.26 -85.76 -84.76 -84.26	N/A (Io for Channel 1 +2.32dB)	
10	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Bands FDD_G Bands FDD_H	dBm/4.5 MHz	N/A		

and is performed according to the principle defined in section A.3.6.1.

Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 3: See Table A.9.1.6.2-1 for the other parameters.

#### A.9.1.18.3 Test Requirements

The test requirements defined in section A.9.1.6.3 shall apply to this test case.

### A.9.1.19 TDD RSRP for E-UTRAN Carrier Aggregation for 10MHz + 5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.19.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

#### A.9.1.19.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.19.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.19.2-1: Carrier aggregation RSRP test parameters for TDD

Po	rameter	Unit		Test 1		
	rameter	Unit	Cell 1	Cell 2	Cell 3	
BW <sub>channel</sub> Note 1		MHz	10	5	5	
Measurement band	lwidth	$n_{PRB}$	22-27	10-15		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.5 TDD	N/A	
PDSCH allocation		$n_{PRB}$	13-36	7-17	N/A	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	R.11	TDD	
OCNG Patterns defined in A.3.2.2 (TDD)			OP.1 TDD	OP.9 TDD	OP.10 TDD	
	Bands TDD_A		-87.76	N/A		
	Bands TDD_C	dBm/9 MHz	-86.76			
lo <sup>Note2</sup>	Bands TDD_E		-85.76			
10	Bands TDD_A			(lo for C	hannal 1	
	Bands TDD_C	dBm/4.5MHz	N/A	(Io for Channel 1 +2.32dB)		
	Bands TDD_E				,	
Note 1: This test	verifies the RRM requiren	nent which is indep	pendent of cha	annel bandwid	dth and is	
performe	performed according to the principle defined in section A.3.6.1.					
Note 2: lo levels have been derived from other parameters for information purposes. They are not					ey are not	
settable parameters themselves.						
Note 3: See Tab	le A.9.1.7.2-1 for the other	r parameters.				

#### A.9.1.19.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

# A.9.1.20 FDD RSRP for E-UTRAN Carrier Aggregation for 5MHz + 5MHz bandwidth

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.20.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.6.1.

#### A.9.1.20.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.20.2-1 will replace the values of corresponding parameters in Tables A.9.1.6.2-1.

Table A.9.1.20.2-1: RSRP FDD carrier aggregation test parameters

D		l lmit		Test 1		
Pai	rameter	Unit	Cell 1	Cell 2	Cell 3	
BW <sub>channel</sub> Note 1		MHz	5	5	5	
Measurement b	oandwidth	$n_{\scriptscriptstyle PRB}$	10-15	10-15	10-15	
	PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	R.5 FDD	N/A	
PDSCH allocat	ion	$n_{PRB}$	7-17	7-17	-	
PDCCH/PCFIC Reference mea defined in A.3.	surement channel		R.11 FDD	R.11 FDD	R.11 FDD	
A.3.2.1.15 (OP	OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.26 (OP.16 FDD)		OP.15 FDD	OP.15 FDD	OP.16 FDD	
	Bands FDD_A		-90.76			
	Bands FDD_C	 	-89.76			
lo <sup>Note2</sup>	Bands FDD_D Note 5		-89.26	· (Io for Channel 1 +5.33dB)		
10	Bands FDD_E, FDD_F Note 5	dBm/4.5 MHz	-88.76			
	Bands FDD_G Note 5		-87.76			
	Bands FDD_H Note 5		-87.26			
	test verifies the RRM				l bandwidth	
Note 2: lo le	is performed accordir vels have been derive not settable paramete	ed from other para			oses. They	
Note 3: See Table A.9.1.6.2-1 for the other parameters.						
	TRA operating band of			า 3.5.		
Note 5: The test applies for E-UTRA operating bands in this band gr					are	
supp	orting 5MHz + 5MHz	channel bandwid	th.			

#### A.9.1.20.3 Test Requirements

The test requirements defined in section A.9.1.6.3 shall apply to this test case.

# A.9.1.21 TDD RSRP for E-UTRAN Carrier Aggregation for 5MHz + 5MHz bandwidth

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.21.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

#### A.9.1.21.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.21.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.21.2-1: Carrier aggregation RSRP test parameters for TDD

Parameter	Unit	Test 1			
	Onit	Cell 1	Cell 2	Cell 3	
BW <sub>channel</sub> Note 1	MHz	5	5	5	
Measurement bandwidth	$n_{PRB}$	10-15	10-15	10-15	
PDSCH Reference measurement channel defined in A.3.1.1.2		R.4 TDD	R.4 TDD	N/A	
PDSCH allocation	$n_{PRB}$	7-17	7-17	N/A	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.11 TDD		
OCNG Patterns defined in A.3.1.2.9 (OP.9 TDD) and A.3.2.2.10 (OP.10 TDD)		OP.9 TDD	OP.9 TDD	OP.10 TDD	
Io <sup>Note2</sup> Bands TDD_A Note 5 Bands TDD_C Note 5 Bands TDD_E Note 5	dBm/4.5MHz	-90.76 -89.76 (lo for Channel 1 +5.33dB)			
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.  Note 2: lo levels have been derived from other parameters for information purposes. They are not					
settable parameters themselves.  Note 3: See Table A.9.1.7.2-1 for the other parameters.  Note 4: E-UTRA operating band groups are as defined in Section 3.5.  Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 5MF + 5MHz channel bandwidth.					

#### A.9.1.21.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

## A.9.1.22 RSRP for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD

#### A.9.1.22.1 Test Purpose and Environment

The test case is applicable for TDD-FDD carrier aggregation capable UEs which have been configured with a downlink PCell in FDD and a downlink SCell in TDD.

The purpose of this test is to verify that the RSRP absolute and relative measurements accuracy in TDD-FDD carrier aggregation is within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2, the relative RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2 between the SCell and a neighbour cell, and the relative RSRP accuracy requirements of the PCell compared to the SCell defined in Clause 9.1.11.3.

#### A.9.1.22.2 Test parameters

In this test case, Cell 1 is the PCell on the FDD primary component carrier, Cell 2 is the configured and activated SCell on the TDD secondary component carrier, and Cell 3 is the neighboring cell on the TDD secondary component carrier. The test parameters are given in Table A.9.1.22.2-1.

Table A.9.1.22.2-1: RSRP TDD-FDD carrier aggregation test parameters

			1		1
Par	rameter	Unit	Coll 4	Test 1	Calla
			Cell 1	Cell 2	Cell3
E-UTRA RF Ch	iannei Number		1 5MHz:	2	2
			$N_{RB,c} = 25$	5MHz:	5MHz: N <sub>RB,c</sub>
			10MHz:	$N_{RB,c} = 25$	= 25
BV	$V_{channel}$		$N_{RB,c} = 50$	10MHz:	10MHz:
	- 1201112		20MHz:	$N_{RB,c} = 50$ 20MHz:	$N_{RB,c} = 50$ 20MHz:
			$N_{RB,c} =$	$N_{RB,c} = 100$	$N_{RB,c} = 100$
			100	14RB,c = 100	14RB,c = 100
Special subfran	ne le9		-	6	6
configuration Not	k configuration <sup>Note9</sup>			1	
Opiink-downlini	Configuration		5MHz: 10-	5MHz: 10-	1 5MHz: 10-
			15	15	15
	1. 4.101		10MHz:	10MHz:	10MHz: 22-
Measurement b	pandwidth	$n_{\it PRB}$	22-27	22-27	27
			20MHz:	20MHz:	20MHz: 47-
			47-52	47-52	52
			5MHz:	5MHz: R.4	-
PDSCH Refere	nce measurement		R.5 FDD	TDD	
	d in A.3.1.1.1 and		10MHz: R.0 FDD	10MHz: R.0 TDD	
A.3.1.1.2			20MHz:	20MHz:	
			R.4 FDD	R.3 TDD	
			5MHz: 7-	5MHz: 7-	
			17	17	
PDSCH allocat	ion	$n_{PRB}$	10MHz:	10MHz:	_
1 Door anooat	1011	**PRB	13-36	13-36	
			20MHz:	20MHz:	
			38-61 5MHz:	38-61 5MHz:	5MHz: R.11
			R.11 FDD	R.11 TDD	TDD
PDCCH/PCFIC			10MHz:	10MHz:	10MHz: R.6
	surement channel		R.6 FDD	R.6 TDD	TDD
defined in A.3.1	I.2.1 and A.3.1.2.2		20MHz:	20MHz:	20MHz:
			R.10 FDD	R.10 TDD	R.10 TDD
			5MHz:	E . 41 .	<b>5.4.</b>
			OP.15 FDD	5MHz: OP.9 TDD	5MHz: OP.10 TDD
			10MHz:	10MHz:	10MHz:
OCNG Patterns	s defined in A.3.2		OP.1 FDD	OP.1 TDD	OP.2 TDD
			20MHz:	20MHz:	20MHz:
			OP.11	OP.7 TDD	OP.8 TDD
	1		FDD		
	Bands FDD_A		-117		-
	Bands FDD_C		-116		-
	Bands FDD_D		-115.5		-
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 6		-115		-
¹V oc	Bands FDD_G	dBm/15 kHz	-114		
	Bands FDD_H		-113.5		-
	Bands TDD_A		-		
Bands TDD_C			-	( $N_{ m ca}$ for Ch	annel 1 +1dB)
	Bands TDD_E		-	. 00	
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
$\hat{E}_{s}/I_{ot}$		dB	-4	0.46	-5.76
s/ ot	Bands FDD_A		-121	-	
	Bands FDD_A  Bands FDD_C		-120	-	-
DOD = Note3	Bands FDD_D	ID (45	-119.5	-	-
RSRP <sup>Note3</sup>	Bands EDD E	dBm/15 kHz			
	FDD_F Note 6		-119		-
	Bands FDD_G		-118	-	
	<del>-</del>				

	Bands FDD_H		-117.5	-	-	
	Bands TDD_A		-	(RSRP for	(DODD (	
	Bands TDD_C		-	Cell 1	(RSRP for	
	Bands TDD_E		-	+8dB)	Cell 1 +4dB)	
	_		-87.76 +	,		
	Bands FDD A		10log(N <sub>RB,</sub>		-	
	_		√50)			
			-86.76 +			
	Bands FDD C		10log(N <sub>RB.</sub>		-	
	_		<sub>c</sub> /50)			
			-86.26 +			
	Bands FDD_D		10log(N <sub>RB</sub>		-	
			<sub>0</sub> /50)			
	Danda EDD. E		-85.76 +			
Io <sup>Note3</sup>	Bands FDD_E, FDD_F Note 6	dBm/ BW <sub>channel</sub>	10log(N <sub>RB</sub> ,		-	
	רטט_ר		<sub>c</sub> /50)			
			-84.76 +			
	Bands FDD_G		10log(N <sub>RB</sub> ,	-		
			<sub>o</sub> /50)			
			-84.26 +			
	Bands FDD_H		10log(N <sub>RB,</sub>		-	
			<sub>c</sub> /50)			
	Bands TDD_A		-		nel 1 +5.33dB	
	Bands TDD_C		-		0log	
	Bands TDD_E		-		/ N <sub>RB channel 1</sub> ))	
	ion condition	-	AWGN	AWGN	AWGN	
Antenna	Configuration	-	1x2	1x2	1x2	
	fset to cell 1	μs	-	0	3	
Time alig	nment error relative to	_	_	≤TAE	_	
cell 1 Note	8				_	
Note 1:	For special subframe	and uplink-downlink	configurations	see Tables 4.	2-1 and 4.2-2	
	in TS 36.211.					
Note 2:	OCNG shall be used				nt total	
	transmitted power sp					
Note 3:	Interference from other					
	to be constant over s	ubcarriers and time ar	na snali be mo	odelled as AVV	GN of	
	appropriate power for	$N_{oc}$ to be fulfilled				
Note 4:	Es/lot, RSRP and lo	avala hava haan darii	and from other	r naramatara f	or information	
Note 4.					or inionnation	
Note 5:	purposes. They are not settable parameters themselves. e 5: RSRP minimum requirements are specified assuming independent interference and					
noise at each receiver antenna port.						
Note 6: The selection of the bands for testing depends on the configuration of the carrier						
aggregation supported by the UEs.						
Note 7:			with the carrie	r frequency of	the assigned	
Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.					ano assignica	
Note 8:				01 clause 6.5.3	.1. The TAF	
. 1010 0.	lote 8: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE					

#### A.9.1.22.3 Test Requirements

Note 9:

In the test, the performance of RSRP measurements is verified from following four perspectives:

value depends upon the type of carrier aggregation.

E-UTRA operating band groups are as defined in Section 3.5.

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.A.9.1.23 RSRP for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD

#### A.9.1.23.1 Test Purpose and Environment

The test case is applicable for TDD-FDD carrier aggregation capable UEs which have been configured with a downlink PCell in TDD and a downlink SCell in FDD.

The purpose of this test is to verify that the RSRP absolute and relative measurements accuracy in TDD-FDD carrier aggregation is within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2, the relative RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2 between the SCell and a neighbour cell, and the relative RSRP accuracy requirements of the PCell compared to the SCell defined in Clause 9.1.11.3.

#### A.9.1.23.2 Test parameters

In this test case, Cell 1 is the PCell on the TDD primary component carrier, Cell 2 is the configured and activated SCell on the FDD secondary component carrier, and Cell 3 is the neighboring cell on the FDD secondary component carrier. The test parameters are given in Table A.9.1.23.2-1.

Table A.9.1.23.2-1: RSRP TDD-FDD carrier aggregation test parameters

Para	ameter	Unit		Test 1	
		<b>-</b>	Cell 1	Cell 2	Cell3
	Channel Number  V <sub>channel</sub>		$\begin{array}{c} 1 \\ \text{5MHz:} \\ \text{N}_{\text{RB,c}} = 25 \\ \text{10MHz:} \\ \text{N}_{\text{RB,c}} = 50 \\ \text{20MHz:} \\ \text{N}_{\text{RB,c}} = \\ 100 \end{array}$	$\begin{array}{c} 2\\ \text{5MHz:}\\ \text{N}_{\text{RB,c}} = 25\\ \text{10MHz:}\\ \text{N}_{\text{RB,c}} = 50\\ \text{20MHz:}\\ \text{N}_{\text{RB,c}} = \\ 100 \end{array}$	$\begin{array}{c} 2 \\ 5 \text{MHz: } N_{\text{RB,c}} \\ = 25 \\ 10 \text{MHz: } \\ N_{\text{RB,c}} = 50 \\ 20 \text{MHz: } \\ N_{\text{RB,c}} = 100 \end{array}$
Special subfram	NE		6	-	-
configuration Note1 Uplink-downlink configuration Note1			1	_	-
Measurement ba		$n_{{\scriptscriptstyle PRB}}$	5MHz: 10- 15 10MHz: 22-27 20MHz: 47-52	5MHz: 10- 15 10MHz: 22-27 20MHz: 47-52	5MHz: 10- 15 10MHz: 22- 27 20MHz: 47- 52
	nce measurement in A.3.1.1.1 and		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-
PDSCH allocation		$n_{\it PRB}$	5MHz: 7- 17 10MHz: 13-36 20MHz: 38-61	5MHz: 7- 17 10MHz: 13-36 20MHz: 38-61	-
	H/PHICH surement channel .2.1 and A.3.1.2.2		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns	defined in A.3.2		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD
$N_{oc}^{$	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 9 Bands FDD_G Bands FDD_H Bands TDD_A Bands TDD_C Bands TDD_C Bands TDD_E	dBm/15 kHz	- - - - - -117 -116 -115	( $N_{oc}$ for Ch	annel 1 +1dB) - - -
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	-4	0.46	-5.76
RSRP Note 4	Bands FDD_A Bands FDD_C Bands FDD_D	dBm/15 kHz	- - -	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)

	Bands FDD_E, FDD_F Note 9		-			
	Bands FDD_G		-	1		
	Bands FDD_H		-			
	Bands TDD_A		-121			
	Bands TDD_C		-120	-	-	
	Bands TDD_E		-119			
	Bands FDD_A		-			
	Bands FDD_C		-	(In for C	hannel 1	
	Bands FDD_D		-		B+10log	
	Bands FDD_E, FDD_F Note 9		-	$(N_{RB \text{ channel 2}} / N_{RB \text{ channel 1}}))$		
	Bands FDD_G		-			
	Bands FDD_H		-			
lo Note 4			<b>-87.76</b> +			
lo Note 4	Bands TDD_A	dBm/ BW <sub>channel</sub>	$10\log(N_{RB})$		-	
			,c/50)			
			<b>-</b> 86.76 +	-		
	Bands TDD_C		$10\log(N_{RB})$			
			,c/50)			
			<b>-</b> 85.76 +			
	Bands TDD_E		$10\log(N_{RB})$		-	
			,c/50)			
	on condition	-	AWGN	AWGN	AWGN	
	Configuration	-	1x2	1x2	1x2	
Timing of	fset to cell 1	μs	-	0	3	
cell 1 Note to		-	-	≤TAE	-	
Note 1:	For special subframe ar	d uplink-downlink o	configurations	see Tables 4.	2-1 and 4.2-2	
	in TS 36.211.					
Note 2:	OCNG shall be used su				nt total	
Note 3:	transmitted power spect Interference from other				ic accumed	
Note 3.	to be constant over sub					
	λ	7	ia oriali bo ilic	aonoa ao 7 m	01101	
	appropriate power for	$^{\prime}_{oc}$ to be fulfilled.				
Note 4:	Es/lot, RSRP and lo lev	els have been deriv			or information	
	purposes. They are not					
Note 5:	RSRP minimum require		d assuming in	dependent inte	rference and	
Not- 0	noise at each receiver antenna port.					
Note 6:	Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.					
Note 7:	For Band 26, the tests s		with the carria	r frequency of	the assigned	
NOIE /.	E-UTRA channel bandw			i irequericy or	uic assigned	
Note 8:	Time alignment error (T.			01 clause 6.5.3	.1. The TAF	
	value depends upon the			-, 5.2250 0.0.0		
Note 9:	E-UTRA operating band			า 3.5.		
Note 6. Le offict operating band groupe are as defined in Section 6.6.						

### A.9.1.23.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.A.9.1.24 TDD RSRP for E-UTRAN Carrier Aggregation for 20MHz + 10MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.1.24.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

#### A.9.1.24.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.24.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.24.2-1: Carrier aggregation RSRP test parameters for TDD

Do	rameter	Unit		Test 1	
	rameter	Unit	Cell 1	Cell 2	Cell 3
BW <sub>channel</sub> Note 1		MHz	20	1	0
Measurement band	width	$n_{PRB}$	47-52	22	-27
PDSCH Reference measurement channel defined in A.3.1.1.2			R.3 TDD	R.0 TDD	N/A
PDSCH allocation		$n_{PRB}$	38-61	13-36	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.10 TDD	R.6	TDD
OCNG Patterns def A.3.2.2 (TDD)	OCNG Patterns defined in A.3.2.2 (TDD)		OP.7 TDD	OP.1 TDD	OP.2 TDD
	Bands TDD_A		-84.76	N/A	
	Bands TDD_C	dBm/18 MHz	-83.76		
Io <sup>Note2</sup>	Bands TDD_E		-82.76		
10	Bands TDD_A			(lo for C	hannel 1
	Bands TDD_C	dBm/9MHz	N/A	,	3dB)
	Bands TDD_E			+2.0	Jub)
Note 1: This test	verifies the RRM requiren	nent which is indep	pendent of cha	annel bandwid	dth and is
performed according to the principle defined in section A.3.6.1.					
	have been derived from o	ther parameters for	r information	purposes. The	ey are not
	parameters themselves.				
Note 3: See Tab	le A.9.1.7.2-1 for the other	r parameters.			

#### A.9.1.24.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

# A.9.1.25 FDD intra-frequency absolute and relative RSRP accuracies in CRS based discovery signal

#### A.9.1.25.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative measurement accuracies in CRS based discovery signal are within the specified limits. This test will verify the requirements in Sections 9.1.14.2.

### A.9.1.25.2 Test parameters

In this test case, all cells are on the same carrier frequency. Both absolute and relative accuracies of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.25.2-1. In this test case, Cell 1 is the PCell and Cell 2 is the target cell. The Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.25.2-1: RSRP FDD Intra frequency test parameters

Pa	rameter	Unit	Te	st 1
		Offic	Cell 1	Cell 2
E-UTRA RF Ch	annel Number	NAL I -		1
BW <sub>channel</sub>		MHz	10 22—27	
Measurement b	pandwidth	$n_{PRB}$		
DTMC period	ffoot	ms	N/A	160
DTMC period o	al occasion duration	ms	N/A N/A	10 1
Time offset bety		us		.3
	nce measurement		R.0	
channel defined	d in A.3.1.1.1		FDD	-
PDSCH allocati	ion	$n_{\scriptscriptstyle PRB}$	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in			_	
	channel defined in		R.6	FDD
A.3.1.2.1	s defined in A.3.2.1.1			
	d A.3.2.1.2 (OP.2		OP.1	OP.2
FDD)			FDD	FDD
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA PCFICH_RB				
PHICH_RA PHICH_RB		dB	0	0
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note1</sup>				
OCNG_RB	Bands FDD_A			
	Bands FDD_C			
n 7 Note2	Bands FDD D			
$N_{oc}^{ m Note2}$	Bands FDD_E,	dBm/15 kHz	-106	-106
	FDD_F Note 5			
	Bands FDD_G Note 7			
^ /	Bands FDD_H			
$\hat{E}_{s}/I_{ot}$	T	dB	2.5	-6
	Bands FDD_A			
	Bands FDD_C	1		
RSRP <sup>Note3</sup>	Bands FDD_D Bands FDD_E,	dBm/15 kHz	-100	-105
NONF	FDD F Note 5	ubiii/15 KHZ	-100	-105
	Bands FDD_G Note 7	1		
	Bands FDD_H	1		
	Bands FDD_A			
	Bands FDD_C			
lo <sup>Note3</sup>	Bands FDD_D	alDres /C. NALL	70.07	70.07
10	Bands FDD_E, FDD_F Note 5	dBm/9 MHz	-70.27	-70.27
	Bands FDD_G Note 7			
	Bands FDD_H	1		
$\hat{E}_s/N_{oc}$	<del>-</del>	dB	6	1
Propagation co	ndition	-	_	'GN
r Topagation Co	HUILIOH	-	L AVV	GIN

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time
	and shall be modelled as AWGN of appropriate power for $N_{oc}^{}$
	to be fulfilled.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within
N	865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

#### A.9.1.25.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.2.

# A.9.1.26 TDD intra-frequency absolute and relative RSRP accuracies in CRS based discovery signal

#### A.9.1.26.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP absolute and relative measurement accuracies in CRS based discovery signal are within the specified limits. This test will verify the requirements in Sections 9.1.14.2.

#### A.9.1.26.2 Test parameters

In this test case all cells are on the same carrier frequency. Both absolute and relative accuracies of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.26.2-1. In this test case, Cell 1 is the PCell and Cell 2 is the target cell. The Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.26.2-1: RSRP TDD Intra frequency test parameters

Par	ameter	Unit	Te:	st 1 Cell 2
E-UTRA RF Channel Number				1
BW <sub>channel</sub>		MHz		0
Special subfran			-	
configuration Note1			6	
Uplink/downlink	configuration Note1		1	
Measurement b	andwidth	$n_{PRB}$	22—27	
DTMC period		ms	N/A	160
DTMC period of			N/A	10
	al occasion duration	ms	N/A	2
Time offset bety		μs		.3
	nce measurement		R.0	_
channel defined in A.3.1.1.2			TDD	
PDSCH allocati		$n_{PRB}$	13—36	-
PDCCH/PCFICH/PHICH				
	surement channel		R.6	TDD
defined in A.3.1				
OCNG Patterns			OP.1	OP.2
A.3.2.2.1 (OP.1			TDD	TDD
A.3.2.2.2 (OP.2	(טטו)			
PBCH_RA PBCH_RB PSS_RA SSS_RA				
PCFICH_RB				
PHICH_RA PHICH_RB		٩D	0	0
PDCCH_RA		dB	O	O
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note2</sup>				
OCNG_RB <sup>Note2</sup>				
	Bands TDD_A			
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-106	-106
	Bands TDD_6	dDIII/13 KHZ	-100	-100
$\hat{E}_{s}/I_{ot}$	Danus IDD_L	dB	2.5	-6
s / ot	Bands TDD A		-	-
RSRP <sup>Note4</sup>	Bands TDD_A Bands TDD_C	dBm/15 VU-	-100	-105
RSKP	Bands TDD_C Bands TDD_E	UDIII/ 13 KI IZ	IBm/15 kHz -100	-105
lo <sup>Note4</sup>	Bands TDD_A	-ID /C <b>1</b> 41 1	70.07	70.07
10	Bands TDD_C	dBm/9 MHz	-70.27	-70.27
	Bands TDD_E			
$\hat{E}_s/N_{oc}$		dB	6	1
Propagation co	ndition	-	AW	/GN

Note 1:	For special subframe and uplink-downlink configurations see
	Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and
	a constant total transmitted power spectral density is achieved
	for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in
	the test is assumed to be constant over subcarriers and time
	and shall be modelled as AWGN of appropriate power for $N_{oc}$
	and shall be modelled as AWGN of appropriate power for TY oc
	to be fulfilled.
Note 4:	RSRP and lo levels have been derived from other parameters
	for information purposes. They are not settable parameters
	themselves.
Note 5:	RSRP minimum requirements are specified assuming
	independent interference and noise at each receiver antenna
	port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.

### A.9.1.26.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14. 2.

# A.9.1.27 FDD—FDD inter-frequency absolute and relative RSRP accuracies in CRS based discovery signal

#### A.9.1.27.1 Test Purpose and Environment

The purpose of this test is to verify that the CRS RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.2 for FDD—FDD inter frequency measurements.

#### A.9.1.27.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CRS RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.27.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and a DMTC configuation.

Table A.9.1.27.2-1: CRS RSRP FDD—FDD Inter frequency test parameters

Par	rameter	Unit	Tes	t 1
		Onit	Cell 1	Cell 2
E-UTRA RF Ch	nannel Number	MHz	10	2
BW <sub>channel</sub> Gap Pattern Id		IVIDZ	10 0	10 -
gapOffset		ms	9	
DMTC period		ms	-	160
DMTC period o	ffset	ms	-	10
	al occasion duration	ms	-	1
Time offset bet	ween cells	μs	-	3
Measurement b		$n_{PRB}$	22–	-27
PDSCH Refere	nce measurement d in A.3.1.1.1		R.0 FDD	-
PDSCH allocat		$n_{{\scriptscriptstyle PRB}}$	13—36	-
PDCCH/PCFIC Reference mea defined in A.3.1	surement channel		R.6 I	-DD
OCNG Patterns A.3.2.1.1 (OP.1 A.3.2.1.2 (OP.2	FDD) and		OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB				
PHICH_RA PHICH_RB PDCCH_RA		dB	0	0
PDCCH_RB PDSCH_RA PDSCH_RB				
OCNG_RA <sup>Note1</sup> OCNG_RB <sup>Note1</sup>				
$N_{oc}^{$	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E,	dDm/45 kHz	( $N_{oc}$ for	-115 -114 -113.5
	FDD_F Note 5  Bands FDD_G Note 7	dBm/15 kHz	Channel 2 +6dB)	-113 -112 -111.5
î /ı	Bands FDD_H	ID.	40	
$\hat{E}_{s}/I_{ot}$	T -	dB	13	-6
RSRP <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 5 Bands FDD_G Note 7	dBm/15 kHz	(RSRP for Cell 2 +25dB)	-121 -120 -119.5 -119
	Bands FDD_H Bands FDD_A			-117.5 -86.25
Io <sup>Note3</sup>	Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 5 Bands FDD_G Note 7	dBm/9 MHz	(lo for Channel 2 +19.68dB)	-85.25 -84.75 -84.25 -83.25
	Bands FDD_H			-82.75
$\hat{E}_s/N_{oc}$		dB	13	-6
Propagation cond		-	AW	
Note 1: OCN	IG shall be used such	n that both cells a	are fully alloc	ated and a

	constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in
	the test is assumed to be constant over subcarriers and time and
	shall be modelled as AWGN of appropriate power for $^{N_{oc}}$ to be fulfilled.
Note 3:	RSRP and lo levels have been derived from other parameters for
	information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming
	independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier
	frequency of assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.
Note 8:	DMTC is provided to the UE in the <i>measDS-Config</i> (in TS36.331) before the beginning of the test

### A.9.1.27.3 Test Requirements

The CRS RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.2.

# A.9.1.28 TDD—TDD inter-frequency absolute and relative RSRP accuracies in CRS based discovery signal

### A.9.1.28.1 Test Purpose and Environment

The purpose of this test is to verify that the CRS RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.2 for TDD—TDD inter frequency measurements.

#### A.9.1.28.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CRS RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.28.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and a DMTC configuation.

Table A.9.1.28.2-1: CRS RSRP TDD—TDD Inter frequency test parameters

Pa	rameter	Unit		Test 1	
		Onit	Cell 1	Cell 2	
E-UTRA RF Channel Number		N 41 1-	1	2	
BW <sub>channel</sub> Special subframe		MHz	10	10	
configuration Note1			6		
Uplink-downlink configuration Note1			1		
Gap Pattern Ic			0	-	
gapOffset		ms	9		
DMTC period		ms	-	160	
DMTC period		ms	-	10	
	al occasion duration	ms	-	2	
Time offset be		μs	-	3	
Measurement		$n_{PRB}$	22—27		
channel define	ence measurement ed in A.3.1.1.2		R.0 TDD	-	
PDSCH alloca		$n_{PRB}$	13—36	-	
PDCCH/PCFIC			5.0-	-	
	asurement channel		R.6 TI	טט	
defined in A.3. OCNG Pattern					
A.3.2.2.1 (OP.			OP.1 TDD	OP.2	
A.3.2.2.2 (OP.				TDD	
PBCH_RA				0	
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB PHICH_RA					
PHICH_RB		dB	0		
PDCCH_RA		uВ	J		
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note</sup>	2				
OCNG_RB <sup>Note</sup>	2				
	Bands TDD_A		$\begin{array}{c} (N_{oc}{\rm for}\\ {\rm Channel}2\\ + {\rm 6dB}) \end{array}$	-115	
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz		-114	
	Bands TDD_E			-113	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	13	-6	
	Bands TDD_A		(RSRP for Cell 2 +25dB)	-121	
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz		-120	
	Bands TDD_E			-119	
	Bands TDD_A	dBm/9 MHz	(lo for Channel 2	-86.25	
Io <sup>Note4</sup>	Bands TDD_C			-85.25	
	Bands TDD_E		+19.68dB)	-84.25	
$\hat{E}_s/N_{oc}$		dB	13	-6	
Propagation co	ondition	-	AWG	iN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

OCNG shall be used such that both cells are fully allocated and Note 2: a constant total transmitted power spectral density is achieved for all OFDM symbols.

Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and Note 3:

shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled.

Note 4:	RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters
	themselves.
Note 5:	RSRP minimum requirements are specified assuming
	independent interference and noise at each receiver antenna
	port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	DMTC is provided to the UE in the measDS-Config (in
	TS36.331) before the beginning of test

# A.9.1.28.3 Test Requirements

The CRS RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.2.

# A.9.1.29 FDD intra frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

## A.9.1.29.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI- RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for FDD intra frequency measurements.

# A.9.1.29.2 Test parameters

In this set of test case all cells are on the same carrier frequencies. Both absolute and relative accuracy of CSI- RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.29.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The intra frequency measurements are supported by a DMTC configuration.

Table A.9.1.29.2-1: CSI-RSRP FDD Intra frequency test parameters

			Test 1	
Par	rameter	Unit	Cell 1	Cell 2
E-UTRA RF Ch	annel Number		1	
BW <sub>channel</sub>		MHz	1	
DMTC period		ms	160	
DMTC period o		ms		0
	al occasion duration	ms	2	4
CSI-RS periodi	ce configuration	ms	1	·
CSI-RS subfrar		ms	(	
CSI-RS individu		dB	0	0
CSI-RS muting			Enable	Enable
Time offset bet	Time offset between cells		-	2.3
Measurement b	pandwidth	$n_{\it PRB}$	22-	-27
PDSCH Refere	nce measurement		R.0 FDD	-
PDSCH allocat		$n_{{\scriptscriptstyle PRB}}$	13—36	-
PDCCH/PCFIC	H/PHICH	PRB		
Reference mea	surement channel .2.1		R.6 I	FDD
OCNG Patterns	s defined in		OP.1	OP.2
A.3.2.1.1 (OP.1 FDD) and			FDD	FDD
	A.3.2.1.2 (OP.2 FDD)			
PBCH_RA PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB			0	0
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note1</sup>				
OCNG_RB <sup>Note1</sup>				
p-C-r10[2]		dB	6 6	
	Bands FDD_A		-1 <sup>-</sup>	
	Bands FDD_C		-1 <sup>-</sup>	
A 7 Note2	Bands FDD_D		-11	4.5
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-114	
	Bands FDD_G			
	Note 7		-113	
	Bands FDD_H		-11	
$\operatorname{CRS} \hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB dB	0.46	-5.76
CSI-RS ${ m E_s/I_{of}}$	CSI-RS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		6.46	0.24
	Bands FDD_A		-113	-117
	Bands FDD_C		-112	-116
	Bands FDD_D		-111.5	-115.5
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-111	-115
	Bands FDD_G Note 7		-110	-114
	Bands FDD_H		-109.5	-113.5
	Bands FDD_A	-		
	Bands FDD_C		(RSRP	(RSRP
CSI-RSRP Note3	Bands FDD_D	dBm/15 kHz	for Cell 1	for Cell 2
	Bands FDD_E, FDD_F Note 5		+6dB)	+6dB)
	רטט_ר			

		Bands FDD_G			
		Bands FDD_H			
		Bands FDD A		-82	.43
		Bands FDD_C		-81	.43
		Bands FDD_D		-80	.93
Io <sup>Note3</sup>		Bands FDD_E, FDD_F Note 5	dBm/9 MHz	-80	.43
		Bands FDD_G Note 7		-79	.43
		Bands FDD_H		-78	.93
CRS $\hat{E}_{s}$			dB	3	-1
CSI-RS	CSI-RS $\hat{E}_s/N_{oc}$		dB	9	5
Propagation condition		- AWGN			
Note 1:		G shall be used such			
Note 2:	constant total transmitted power spectral density is achieved for all OFDM symbols. Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and				
Note 3:	shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.  Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe.				
Note 4:					
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of assigned E-UTRA channel bandwidth within 865-894 MHz.				
Note 6:	: E-UTRA operating band groups are as defined in Section 3.5.				
Note 7:					
Note 8:		C is provided to the UE eginning of the test	in the measDS-Co	nfig (in TS36.3	331) before

# A.9.1.29.3 Test Requirements

The CSI- RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

# A.9.1.30 TDD intra frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

## A.9.1.30.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI- RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for TDD intra frequency measurements.

# A.9.1.30.2 Test parameters

In this set of test case all cells are on the same carrier frequencies. Both absolute and relative accuracy of CSI-RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.30.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The intra frequency measurements are supported by a DMTC configuation.

Table A.9.1.30.2-1: CSI-RSRP TDD Intra frequency test parameters

		11.74	Test 1	
	rameter	Unit	Cell 1 Cell 2	
	hannel Number		1	
BW <sub>channel</sub>	Note1	MHz	1	
Special subfram	e configuration <sup>Note1</sup>		6	
	configuration Note1	mo	16	
DMTC period	offeat	ms ms	1	
Discovery signal occasion duration		ms	2	
	CSI-RS resource configuration		2	4
CSI-RS period		ms	1	0
CSI-RS subframe offset		ms	C	)
CSI-RS individ		dB	0	0
CSI-RS muting			Enable	Enable
Time offset be	Time offset between cells		-	2.3
Measurement		$n_{\it PRB}$	22–	-27
PDSCH Reference channel define	ence measurement ed in A.3.1.1.1		R.0 TDD	-
PDSCH alloca		$n_{{\it PRB}}$	13—36	-
defined in A.3.	asurement channel 1.2.1		R.6 <sup>-</sup>	TDD
A.3.2.2.1 (OP.	OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB POCNG_RB		dB	0	0
p-C-r10[2]	Davida TDD A	dB	6	6
$N_{oc}^{ m Note3}$	Bands TDD_A Bands TDD_C	dBm/15 kHz	-1°	16
IV oc	Bands TDD_E	UDIII/13 KHZ	-1	
${ m CRS}\hat{E}_{_{ m S}}/{ m I}_{_{ m ot}}$		dB	0.46	-5.76
CSI-RS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{s}}$	ot	dB	6.46	0.24
Nisted	Bands TDD_A		-113	-117
RSRP <sup>Note3</sup>	Bands TDD_C	dBm/15 kHz	-112	-116
	Bands TDD_E		-111	-115
CSI-RSRP Note3	Bands TDD_A	dBm/15 LU=	(RSRP	(RSRP
USI-KSKP	Bands TDD_C Bands TDD_E	dBm/15 kHz	for Cell 1 +6dB)	for Cell 2 +6dB)
	Bands TDD_A		-82	
Io <sup>Note3</sup> Bands TDD_C		dBm/9 MHz	-81	
Bands TDD_E			-80	
CRS $\hat{E}_s/N_{oc}$		dB	3	-1
CSI-RS $\hat{E}_s/N$		dB	9	5
Propagation con		-	AW	
Note 1: For	special subframe and	uplink-downlink	configuration	is see

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a

	constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in
	the test is assumed to be constant over subcarriers and time and
	N
	shall be modelled as AWGN of appropriate power for $^{N_{oc}}$ to be
	fulfilled.
Note 4:	RSRP and lo levels have been derived from other parameters for
	information purposes. They are not settable parameters
	themselves. Io levels are calculated in CRS symbols of
	measurement subframe.
Note 5:	RSRP minimum requirements are specified assuming
	independent interference and noise at each receiver antenna
	port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	DMTC is provided to the UE in the <i>measDS-Config</i> (in TS36.331) before
	the beginning of the test.

# A.9.1.30.3 Test Requirements

The CSI-RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

# A.9.1.31 FDD—FDD inter-frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

# A.9.1.31.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for FDD—FDD inter frequency measurements.

# A.9.1.31.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CSI-RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.31.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and two DMTC configurations which one is for cell1 and the other is for cell2.

Table A.9.1.31.2-1: CSI-RSRP FDD—FDD Inter frequency test parameters

_			Test 1		
Par	ameter	Unit	Cell 1	Cell 2	
E-UTRA RF Ch	annel Number		1	2	
BW <sub>channel</sub>		MHz	10	10	
Gap Pattern Id			0	-	
gapOffset		ms	9		
DMTC period		ms	160	160	
DMTC period o		ms	0	10	
Discovery signal occasion duration CSI-RS resource configuration		ms	1	1	
CSI-RS resource		ma	2	0	
		ms ms		0	
CSI-RS subframe offset CSI-RS individual offset[2]		dB	0	0	
CSI-RS muting		QB	Enable	Enable	
Time offset bet	ween cells	μs	-	3	
Measurement b		$n_{PRB}$	22-	-27	
	nce measurement	PRB			
channel defined	d in A.3.1.1.1		R.0 FDD	-	
PDSCH allocat		$n_{PRB}$	13—36	-	
PDCCH/PCFIC Reference mea defined in A.3.1	surement channel		R.6	FDD	
OCNG Patterns A.3.2.1.1 (OP.1	defined in		OP.1	OP.2	
A.3.2.1.2 (OP.2 FDD)			FDD	FDD	
PBCH_RA					
	PBCH_RB				
PSS_RA		-			
PCFICH_RB	SSS_RA				
PHICH_RA			0	0	
PHICH_RB		dB			
PDCCH_RA					
PDCCH_RB		1			
PDSCH_RA					
PDSCH_RB				ı	
OCNG_RA <sup>Note1</sup>					
OCNG_RB <sup>Note1</sup>					
p-C-r10[2]	T =	dB	0	6	
	Bands FDD_A			-115	
	Bands FDD_C			-114	
<b>∖</b> / Note2	Bands FDD_D		( $N_{oc}$ for	-113.5	
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	Channel 2	-113	
	Bands FDD G		+6dB)	-112	
	Note 7			-112	
CRS $\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	13	-111.5 -6	
		-		_	
CSI-RS $\hat{E}_s/I_{ot}$		dB	13	0	
	Bands FDD_A Bands FDD_C			-121 -120	
	Bands FDD_D			-119.5	
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	(RSRP for Cell 2	-119	
	Bands FDD_G		+25dB)	-118	
	Note 7 Bands FDD_H			-117.5	
CSI-RSRP Note3	Bands FDD_A	dBm/15 kHz	(RSRP for Cell 1	(RSRP for Cell 2	
JOI-NOINI-	Bands FDD_C		+0dB)	+6dB)	
[	ם במותא ו שם ב	<u> </u>	l .		

		Bands FDD_D Bands FDD_E, FDD_F Note 5 Bands FDD_G				
		Note 7  Bands FDD H	-			
		Bands FDD_N			-86.25	
		Bands FDD C			-85.25	
		Bands FDD_D	1		-84.75	
lo <sup>Note3</sup>		Bands FDD_E, FDD_F Note 5	dBm/9 MHz	(lo for Channel 2 +19.68dB)	-84.25	
		Bands FDD_G Note 7		, 10.00d2)	-83.25	
		Bands FDD_H			-82.75	
CRS $\hat{E}_s$ /			dB	13	-6	
CSI-RS	CSI-RS $\hat{E}_s/N_{oc}$		dB	13	0	
Propagation	Propagation condition		- AWGN			
Note 1: Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and					
Note 3:	shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled. RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe.					
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.			ntenna			
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of assigned E-UTRA channel bandwidth within 865-894 MHz.					
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.					
Note 7:	Except Band 29 and Band 32.					
Note 8:		C is provided to the UE eginning of the test	in the <i>measDS-C</i>	onfig (in TS36.	.331) before	

# A.9.1.31.3 Test Requirements

The CSI-RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

# A.9.1.32 TDD—TDD inter-frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

## A.9.1.32.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for TDD—TDD inter frequency measurements.

#### A.9.1.32.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CSI-RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.32.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and two DMTC configurations which one is for cell 1 and the other is for cell2.

Table A.9.1.32.2-1: CSI-RSRP TDD—TDD Inter frequency test parameters

Par	ameter	Unit	Cell 1	t 1 Cell 2	
E-UTRA RF Ch	annel Number		Cell 1	2	
BW <sub>channel</sub>		MHz	10	10	
Special subfran	ne		6	•	
configuration <sup>Not</sup>	e1				
	configuration Note1		0		
Gap Pattern Id gapOffset		ms	9	-	
DMTC period		ms	160	160	
DMTC period offset		ms	0	10	
Discovery signal occasion duration CSI-RS resource configuration		ms	2	2	
		ma	2 10	4	
CSI-RS periodic		ms ms	0		
CSI-RS individual offset[2]		dB	0 1	0	
CSI-RS muting			Enable	Enable	
Time offset bety	ween cells	μs	-	3	
Measurement b		$n_{PRB}$	22—	-27	
PDSCH Refere channel defined	nce measurement d in A.3.1.1.2		R.0 TDD	-	
PDSCH allocati		$n_{PRB}$	13—36	-	
defined in A.3.1	surement channel .2.2		R.6 T	DD.	
	OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and		OP.1 TDD	OP.2 TDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA OCNG_RA		dB	0	0	
p-C-r10[2]		dB	0	6	
$N_{oc}^{ m Note3}$	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	$(N_{oc} \text{ for } Channel 2 +6dB)$	-115 -114 -113	
$CRS \hat{E}_{s}/I_{ot}$	Danido IDD_L	dB	13	-6	
CSI-RS $\hat{\mathbf{E}}_{_{\mathrm{s}}}/\mathbf{I}_{_{\mathrm{ot}}}$		dB	13	0	
s / ot	Bands TDD_A			-121	
RSRP <sup>Note4</sup>	Bands TDD C	dBm/15 kHz	(RSRP for Cell 2	-120	
	Bands TDD_E		+25dB)	-119	
	Bands TDD_A	dBm/15 kHz		110	
CSI-RSRP		GDIII/ IO KI IZ	(RSRP for	(RSRP	
Note3	Bands TDD_C		Cell 1 +0dB)	for Cell 2 +6dB)	
	Bands TDD_E		/	<u> </u>	
Note 4	Bands TDD_A		(lo for	-86.25	
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	Channel 2	-85.25	
	Bands TDD_E		+19.68dB)	-84.25	

${ m CRS}\hat{E}_s/N_{oc}$		dB	13	-6
CSI-RS	$\hat{E}_s/N_{oc}$	dB	13	0
Propagat	ion condition	-	AWG	N
Note 1:	For special subframe and Tables 4.2-1 and 4.2-2 in		onfigurations	see
Note 2:	OCNG shall be used such constant total transmitted all OFDM symbols.			
Note 3:	<ol> <li>Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time ar</li> </ol>			time and
Note 4:	shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled. RSRP and lo levels have been derived from other parameters for			
	information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe.			
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.			
Note 6: Note 7:	E-UTRA operating band of DMTC is provided to the before the beginning of te	JE in the measDS		

## A.9.1.32.3 Test Requirements

The CSI-RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

# A.9.1.33 FDD absolute and relative RSRP accuracies for E-UTRAN Carrier Aggregation in CRS based discovery signal

#### A.9.1.33.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative measurement accuracies in carrier aggregation in CRS based discovery signal are within the specified limits. This test will verify the absolute RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2, and the relative RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2. The test will also verify the primary and secondary component carrier relative RSRP accuracy requirement defined in Clause 9.1.15.1.3.

#### A.9.1.33.2 Test parameters

In this test case, Cell1 is PCell on the primary component carrier, Cell2 is SCell on the secondary component carrier and activated, and Cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.33.2-1. The Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.33.2-1: RSRP FDD carrier aggregation test parameters

Par	Parameter			Test 1	
		Unit	Cell 1	Cell 2	Cell3
E-UTRA RF Ch	nannel Number		1	2	2
BW <sub>channel</sub>		MHz	10	10	10
DMTC period		ms	N/A	N/A	160
DMTC period o			N/A	N/A	10
	al occasion duration	ms	N/A	N/A	1
Timing offset to	cell1	μs	-	0	3
Time alignment 2 and cell 1	Time alignment error between cell		-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	-
Measurement b		$n_{PRB}$		22—27	
PDSCH Refere channel defined	nce measurement d in A.3.1.1.1		R.0 FDD	R.0 FDD	-
PDSCH allocat		$n_{PRB}$	13—36	13—36	-
defined in A.3.1	surement channel			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA					
	PBCH_RB				
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB		dB	0	0	0
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RANote	e1				
OCNG_RBNote	Э				
	Bands FDD_A		-117		
	Bands FDD_C		-116		
$N_{oc}^{ m Note2}$	Bands FDD_D		-115.5	3.7	
oc oc	Bands FDD_E, FDD_F Note 6	dBm/15 kHz	-115	$(N_{oc}$ for Ch	annel 1 +1dB)
			111		
	Bands FDD_G Bands FDD_H		-114 -113.5		
$\hat{E}_{s}/I_{ot}$		dB	-4	0.46	-5.76
	Bands FDD_A		-121		
	Bands FDD_C		-120		
	Bands FDD_D		-119.5	(RSRP for	(DCDD )
RSRP <sup>Note3</sup>	Bands FDD F	dBm/15 kHz		Cell 1	(RSRP for
1	FDD_F Note 6		-119	+8dB)	Cell 1 +4dB)
	Bands FDD_G		-118		
	Bands FDD_H		-117.5		
	Bands FDD_A		-87.76		
	Bands FDD_C		-86.76		
. Note3	Bands FDD_D		-86.26	, , ,	
Io <sup>Note3</sup>	Bands FDD_E, FDD_F Note 6	dBm/9 MHz	-85.76	(Io for Chanr	nel 1 +5.33dB)
	Bands FDD_G		-84.76		
	Bands FDD_G Bands FDD_H		-84.26		
<u> </u>	<u>,</u>			1	

$\hat{E}_s/N_{oc}$		dB	-4	3	-1
Propagat	ion condition	-		AWGN	
Note 1:	OCNG shall be used such				tant total
	transmitted power spectra				
Note 2:	Interference from other ce				
	to be constant over subca		d shall be mo	delled as AW	GN of
	appropriate power for $N_{\scriptscriptstyle o}$	$_{oc}$ to be fulfilled.			
Note 3:	RSRP and lo levels have	been derived from	n other param	eters for inform	mation
	purposes. They are not se				
Note 4:	RSRP minimum requirem	•	assuming ind	dependent inte	erference and
	noise at each receiver and	•			
Note 5:	The selection of the band		nds on the co	nfiguration of t	he carrier
Note O	aggregation supported by		dele ele e e e e e e		dla a la ali ana ali
Note 6:	For Band 26, the tests sha			r trequency of	tne assigned
NI-4- 7.	E-UTRA channel bandwic				Libraria alcududu
Note 7:	This test verifies the RRM				i bandwidth
Note O	and is performed according				
Note 8:	E-UTRA operating band of	groups are as defii	ned in Section	า 3.5.	

#### A.9.1.33.3 Test Requirements

In the test, the performance of RSRP measurements is verified from following three perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 3 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2
- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.1.3.

# A.9.1.34 TDD absolute and relative RSRP accuracies for E-UTRAN Carrier Aggregation in CRS based discovery signal

# A.9.1.34.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRP absolute and relative measurement accuracies in carrier aggregation in CRS based discovery signal are within the specified limits. This test will verify the absolute RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2, and the relative RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2. The test will also verify the primary and secondary component carrier relative RSRP accuracy requirement defined in Clause 9.1.15.1.3.

#### A.9.1.34.2 Test parameters

In this test case, Cell1 is PCell on the primary component carrier, Cell2 is SCell on the secondary component carrier and activated, and Cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.34.2-1. The Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.34.2-1: Carrier aggregation RSRP test parameters for TDD

D:	arameter	Unit	Test 1			
		Onit	Cell 1	Cell 2	Cell 3	
E-UTRA RF Channe	el Number		1	2	2	
BW <sub>channel</sub>		MHz	10	10	10	
DMTC period		ms	N/A	N/A	160	
DMTC period offset			N/A	N/A	10	
Discovery signal occ	casion duration	ms	N/A	N/A	2	
Special subframe co	onfiguration Note1			6		
Uplink/downlink con	figuration			1		
Timing offset to Cell	1	μs	-	0	3	
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-	
Measurement bandwidth		$n_{PRB}$		22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.0 TDD	-	
PDSCH allocation		$n_{PRB}$	13—36	13—36	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD			
OCNG Patterns defi	OCNG Patterns defined in A.3.2.2.1 (OP.1		OP.1 TDD	OP.1 TDD	OP.2 TDD	
TDD) and A.3.2.2.2	(OP.2 IDD)		J	0	<u> </u>	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RA PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA PONOTES		dB	0	0	0	
OCNG_RB <sup>Note2</sup>	Bands TDD_A		-117	/ N/	01	
N <sub>oc</sub> Note3 Bands TDD_C Bands TDD_E		dBm/15 kHz	-116 -115	( $N_{oc}$ for (		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-4	0.5	-5.76	
RSRP <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-121 -120 -119	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)	
Io <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/9 MHz	-87.76 -86.76 -85.76	(lo for Cl +5.3		
	Danus IDD_L					
$\hat{E}_s/N_{oc}$	Bands IDD_L	dB	-4	3	-1	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power

for  $^{IV}oc$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes.

	They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise
	at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier
	aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is
	performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

## A.9.1.34.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following three perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 3 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2
- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.1.3.

# A.9.1.35 FDD absolute and relative CSI-RSRP accuracies for E-UTRAN Carrier Aggregation in CSI-RS based discovery signal

# A.9.1.35.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD CSI-RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute CSI-RSRP accuracy requirements of the primary component carrier defined in clause 9.1.15.2.1, the absolute CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2, and the relative CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2. The test will also verify the primary and secondary component carrier relative CSI-RSRP accuracy requirement defined in Clause 9.1.15.2.3.

#### A.9.1.35.2 Test parameters

In this set of cases cell1 is PCell on the primary component carrier, cell2 is SCell on the secondary component carrier and activated, and cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.35.2-1. This set is supported by two DMTC configurations which one is for cell1 and the other is for cell2 and cell3.

Table A.9.1.35.2-1: CSI-RSRP FDD carrier aggregation test parameters

Par	Parameter			Test 1	
			Cell 1	Cell 2	Cell3
E-UTRA RF Ch	annel Number		1	2	2
BW <sub>channel</sub>		MHz	10	10	10
Timing offset to	cell1	μs	-	0	3
2 and cell 1	error between cell		-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	-
DMTC period		ms	160		60
DMTC period o		ms	0		10
	al occasion duration	ms	1		1
	ce configuration		2	4	6
CSI-RS periodic	City	ms	10	10	10
CSI-RS subfrar		ms	0	0	0
CSI-RS individu	iai offset[2]	dB	0 Enable	0 Enable	0 Enable
			Enable	Enable	Enable
Measurement b	nce measurement	$n_{PRB}$		22—27	
channel defined			R.0 FDD	R.0 FDD	-
PDSCH allocati		$n_{PRB}$	13—36	13—36	-
defined in A.3.1	surement channel .2.1		R.6 FDD		
OCNG Patterns A.3.2.1.1 (OP.1 A.3.2.1.2 (OP.2	FDD) and		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RANote	PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RANote1		0	0	0
p-C-r10[2]		dB	6	6	6
Noce2  Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H		dBm/15 kHz	-117 -116 -115.5 -115 -114 -113.5	( $N_{oc}$ for Channel 1 +1dB	
${\sf CRS}\hat{\sf E}_{_{\sf s}}/{\sf I}_{_{\sf ot}}$			-4	0.46	-5.76
CSI-RS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB	2	6.46	0.24
RSRP <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H	dBm/15 kHz	-121 -120 -119.5 -119 -118 -117.5	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)

		Bands FDD_A		-115		
		Bands FDD_C		-114	(CSI-	,
CSI-		Bands FDD_D		-113.5	RSRP for	(CSI-RSRP
RSRP <sup>Note</sup>	3	Bands FDD_E, FDD_F Note 6	dBm/15 kHz	-113	Cell 1	for Cell 1 +4dB)
		Bands FDD_G		-112	+8dB)	· I
		Bands FDD_H		-111.5		
		Bands FDD_A		-87.76		
		Bands FDD_C		-86.76	1	
		Bands FDD_D		-86.26	]	
Io <sup>Note3</sup>		Bands FDD_E, FDD_F Note 6	dBm/9 MHz	-85.76	(Io for Chanr	nel 1 +5.33dB)
		Bands FDD_G		-84.76		
		Bands FDD_H		-84.26		
CRS $\hat{E}_s$ /	$N_{oc}$		dB	-4	3	-1
CSI-RS É	$\hat{z}_s/N_c$	9C	dB	2	9	5
Propagati	ion co	ndition	-		AWGN	
Note 1: Note 2:	trans Inter to be	IG shall be used such smitted power spectra ference from other case constant over subcatoriate power for $N_{\scriptscriptstyle d}$	al density is achievells and noise soul arriers and time an	ved for all OF rces not spec	DM symbols. ified in the test	is assumed
Note 3:	purp CRS	P and lo levels have oses. They are not so symbols of measure	ettable parameters ment subframe.	s themselves.	lo levels are o	calculated in
Note 4:		P minimum requirem at each receiver an		l assuming in	dependent inte	erference and
Note 5:		selection of the band egation supported by		nds on the co	nfiguration of t	he carrier
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assi E-UTRA channel bandwidth within 865-894 MHz.						the assigned
Note 7:	_				dent of channe	l bandwidth
Note 7: This test verifies the RRM requirement which is independent of channel band and is performed according to the principle defined in section A.3.6.1.					. Dallamani	
Note 8:		TRA operating band of				
Note9:	DMT	C configurations are pro ining of the test.				1) before the

#### A.9.1.35.3 Test Requirements

In the test, the performance of CSI-RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.15.2.1.
- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.
- The relative accuracy of intra-frequency CSI-RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.
- The relative accuracy of inter-frequency CSI-RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.2.3.

# A.9.1.36 TDD absolute and relative CSI-RSRP accuracies for E-UTRAN Carrier Aggregation in CSI-RS based discovery signal

#### A.9.1.36.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD CSI-RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute CSI-RSRP accuracy requirements of the primary component carrier defined in clause 9.1.15.2.1, the absolute CSI-RSRP accuracy requirements of the secondary

component carrier defined in clause 9.1.15.2.2, and the relative CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2. The test will also verify the primary and secondary component carrier relative CSI-RSRP accuracy requirement defined in Clause 9.1.15.2.3.

# A.9.1.36.2 Test parameters

In this set of cases cell1 is PCell on the primary component carrier, cell2 is SCell on the secondary component carrier and activated, and cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.36.2-1. This set is supported by two DMTC configurations which one is for cell1 and the other is for cell2 and cell3.

Table A.9.1.36.2-1: CSI-RSRP TDD carrier aggregation test parameters

		I		T14	
P	arameter	Unit	Cell 1	Test 1 Cell 2	Cell 3
E-UTRA RF Chann	al Number		Cell 1		Cell 3
BW <sub>channel</sub>	ei Numbei	MHz	ı	10	<u> </u>
Special subframe co	onfiguration <sup>Note1</sup>	IVII IZ		6	
Uplink/downlink cor	offiguration Note1			1	
Timing offset to Cel		110		0	3
Tilling onset to Cer	1 1	μs	-	≤ Time	3
				alignment error as	
Time alignment erro	or between cell 2 and cell 1		-	specified in 3GPP TS 36.104	-
				[30] clause 6.5.3.1	
DMTC period		ms	160	16	60
DMTC period offset		ms	0	1	0
Discovery signal oc		ms	2	2	2
CSI-RS resource co	onfiguration		2	4	6
CSI-RS periodicity		ms	10	10	10
CSI-RS subframe o		ms	0	0	0
CSI-RS individual o	ffset[2]	dB	0	0	0
CSI-RS muting			Enable	Enable	Enable
Measurement band		$n_{PRB}$		22—27	
defined in A.3.1.1.2	measurement channel		R.0 TDD	R.0 TDD	-
PDSCH allocation		$n_{PRB}$	13—36	13—36	-
PDCCH/PCFICH/PI measurement chan	HICH Reference nel defined in A.3.1.2.2		R.6 TDD		
	fined in A.3.2.2.1 (OP.1		OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA	(01.2 100)				
PBCH_RB		1			
PSS_RA		-			
SSS_RA		-			
PCFICH_RB		-			
PHICH_RA					
PHICH_RB PDCCH_RA		dB	0	0	0
<u> </u>		-			
PDCCH_RB PDSCH_RA		-			
		-			
PDSCH_RB OCNG_RA <sup>Note2</sup>		-			
OCNG_RB <sup>Note2</sup>		-			
p-C-r10[2]		dB	6	6	6
	Bands TDD_A	UD.	-117		
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-116	( $N_{oc}$ for	Channel 1
1 voc	Bands TDD_E	dbiii/10 ki iz	-115	+10	dB)
$\text{CRS}\hat{E}_{s}/I_{\text{ot}}$	dB	-4	0.46	-5.76	
CSI-RS $\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	2	6.46	0.24
5. 00	Bands TDD_A		-121	(RSRP for	(RSRP for
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-120	Cell 1	Cell 1
1	Bands TDD_E		-119	+8dB)	+4dB)
Bands TDD_A			-115	(CSI-	(CSI-
OOL DOD DNote4	Bands TDD_C	ID //= · · ·	-114	RSRP for	RSRP for
CSI-RSRP <sup>Note4</sup>	Bands TDD_E	dBm/15 kHz	-113	Cell 1 +8dB)	Cell 1 +4dB)
	Bands TDD_A		-87.76	,	,
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-86.76	(lo for C	
	Bands TDD_E	\$2.77,0 IVII 12	-85.76	+5.3	3dB)
		1		l .	

$CRS\hat{E}_s$ /	$N_{oc}$	dB	-4	3	-1	
CSI-RS É	$\hat{E}_s/N_{oc}$	dB	2	9	5	
Propagat	Propagation condition - AWGN					
Note 1:	For special subframe and uplink-down 36.211.	nlink configuration	ons see Table	es 4.2-1 and 4	1.2-2 in TS	
Note 2:	OCNG shall be used such that both of power spectral density is achieved for	•		constant total	transmitted	
Note 3:	Interference from other cells and nois constant over subcarriers and time ar					
	for $N_{oc}$ to be fulfilled.					
Note 4:	RSRP and lo levels have been derive They are not settable parameters the measurement subframe.	•		•	•	
Note 5:	RSRP minimum requirements are speat each receiver antenna port.	ecified assuming	g independen	t interference	and noise	
Note 6:	The selection of the bands for testing aggregation supported by the UEs.	depends on the	configuration	of the carrie	r	
Note 7:						
Note 8: E-UTRA operating band groups are as defined in Section 3.5.						
Note9:	DMTC configurations are provided to the lof the test	JE in the <i>measDS</i>	S-Config (in TS3	36.331) before	the beginning	

# A.9.1.36.3 Test Requirements

In the test, the performance of CSI-RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.15.2.1.
- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.
- The relative accuracy of intra-frequency CSI-RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.
- The relative accuracy of inter-frequency CSI-RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.2.3.

# A.9.1.37 3 DL PCell in FDD RSRP for E-UTRAN in Carrier Aggregation

#### A.9.1.37.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD-FDD RSRP absolute and relative accuracy requirements in carrier aggregation with PCell in FDD are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

#### A.9.1.37.2 Test parameters

In this set of cases cell 1 is PCell on the primary component carrier, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The test parameters are given in Table A.9.1.37.2-1.

Table A.9.1.37.2-1: 3 Downlink PCell in FDD RSRP carrier aggregation test parameters

	ameter	Unit	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5
E-UTRA RF (	Channel Number		1	2			3
BW <sub>channel</sub>	BW <sub>channel</sub>		$\begin{array}{c} \text{5MHz:} \\ \text{N}_{\text{RB,c}} = 25 \\ \text{10MHz:} \\ \text{N}_{\text{RB,c}} = 50 \\ \text{20MHz:} \\ \text{N}_{\text{RB,c}} = 100 \end{array}$	5MHz: N <sub>F</sub> 10MHz: N 20MHz: N <sub>F</sub>	$_{RB,c} = 50$	10MHz:	$N_{RB,c} = 25$ $N_{RB,c} = 50$ $N_{RB,c} = 100$
Special subfra	ame Note1		-	6			6
configuration Uplink/downli	nk						
configuration	Note1		-	1			1
Measuremen	t bandwidth	$n_{PRB}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10MHz: 20MHz:	22-27	10MH:	:: 10-15 z: 22-27 z: 47-52
PDSCH Refe measurement defined in A.3	t channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	-	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	-
PDSCH alloc	ation	$n_{{\scriptscriptstyle PRB}}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-	5MHz: 7- 17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCF Reference me channel defin	easurement		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patter A.3.2.	ns defined in		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.7 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB		dB	0	0	0	0	0
PDCCH_RA							
PDCCH_RB							
PDSCH_RA							
PDSCH_RB	2						
OCNG_RA <sup>Not</sup>							
OCNG_RB <sup>Not</sup>	Bands TDD_A Bands TDD_C Bands TDD_E		-	( $N_{oc}$ for Cha	nnel 1 +1dB)	00	Channel 1
$N_{oc}^{$	Bands FDD_A Bands FDD_C Bands FDD_D	dBm/15 kHz	-117 -116 -115.5				<u>ab</u> ,
	Bands FDD_E, FDD_F Note 7 Bands FDD_G		-115 -114	- -			-
Ê/N	Bands FDD_H	٦D	-113.5	2	4	2	4
$\hat{E}_s/N_{oc}$		dB	-4	3	-1	3	-1
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	Panda TDD ^	dB	-4	0.46	-5.76	0.46	-5.76
	Bands TDD_A Bands TDD_C		-	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)	(RSRP for Cell 1	(RSRP for Cell 1

	Bands TDD_E					+8dB)	+4dB)							
	Bands FDD_A		-121			,	,							
RSRP <sup>Note4</sup>	Bands FDD_C	dBm/15	-120											
	Bands FDD_D	kHz	-119.5											
	Bands													
	FDD_E,		-119	=	-	_	-							
	FDD_F Note 7													
	Bands FDD_G		-118											
	Bands FDD_H		-117.5											
	Bands TDD_A			(Io for Channe	el 1 +5.33dB	(Io for Chani	nel 1 +5.33dB							
	Bands TDD_C		-	+101	og		Olog							
	Bands TDD_E			(N <sub>RB channel2</sub> / I	V <sub>RB channel 1</sub> ))	(N <sub>RB channel3</sub>	/ N <sub>RB channel 1</sub> ))							
	Bands FDD_A		-87.76+10log(N <sub>RB,</sub> /50)											
	Bands FDD_C	dBm/	-86.76+10log(N <sub>RB,</sub> /50)											
Io <sup>Note4</sup>	Bands FDD_D	BW <sub>channel</sub>	-86.26+10log(N <sub>RB,0</sub> /50)											
	Bands	DVV channel												
	FDD_E,		-85.76 +10log(N <sub>RB,c</sub> /50)	_			-							
	FDD_F Note 7													
	Bands FDD_G		-84.76 +10log(N <sub>RB,c</sub> /50)											
	Bands FDD_H		-84.26 +10log(N <sub>RB,c</sub> /50)											
Propagation		-	AWGN	AWGN	AWGN	AWGN	AWGN							
Antenna Con		-	1x2	1x2	1x2	1x2	1x2							
Timing offset	to cell 1	μs	-	0	3	0	3							
Time alignme	ent error relative		_	≤TAE	_	≤ TAE	_							
to cell 1 Note 8				2 IAL		2 IAL								
Time alignme	ent error relative		_	_	_	≤ TAE	_							
to cell 2 <sup>Note 8</sup>														
	Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.													
			cells are fully allocated and	a constant total tra	ansmitted power	r spectral dens	sity is							
a	achieved for all OF	DIVI symbols.				achieved for all OFDM symbols.								

- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.
- Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters
- Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
- Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz
- Note 8: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
- Note 9: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.1.37.3 Test Requirements

In the test, the performance of RSRP measurements is verified from the following 7 perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.1.38 3 DL PCell in TDD RSRP for E-UTRAN in Carrier Aggregation

## A.9.1.38.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD-FDD RSRP absolute and relative accuracy requirements in carrier aggregation with PCell in TDD are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

#### A.9.1.38.2 Test parameters

In this set of cases cell 1 is PCell on the primary component carrier, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The test parameters are given in Table A.9.1.38.2-1.

Table A.9.1.38.2-1: 3 Downlink PCell in TDD RSRP carrier aggregation test parameters

Parameter	Unit	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	
E-UTRA RF Channel Number		1		2		3	
BW <sub>channel</sub>	MHz	$5MHz$ : $N_{RB,c} = 25$ $10MHz$ : $N_{RB,c} = 50$ $20MHz$ : $N_{RB,c} = 100$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$		10MHz	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$	
Special subframe configuration Note1		6		-		-	
Uplink/downlink configuration <sup>Note1</sup>		1		-		-	
Measurement bandwidth	$n_{PRB}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	10MHz 20MHz	: 10-15 :: 22-27 :: 47-52	10MH 20MH	z: 10-15 łz: 22-27 łz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-	
PDSCH allocation	$n_{{\scriptscriptstyle PRB}}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-	5MHz: 7- 17 10MHz: 13-36 20MHz: 38-61	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	
OCNG Patterns defined in A.3.2.		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB	dB	0	0	0	0	0	
PDCCH_RA							
PDCCH_RB							
PDSCH_RA							
PDSCH_RB							
OCNG_RA <sup>Note1</sup>							
OCNG_RB <sup>Note1</sup>							
Noc Note3  Noc Note3  Bands FDD_A  Bands FDD_D  Bands  FDD_E,  FDD_F Note 7  Bands FDD_G  Bands FDD_G  Bands FDD_H	dBm/15 kHz	-	( $N_{oc}$ for Ch	annel 1 +1dB)	( $N_{oc}$ for C	hannel 1 +1dB)	
Bands TDD_A		-117					
Bands TDD_C		-116		-		-	
$\hat{E}_s/N_{oc}$ Bands TDD_E	dB	-115 -4	3	-1	3	-1	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	-4	0.46	-5.76	0.46	-5.76	
s / -ot				<u> </u>	l	_	

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RSRP <sup>Note4</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 7 Bands FDD_G Bands FDD_G Bands FDD_H	dBm/15 kHz	-	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands TDD_A Bands TDD_C Bands TDD_E		-121 -120 -119	-	-	-	-
lo <sup>Note4</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 7 Bands FDD_G Bands FDD_G Bands FDD_H	dBm/ BW <sub>channel</sub>	-	(Io for Channel 1 +5.33dB +10log (N <sub>RB channel 2</sub> / N <sub>RB channel 1</sub> )) (Io for Channel 1 +10log (N <sub>RB channel 3</sub> / N <sub>R</sub>		10log	
	Bands TDD_A Bands TDD_C Bands TDD_E		-87.76+10log(N <sub>RB,</sub> /50) -86.76+10log(N <sub>RB,</sub> /50) -85.76+10log(N <sub>RB,</sub> /50)		-	-	
Propagation	condition	1	AWGN	AWGN	AWGN	AWGN	AWGN
Antenna Con		-	1x2	1x2	1x2	1x2	1x2
Timing offset		μs	-	0	3	0	3
to cell 1 Note 8	Time alignment error relative to cell 1 Note 8		-	≤TAE	-	≤TAE	-
Time alignment error relative to cell 2 <sup>Note8</sup>			-	-	-	≤TAE	-
			k-downlink configurations sall cells are fully allocated				nsitv is

OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is Note 2: achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $\,N_{oc}\,$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters

RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5:

Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.

For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within Note 7: 865-894 MHz

Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier Note 8:

Note 9: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.1.38.3 **Test Requirements**

In the test, the performance of RSRP measurements is verified from the following 7 perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3. The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.1.39 3 DL FDD RSRP for E-UTRAN in Carrier Aggregation

## A.9.1.39.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

#### A.9.1.39.2 Test parameters

In this set of test cases there are five cells on three carrier frequencies. Cell 1 is PCell on channel 1, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The parameters for the test are listed in Table A.9.1.39.2-1.

Table A.9.1.39.2-1: 3 DL FDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #1, cell #2 and cell #3)

Pa	rameter	Unit	Cell 1	Cell 2	Cell 3	
E-UTRA RF	Channel		1		2	
Number			-			
DW.		MUZ	5MHz: N <sub>RB,c</sub> = 25		$I_{RB,c} = 25$	
BW <sub>channel</sub>		MHz	10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$	20MHz: N	N <sub>RB,c</sub> = 50 I <sub>RB,c</sub> = 100	
			5MHz: 10-15		10-15	
Measureme	ent bandwidth	$n_{PRB}$	10MHz: 22-27		: 22-27	
		PKB	20MHz: 47-52	20MHz	: 47-52	
PDSCH Re			5MHz: R.5 FDD	5MHz: R.5 FDD		
measureme			10MHz: R.0 FDD	10MHz: R.0 FDD	-	
defined in A	3.1.1.1		20MHz: R.4 FDD	20MHz: R.4 FDD		
PDSCH allo	action	10	5MHz: 7-17 10MHz: 13-36	5MHz: 7-17 10MHz: 13-36		
PDSCH all	CallOff	$n_{PRB}$	20MHz: 38-61	20MHz: 38-61	-	
PDCCH/PC	FICH/PHICH		5MHz: R.11 FDD	5MHz: R.11 FDD	5MHz: R.11 FDD	
	neasurement		10MHz: R.6 FDD	10MHz: R.6 FDD	10MHz: R.6 FDD	
channel def	ined in A.3.1.2.1		20MHz: R.10 FDD	20MHz: R.10 FDD	20MHz: R.10 FDD	
			5MHz: OP.15 FDD	5MHz: OP.15 FDD	5MHz: OP.16 FDD	
	erns defined in		10MHz: OP.15 FDD	10MHz: OP.1 FDD	10MHz: OP.2 FDD	
A.3.2.1			20MHz: OP.11 FDD	20MHz: OP.11	20MHz: OP.12	
DDCH DA				FDD	FDD	
PBCH_RA PBCH_RB						
PSS_RA		-				
SSS RA		-				
PCFICH_R	B	1				
PHICH_RA						
PHICH_RB		dB	0	0	0	
PDCCH_RA			-			
PDCCH_RE	3					
PDSCH_RA						
PDSCH_RE	Solution 1					
OCNG_RA	Note 1					
OCNG_RB						
	Bands FDD_A	-	-117	( $N_{oc}$ for Channel 1 +1dB)		
	Bands FDD_C		-116 115.5			
$N_{oc}^{ m Note2}$	Bands FDD_D Bands FDD E.	dBm/	-115.5			
1 voc	FDD_F Note 6	15kHz	-115			
	Bands FDD_G	+	-114			
	Bands FDD_H		-113.5			
$\hat{E}_s/N_{oc}$	. =	dB	-4	3	-1	
		ub	<del>-4</del>			
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB	-4	0.46	-5.76	
	Bands FDD_A		-121			
	Bands FDD_C		-120			
Noto?	Bands FDD_D	dBm/	-119.5	(RSRP for Cell 1	(RSRP for Cell 1	
RSRP <sup>Note3</sup>	Bands FDD_E,	15kHz	-119	+8dB)	+4dB)	
	FDD_F Note 6			. 552		
Bands FDD_G		-	-118			
	Bands FDD_H		-117.5 -87.76			
	Bands FDD_A		-67.76 +10log(N <sub>RB,c</sub> /50)			
		1	-86.76			
	Bands FDD_C		+10log(N <sub>RB,c</sub> /50)			
	Randa EDD D	dDm/	-86.26	(lo for Channel 4	15 22dP 11010~	
Io <sup>Note3</sup>	Bands FDD_D	dBm/ BW <sub>channel</sub>	+10log(N <sub>RB,c</sub> /50)	(Io for Channel 1 +5.33dB +10log (N <sub>RB channel2</sub> / N <sub>RB channel 1</sub> ))		
	Bands FDD_E,	□ • • cnannel	-85.76	( TKB channel2 /	• • RD Channel 1//	
	FDD_F Note 6		+10log(N <sub>RB,c</sub> /50)			
	Bands FDD_G		-84.76			
		-	+10log(N <sub>RB,c</sub> /50)			
	Bands FDD_H	<u> </u>	-84.26			

		+10log(N <sub>RB,c</sub> /50)		
Propagation Condition		AWGN	AWGN	AWGN
Antenna Configuration		1x2	1x2	1x2
Timing offset to Cell 1	μs	-	0	3
Time alignment error relative to cell 1 Note 7		-	≤TAE	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
- Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
- Note 8: E-UTRA operating band groups are as defined in Section 3.5.

Table A.9.1.39.2-2: 3 DL FDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #4 and cell #5)

Pa	rameter	Unit	Cell 4	Cell 5	
E-UTRA RF	Channel		,	3	
Number			•	3	
BW <sub>channel</sub>		MHz		$I_{RB,c} = 25$ $N_{RB,c} = 50$ $I_{RB,c} = 100$	
Measureme	nt bandwidth	$n_{PRB}$	5MHz: 10MHz	10-15 :: 22-27 :: 47-52	
PDSCH Ret	nt channel		5MHz: R.5 FDD 10MHz: R.0 FDD	-	
defined in A	3.1.1.1		20MHz: R.4 FDD		
PDSCH allo	ocation	$n_{PRB}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-	
PDCCH/PC	FICH/PHICH		5MHz: R.11 FDD	5MHz: R.11 FDD	
	neasurement		10MHz: R.6 FDD	10MHz: R.6 FDD	
channel def	ined in A.3.1.2.1		20MHz: R.10 FDD	20MHz: R.10 FDD	
OCNG Patte A.3.2.1	erns defined in		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	
PBCH RA				. 55	
PBCH RB					
PSS_RA					
SSS RA					
PCFICH RI	3			0	
PHICH RA		dB			
PHICH RB			0		
PDCCH RA	1	ub.			
PDCCH RE					
PDSCH_RA					
PDSCH RE					
OCNG_RA					
OCNG_RB					
$N_{oc}^{Note2}$	Bands FDD_A Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H	dBm/ 15kHz	( $N_{oc}$ for Cha	annel 1 +1dB)	
$\hat{E}_s/N_{oc}$	Danus i DD_ii	dB	3	-1	
$\hat{E}_s/I_{ot}$		dB	0.46	-5.76	
RSRP <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D		(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)	
IoNote3  Bands FDD_H Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H Bands FDD_H		dBm/ BW <sub>channel</sub>	(N <sub>RB channel3</sub> /	+5.33dB +10log N <sub>RB channel 1</sub> ))	
Propagation			AWGN	AWGN	
Antenna Co			1x2	1x2	
Timing offse	it to Cell 1	μs	0	3	

Time alignment error relative to cell 1 Note 7		≤TAE	-				
Time alignment error relative to cell 2 <sup>Note 7</sup>			≤TAE	-			
Note 1:			both cells are fully alloc				
Note 2:	total transmitted power spectral density is achieved for all OFDM symbols.  Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled						
	as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.						
Note 3:	RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.						
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.						
Note 5:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.						
Note 6:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.						
Note 7:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.						
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.						

#### A.9.1.39.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.1.40 3 DL TDD RSRP for E-UTRAN in Carrier Aggregation

#### A.9.1.40.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

#### A.9.1.40.2 Test parameters

In this set of test cases there are five cells on three carrier frequencies. Cell 1 is PCell on channel 1, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring

cells on secondary component carriers SCC1 and SCC2 respectively. The parameters for the test are listed in Table A.9.1.40.2-1.

Table A.9.1.40.2-1: 3 DL TDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #1, cell #2 and cell #3)

Pa	rameter	Unit	Cell 1	Cell 2	Cell 3				
E-UTRA RF Channel			1	,	2				
Number									
			5MHz: $N_{RB,c} = 25$		$I_{RB,c} = 25$				
BW <sub>channel</sub>			$10MHz: N_{RB,c} = 50$		$N_{RB,c} = 50$				
			$20MHz: N_{RB,c} = 100$	$20MHz: N_{RB,c} = 100$					
Special sub	oframe		6						
configuration	on "								
Uplink/dow configuration	niink on <sup>Note1</sup>			1					
oormgaratic	711		5MHz: 10-15 5MHz: 10-15						
Measurement bandwidth		$n_{PRB}$	10MHz: 22-27	10MHz: 22-27					
Mododrom	ont banawatii	PRB	20MHz: 47-52	20MHz: 47-52					
PDSCH Re	ference		5MHz: R.4 TDD	5MHz: R.4 TDD					
measureme			10MHz: R.0 TDD	10MHz: R.0 TDD	_				
defined in A			20MHz: R.3 TDD	20MHz: R.3 TDD	_				
defined in F	1.0.1.1.2		5MHz: 7-17	5MHz: 7-17					
PDSCH allo	ocation	n	10MHz: 13-36	10MHz: 13-36					
I DOCH all	Joanon	$n_{PRB}$			_				
DDCCU/DC	CFICH/PHICH		20MHz: 38-61	20MHz: 38-61 5MHz: R.11 TDD	5MU D 11 TDD				
			5MHz: R.11 TDD	_	5MHz: R.11 TDD				
	measurement fined in A.3.1.2.2		10MHz: R.6 TDD	10MHz: R.6 TDD	10MHz: R.6 TDD				
channel de	iiiieu iii A.3.1.2.2		20MHz: R.10 TDD	20MHz: R.10 TDD	20MHz: R.10 TDD				
OCNG Patt	terns defined in		5MHz: OP.9 TDD	5MHz: OP.9 TDD	5MHz: OP.10 TDD				
A.3.2.2			10MHz: OP.1 TDD	10MHz: OP.1 TDD	10MHz: OP.2 TDD				
			20MHz: OP.7 TDD	20MHz: OP.7 TDD	20MHz: OP.8 TDD				
PBCH_RA									
PBCH_RB									
PSS_RA									
SSS_RA									
PCFICH_R	В								
PHICH_RA	1								
PHICH_RB			0	0	0				
PDCCH_R			-						
PDCCH_RI									
PDSCH_R/									
PDSCH_RI									
OCNG_RA	Note2								
OCNG_RB	Note2								
	Bands TDD_A		-117						
$N_{oc}^{ m \ Note3}$	Bands TDD_A Bands TDD_C	dBm/	-116	(N) for Ch	annel 1 +1dB)				
IV oc		15kHz		(1V <sub>oc</sub> for Ch					
^ /	Bands TDD_E		-115						
$\hat{E}_s/N_{oc}$		dB	-4	3	-1				
$\hat{ ext{E}}_{ ext{s}}/ ext{I}_{ ext{ot}}$		dB	-4	0.46	-5.76				
	Bands TDD_A		-121						
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/	-120	(RSRP for Cell 1	(RSRP for Cell 1				
	Bands TDD_E	15kHz	-119	+8dB)	+4dB)				
	_		-87.76 +		<u> </u>				
Note 4	Bands TDD_A		10log(N <sub>RB,c</sub> /50)						
		dBm/	-86.76 +	(In for Channel 1	+5.33dB +10log				
Io <sup>Note4</sup>	Bands TDD_C	BW <sub>channel</sub>	10log(N <sub>RB,c</sub> /50)						
		_ Dvv channel	-85.76 +	(N <sub>RB channel2</sub> / N <sub>RB channel 1</sub> ))					
Bands TDD_E									
			10log(N <sub>RB,c</sub> /50)	AWGN	ANA/CNI				
Propagation Condition			AWGN		AWGN				
Antenna Configuration			1x2	1x2	1x2				
Timing offset to Cell 1		μs	-	0	3				
Time alignment error			_	≤TAE	_				
relative to o	cell 1 Note /		=		_				
Noto 1:	For appoint aubfror	مناميا لممام	k downlink configuratio	ns see Tables 4 2-1 an	d 4 2 2 in TC 26 244				

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

	over subcarriers and time and shall be modelled as AWGN of appropriate power for $^{N}_{\it oc}$ to be fulfilled.
Note 4:	RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

Table A.9.1.40.2-2: 3 DL TDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #4 and cell #5)

Pa	rameter	Unit	Cell 4	Cell 5				
E-UTRA RF	Channel		3					
Number			-					
DIA				$_{RB,c} = 25$				
BW <sub>channel</sub>		MHz	10MHz: $N_{RB,c} = 50$					
Consider the	fue us a		$20MHz: N_{RB,c} = 100$					
Special sub configuration	Note1		6					
Uplink/dowr	nlink							
configuratio	n <sup>Note1</sup>		1					
comigarano	···		5MHz:	10-15				
Measureme	ent bandwidth	$n_{PRB}$	10MHz: 22-27					
		FKB	20MHz	: 47-52				
PDSCH Re	ference		5MHz: R.4 TDD					
measureme			10MHz: R.0 TDD	N/A				
defined in A	\.3.1.1.2		20MHz: R.3 TDD					
DD00H -II-	4:		5MHz: 7-17	N1/A				
PDSCH allo	ocation	$n_{PRB}$	10MHz: 13-36 20MHz: 38-61	N/A				
PDCCH/PC	FICH/PHICH		5MHz: R.11 TDD	5MHz: R.11 TDD				
	measurement		10MHz: R.6 TDD	10MHz: R.6 TDD				
	fined in A.3.1.2.2		20MHz: R.10 TDD	20MHz: R.10 TDD				
			5MHz: OP.9 TDD	5MHz: OP.10 TDD				
A.3.2.2	erns defined in		10MHz: OP.1 TDD	10MHz: OP.2 TDD				
A.J.Z.Z			20MHz: OP.7 TDD	20MHz: OP.8 TDD				
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA		-						
PCFICH_R		-						
PHICH_RA								
PHICH_RB PDCCH_RA		dB	0	0				
PDCCH_RE		1						
PDSCH_RA		-						
PDSCH RE		-						
OCNG_RA								
OCNG_RB								
	Bands TDD_A							
$N_{oc}^{\rm Note3}$	Bands TDD_C	dBm/	( $N_{oc}$ for Channel 1 +1dB)					
OC .	Bands TDD_E	15kHz	` 00	,				
$\hat{E}_s/N_{oc}$		dB	3	-1				
$\hat{E}_s/I_{ot}$		dB	0.46	-5.76				
-s/ ot	Dondo TDD ^		5.10	5.7.0				
RSRP <sup>Note4</sup>	Bands TDD_A	dBm/	(RSRP for Cell 1	(RSRP for Cell 1				
KOKP	Bands TDD_C	15kHz	`+8dB)	`+4dB)				
	Bands TDD_E Bands TDD_A							
Io <sup>Note4</sup>	Bands TDD_A Bands TDD_C	dBm/		1 +5.33dB +10log <sup>7</sup> N <sub>RB channel 1</sub> ))				
Ю	Bands TDD_C Bands TDD_E	BW <sub>channel</sub>	(N <sub>RB channel3</sub> /					
Propagation Condition			AWGN	AWGN				
Antenna Configuration			1x2	1x2				
Timing offset to Cell 1		μs	0	3				
Time alignment error			-	-				
relative to cell 1 Note 7			≤TAE	-				
Time alignm	nent error		/ TAE					
relative to c	ell 2 Note 7		≤TAE					
Note 1: F	or special subfrar		k-downlink configuratio	ns see Tables 4.2-1				
a	and 4.2-2 in TS 36	.211.						

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled

	as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 4:	RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

### A.9.1.40.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.1.41 FD-FDD RSRP Intra frequency case for UE category 0

#### A.9.1.41.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.13.1 and 9.1.13.2 for FD-FDD intra frequency RSRP measurements for UE category 0.

## A.9.1.41.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.41.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.41.2-1: FD-FDD RSRP Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3		
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2	
E-UTRA RF Channel Number			1		•		,	1	
BW <sub>channel</sub>		MHz	1	10		0	10		
Measurement	bandwidth	$n_{{\scriptscriptstyle PRB}}$	22—27		22—27		22—27		
	ence measurement		R.13	-	R.13	-	R.13	-	
channel define			FDD		FDD		FDD		
PDSCH alloca		$n_{PRB}$	13—36	-	13—36	-	13—36	-	
	CH/PHICH Reference channel defined in		R.6 FDD		R.6 FDD		R.6 FDD		
A.3.1.2.1	channer denned in						K.0	רטט	
	s defined in A.3.2.1		OP.1	OP.2	OP.1	OP.2	OP.1	OP.2	
	0 40111104 1117 1101211		FDD	FDD	FDD	FDD	FDD	FDD	
PBCH_RA PBCH_RB									
PSS_RA									
SSS RA									
PCFICH_RB									
PHICH_RA					0	0		0	
PHICH_RB		dB	0	0			0		
PDCCH_RA									
PDCCH_RB									
PDSCH_RA									
PDSCH_RB									
OCNG_RA <sup>Note</sup>									
OCNG_RB <sup>Note</sup>	OCNG_RB <sup>Note1</sup>								
	Bands DD_A		-106		-86		-116		
	Bands FDD_C						-115		
$N_{oc}^{ m Note2}$	Bands FDD_D	-ID /4 C   .     -					-114.5		
00	Bands FDD_E, FDD_F Note 4	dBm/15 kHz					-114 -113		
	Bands FDD_G Note 6								
	Bands FDD_H						-112.5		
Ê/M	Bando i BB_ii								
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	2.5	-6	2.5	-6	0.46	-5.76	
	Bands FDD_A						-113	-117	
	Bands FDD_C					-85	-112	-116	
Noto3	Bands FDD_D			-105			-111.5	-115.5	
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 4	dBm/15 kHz	-100		-80		-111	-115	
	FDD_F								
	Bands FDD_G Note 6						-110	-114	
	Bands FDD_H Bands FDD_A						-109.5	-113.5	
	Bands FDD_A Bands FDD_C							-82.43 -81.43	
	Bands FDD_C Bands FDD_D	dBm/9 MHz						.93	
Io <sup>Note3</sup>	Bands FDD F		-70	-70.27		-50.27		.43	
	FDD_F Note 4  Bands FDD_G Note 6								
	Bands FDD_G Bands FDD_H							.43	
Propagation of			۸۱۸	AWGN		AWGN		-78.93 AWGN	
Propagation condition Correlation Matrix and Antenna		-							
Configuration Matrix and Antenna			1:	1x1		<b>k1</b>	1x1		
Note 1: OCNG shall be used such the		hat hoth calls ar	e fully allo	hated and	a constant	total trans	mitted now	ıor.	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

- Note 3: Es/lot, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 5: E-UTRA operating band groups are as defined in Section 3.5.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 6: Except Band 29 and Band 32.

## A.9.1.41.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.13.1 and 9.1.13.2.

# A.9.1.42 HD-FDD RSRP Intra frequency case for UE category 0

# A.9.1.42.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.13.1 and 9.1.13.2 for HD-FDD intra frequency RSRP measurements for UE category 0.

## A.9.1.42.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.42.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.42.2-1: HD-FDD RSRP Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
		Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
BW <sub>channel</sub>		MHz	10		10		10	
Measurement bandwidth		$n_{{\it PRB}}$	22—27		22—27		22—27	
PDSCH Refere	ence measurement ed in A.3.1.1.4		R.1 HD- FDD	-	R.1 HD- FDD	-	R.1 HD- FDD	-
PDSCH alloca	tion	$n_{PRB}$	13—36	-	13—36	-	13—36	-
	CH/PHICH Reference channel defined in		R.3 HD-FDD		R.3 HD-FDD		R.3 HD-FDD	
OCNG Pattern	s defined in A.3.2.1		OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA						0		
PCFICH_RB					0		0	0
PHICH_RA								
PHICH RB		dB	0	0				
PDCCH_RA				O				
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA <sup>Note</sup>								
OCNG_RB <sup>Note</sup>	1							
	Bands DD_A		-106		-86		-116 -115	
	Bands FDD_C							
λ/ Note2	Bands FDD_D						-114.5	
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD F Note 5	dBm/15 kHz					-114 -113	
	Bands FDD_G Note 7							
	Bands FDD_H						-112.5	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	2.5	-6	2.5	-6	0.46	-5.76
	Bands FDD_A						-113	-117
	Bands FDD_C			-105	-80	-85	-112	-116
	Bands FDD_D						-111.5	-115.5
RSRP <sup>Note3</sup>	Bands FDD F	dBm/15 kHz	-100					
	FDD F Note 4	0.211,710111					-111	-115
	Bands FDD_G Note 6						-110	-114
	Bands FDD_H						-109.5	-113.5
	Bands FDD_A							.43
	Bands FDD_C							.43
	Bands FDD_D	dBm/9 MHz				-50.27		.93
Io <sup>Note3</sup>	Bands FDD_E, FDD_F Note 4		-70	.27	-50			.43
	Bands FDD_G Note 6						-70	.43
	Bands FDD_G							
Propagation of	Propagation condition		AWGN		AWGN		-78.93 AWGN	
Correlation Matrix and Antenna		-						
Configuration	and ranoffild		1)	k1	1x1		1x1	
		hat both cells ar	e fully allo	cated and	a constant	constant total transmitted power		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: Es/lot, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

Note 5: E-UTRA operating band groups are as defined in Section 3.5.

Note 6: Except Band 29 and Band 32.

#### A.9.1.42.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.13.1 and 9.1.13.2.

# A.9.1.43 TDD RSRP Intra frequency case for UE category 0

#### A.9.1.43.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.13.1 and 9.1.13.2 for TDD intra frequency RSRP measurements for UE category 0.

### A.9.1.43.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.43.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.43.2-1: TDD RSRP Intra frequency test parameters for UE category 0

Pa	rameter	Unit		Test 1		Test 2		Test 3	
		Offic	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2	
	nannel Number		•			1	1		
BW <sub>channel</sub>		MHz	1	0	1	0	1	0	
Special subfration Configuration	ote1			6	(			6	
Uplink/downlin	k configuration <sup>Note1</sup>		<i>'</i>	1		1		1	
Measurement		$n_{PRB}$		<b>–27</b>	22-	<b>–27</b>		<b>–27</b>	
PDSCH Reference channel define	ence measurement d in A.3.1.1.5		R.12 TDD	-	R.12 TDD	-	R.12 TDD	-	
PDSCH alloca	tion	$n_{PRB}$	13—36	-	13—36	-	13—36	-	
PDCCH/PCFIC Reference mea defined in A.3.	asurement channel		R.6	TDD	R.6	TDD	R.6	TDD	
OCNG Pattern A.3.2.2.1 (OP. A.3.2.2.2 (OP.	1 TDD) and		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB  POCNG_RB	2 2 Bands TDD_A	dB	0	0	0	0	0 0		
$N_{oc}^{ m Note3}$	Bands TDD_C Bands TDD_E	dBm/15 kHz	-1	06	3-	36	-1	16 15 14	
$\hat{E}_s/N_{oc}$	· =	dB	6	1	6	1	3	-1	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	2.5	-6	2.5	-6	0.5	-5.76	
RSRP <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-100	-105	-80	-85	-113 -112 -111	-117 -116 -115	
	Bands TDD_A						-82	2.43	
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-70	.27	-50	.27	-81	.43	
	Bands TDD_E							.43	
Propagation co		-	AW	'GN	AWGN		AWGN		
Correlation Ma Configuration	trix and Antenna	Lundink downlink	1)			<b>k1</b>		x1	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled.

Note 4: Es/lot, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.1.43.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.13.1 and 9.1.13.2.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

# A.9.2 RSRQ

# A.9.2.1 FDD Intra frequency case

### A.9.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.5.1.

### A.9.2.1.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.1.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.1.2-1: RSRQ FDD Intra frequency test parameters

			Tes	st 1	Tes	st 2	Tes	st 3
Pa	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF C	hannel Number				•		,	1
BW <sub>channel</sub>		MHz	1	0	1	0	1	0
Measurement	bandwidth	$n_{\it PRB}$	22-	<b>–27</b>	22-	<b>–</b> 27	22-	<b>–27</b>
PDSCH Refer	ence measurement	710	R.0		R.0		R.0	
channel define			FDD	-	FDD	-	FDD	-
PDSCH alloca	tion	$n_{{\scriptscriptstyle PRB}}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFI								
	asurement channel		R.6	FDD	R.6	FDD	R.6	FDD
defined in A.3. OCNG Pattern								
A.3.2.1.1 (OP.			OP.1	OP.2	OP.1	OP.2	OP.1	OP.2
A.3.2.1.2 (OP.			FDD	FDD	FDD	FDD	FDD	FDD
PBCH_RA								
PBCH_RB								
PSS_RA SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB		dB	0	0	0	0	0	0
PDCCH_RA								
PDCCH_RB								
PDSCH_RA PDSCH_RB								
OCNG_RA <sup>Note</sup>	1							
OCNG_RB <sup>Note</sup>	1							
CONC_NE	Bands FDD_A						-1	16
	Bands FDD_C							15
N-4-0	Bands FDD_D				-103.85	-103.85	-11	4.5
$N_{oc}^{ m Note2}$	Bands FDD_E,	dBm/15 kHz	-84.76	-84.76			-1	14
	FDD_F Note 5  Bands FDD_G							
	Note 7						-1	13
	Bands FDD_H						-11	2.5
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	•	dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
37 00	Bands FDD_A						-120	-120
	Bands FDD_C						-119	-119
	Bands FDD_D						-118.5	-118.5
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-118	-118
	Bands FDD_G						-117	-117
	Bands FDD_H						-116.5	-116.5
	Bands FDD_A						1.0.0	1.0.0
	Bands FDD_C							
	Bands FDD_D							
RSRQ <sup>Note3</sup>	Bands FDD_E, FDD F Note 5	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
	Bands FDD_G					-		-
	Note 7							
-	Bands FDD_H Bands FDD_A						0.5	.67
	Bands FDD_A Bands FDD_C							.67
	Bands FDD_D							.17
lo <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/0 MU-	FO	ΕO	72	72		
10		dBm/9 MHz	-50	-50	-73	-73	-83	5.67
	Bands FDD_G Note 7						-82	67
	Bands FDD_H						-82	.17
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
		<u> </u>	1	<u> </u>	<u> </u>		l	l

Propaga	tion condition	-	AWGN	AWGN	AWGN				
Note 1:	OCNG shall be used such spectral density is achieve	ed for all OFDM s	ymbols.						
Note 2:	e 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over								
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.								
Note 3:	3: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.								
Note 4:	RSRP and RSRQ minimu each receiver antenna po	•	re specified assuming	g independent interfe	rence and noise at				
Note 5:	For Band 26, the tests shandwidth within 865-894		vith the carrier freque	ncy of the assigned E	E-UTRA channel				
Note 6:	E-UTRA operating band of	roups are as defi	ned in Section 3.5.						
Note 7:	Except Band 29 and Band	d 32.							

#### A.9.2.1.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.1.

# A.9.2.2 TDD Intra frequency case

### A.9.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.5.1.

#### A.9.2.2.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.2.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.2.2-1: RSRQ TDD Intra frequency test parameters

Par	rameter	Unit	Tes		Test 2		Test 3		
		Offic	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2	
	Channel Number			1		1		1	
B\	N <sub>channel</sub> Note1	MHz		0		0		0	
Special subfran	ne configuration <sup>Note1</sup> Nk configuration <sup>Note1</sup>			<u>3</u> 1		<u>6</u> 1		5	
				-	-		1		
	nent bandwidth	$n_{\it PRB}$		22—27		22—27		22—27	
	ence measurement ined in A.3.1.1.2		R.0 TDD	-	R.0 TDD	-	R.0 TDD	-	
PDSCI	-l allocation	$n_{\it PRB}$	13—36	-	13—36	-	13—36	-	
measurement A.:	H/PHICH Reference channel defined in 3.1.2.2			TDD		TDD		TDD	
	defined in A.3.2.2.1 A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	
	CH_RA		100	100	100	100	100	100	
	CH_RB								
	SS_RA								
	SS_RA								
	FICH_RB ICH_RA								
	ICH_RB	dB	0	0	0	0	0	0	
	CCH_RA	uБ	0	0				0	
PDC	CCH_RB								
	SCH_RA								
PDS	SCH_RB								
OCN	G_RA <sup>Note2</sup>								
OCN	G_RB <sup>Note2</sup>								
$N_{oc}^{ m Note3}$	Bands TDD_A	dBm/15 kHz	-84.76		-84.76 -103.85	-103.85		16	
oc oc	Bands TDD_C			-84.76			-115		
	Bands TDD_E						-114		
Ê	$\Sigma_{\rm s}/{ m I}_{ m ot}$	dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46	
	Bands TDD_A						-120	-120	
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-119	-119	
	Bands TDD_E						-118	-118	
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34	
	Bands TDD_A						-85	.67	
lo <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-50	-50	-73	-73	-84	.67	
	Bands TDD_E						-83.67		
$\hat{E}_s$	$N_{oc}$	dB	3	3	-2.9	-2.9	-4	-4	
	tion condition	-	AW	'GN	AW	'GN	AW	'GN	
	enacial subframe and	unlink-downlink	configuration	ne saa Ta	hlas 1 2-1	and 4 2-2 i			

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

#### A.9.2.2.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.5.1.

# A.9.2.3 FDD—FDD Inter frequency case

#### A.9.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2.

### A.9.2.3.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.3.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.3.2-1: RSRQ FDD—FDD Inter frequency test parameters

Do	rometer	l lmit	Tes	st 1	Tes	st 2	Tes	t 3
Pa	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
	hannel Number		1	2	1	2	1	2
BW <sub>channel</sub>	1	MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Measurement		$n_{PRB}$		<del>-</del> 27		–27	22—	-27
channel define	ence measurement		R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH alloca		$n_{PRB}$	13—36	_	13—36	_	13—36	-
PDCCH/PCFIG		PRB	10 00					
Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6	FDD	R.6 F	DD
OCNG Pattern A.3.2.1.1 (OP. A.3.2.1.2 (OP.	1 FDD) and		OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	2100)							
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB PHICH_RA		-						
PHICH_RB		dB	0	0	0	0	0	0
PDCCH_RA		ub.	0	U		U	U	U
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA <sup>Note</sup>								
OCNG_RB <sup>Note</sup>							440.5	440.5
	Bands FDD_A Bands FDD_C						-119.5 -118.5	-119.5 -118.5
	Bands FDD_D						-118	-118
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD F Note 5	dBm/15 kHz	-80	-80	-104.70	-104.70	-117.5	-117.5
	Bands FDD_G						-116.5	-116.5
	Bands FDD_H						-116	-116
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
	Bands FDD_A						-123.5	-123.5
	Bands FDD_C						-122.5	-122.5
	Bands FDD_D						-122	-122
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-81.75	-81.75	-108.70	-108.70	-121.5	-121.5
	Bands FDD_G Note 7						-120.5	-120.5
	Bands FDD_H						-120	-120
	Bands FDD_A							
	Bands FDD_C							
	Bands FDD_D Bands FDD_E,	-						
RSRQ <sup>Note3</sup>	FDD_F Note 5	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
	Bands FDD_G Note 7							
	Bands FDD_H							
	Bands FDD_A						-90.26	-90.26
	Bands FDD_C	-					-89.26 -88.76	-89.26
- Noto3	Bands FDD_D Bands FDD_E,		_	_				-88.76
Io <sup>Note3</sup>	FDD_F Note 5	dBm/9 MHz	-50	-50	-75.46	-75.46	-88.26	-88.26
	Bands FDD_G Note 7						-87.26	-87.26
	Bands FDD_H						-86.76	-86.76

$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation	on condition	=	AWGN		AWGN		AWĠN	
Note 1:	OCNG shall be used such spectral density is achieve	ed for all OFD	M symbols					
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over							ant over
	subcarriers and time and shall be modelled as AWGN of appropriate power for $^{N_{oc}}$ to be fulfilled.							
Note 3:	RSRQ, RSRP and lo leve	ls have been	derived fro	m other pa	rameters fo	or informati	on purposes	. They
	are not settable paramete							
Note 4:	RSRP and RSRQ minimule each receiver antenna po		its are spec	cified assur	ming indep	endent inte	erference and	I noise at
Note 5:	For Band 26, the tests sha		ed with the	carrier free	quency of t	he assigne	d E-UTRA cl	nannel
	bandwidth within 865-894	•			1	3		
Note 6:								
Note 7:	Except Band 29 and Band	d 32.						

### A.9.2.3.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.6.1 and 9.1.6.2.

# A.9.2.4 TDD—TDD Inter frequency case

#### A.9.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2.

#### A.9.2.4.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.4.2-1 for TDD configuration 1 and in Table A.9.2.4.2-2 for TDD configuration 0. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A 9.2.4.2-1: RSRQ TDD—TDD Inter frequency test parameters for TDD configuration 1

Por	amatar	Unit	Tes	Test 1		Test 2		Test 3	
Par	ameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2	
	Channel Number		1	2	1	2	1	2	
	V <sub>channel</sub>	MHz	10	10	10	10	10	10	
	Gap Pattern Id  Special subframe configuration Note1		0	-	0	-	0	-	
Uplink-downlink configuration Note1				<u>6</u> 1	6		6 1		
•		$n_{PRB}$		-	-			-	
	Measurement bandwidth		22-	<b>–27</b>	22—	-27	22-	–27	
	PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	-	R.0 TDD	-	R.0 TDD	-	
PDSCH	H allocation	$n_{{\scriptscriptstyle PRB}}$	13—36	-	13—36	-	13—36	-	
measurement A.:	H/PHICH Reference channel defined in 3.1.2.2			TDD	R.6 T	DD		TDD	
	defined in A.3.2.2.1 A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	
	CH_RA		100	100	100	100	טטו	100	
PBO	CH_RB								
	SS_RA								
	SS_RA				0			0	
	ICH_RB CH_RA								
	CH RB	dB	0	0		0	0		
	CH_RA	42							
	CH_RB								
	SCH_RA								
	SCH_RB G_RA <sup>Note2</sup>								
OCN	G_RB <sup>Note2</sup>								
	Bands TDD_A						-119.50	-119.50	
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-80	-80	-104.70	104.70	-118.50	-118.50	
	Bands TDD_E					104.70	-117.50	-117.50	
Ê	$I_{\rm ot}$	dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0	
	Bands TDD_A						-123.50	-123.50	
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-81.75	-81.75	-108.70	- 108.70	-122.50	-122.50	
	Bands TDD_E					100.70	-121.50	-121.50	
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25	
	Bands TDD_A						-90.26	-90.26	
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-50	-50	-75.46	-75.46	-89.26	-89.26	
	Bands TDD_E						-88.26	-88.26	
	$/N_{oc}$	dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0	
	tion condition	-		GN	AWO			'GN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 4: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Table A 9.2.4.2-2: RSRQ TDD—TDD Inter frequency test parameters for TDD configuration 0

Par	rameter	Unit	Tes	st 1	Tes	t 2	Test 3	
		Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
	Channel Number		1	2	1	2	1	2
	V <sub>channel</sub>	MHz	10	10	10	10	10	10
	Pattern Id		0	<u>-</u>	0	-	0 -	
	ne configuration Note1			6	6		6	
Uplink-downlin	k configuration Note1		-	0	0			-
	Measurement bandwidth		22-	<b>–27</b>	22—	-27	22-	<b>–</b> 27
	ence measurement ined in A.3.1.1.2		R.5 TDD	-	R.5 TDD	-	R.5 TDD	-
PDSC	H allocation	$n_{\it PRB}$	13—36	-	13—36	-	13—36	-
measurement A.	H/PHICH Reference channel defined in 3.1.2.2			TDD	R.6 T			TDD
	defined in A.3.2.2.1 A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
	CH_RA							
	CH_RB							
	SS_RA							
	SS_RA							0
	FICH_RB ICH_RA				0	0	0	
	ICH_RB	dB	0	0				
	CCH_RA	uБ		0		0	0	U
PDC	CCH_RB							
	SCH_RA							
	SCH_RB							
OCN	G_RA <sup>Note2</sup>							
OCN	G_RB <sup>Note2</sup>							
$N_{oc}^{ m Note3}$	Bands TDD_A					104.70	-119.50	-119.50
oc oc	Bands TDD_C	dBm/15 kHz	-80	-80	-104.70		-118.50	-118.50
	Bands TDD_E						-117.50	-117.50
Ê	$E_{\rm s}/{ m I}_{ m ot}$	dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
	Bands TDD_A						-123.50	-123.50
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-81.75	-81.75	-108.70	108.70	-122.50	-122.50
	Bands TDD_E						-121.50	-121.50
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
	Bands TDD_A						-90.26	-90.26
lo <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-50	-50	-75.46	-75.46	-89.26	-89.26
	Bands TDD_E						-88.26	-88.26
$\hat{E}_{s}$	$_{\rm s}/N_{oc}$	dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
	tion condition	-		/GN	AWO			'GN
Note 1. For s	enacial subframe and	unlink-downlink	configuratio	ne saa Tal	Nec / 2-1 a	and 1 2-2	in TS 36 2	11

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

- Note 4: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 6: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.2.4.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.6.1 and 9.1.6.2.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

# A.9.2.4A FDD—TDD Inter frequency case

### A.9.2.4A.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2 for FDD—TDD inter frequency measurements.

#### A.9.2.4A.2 Test parameters

In this set of test cases the two cells are on different carrier frequencies. Both absolute and relative accuracy of RSRQ inter frequency measurements are tested by using the parameters in Table A.9.2.4A.2-1 and Table A.9.2.4A.2-2. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. Cell 1 is FDD cell and Cell 2 is TDD cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.2.4A.2-1: RSRQ FDD—TDD Inter frequency test parameters (FDD Cell1)

Dorometer	Unit	Test 1	Test 2	Test 3
Parameter	Unit	Cell 1	Cell 1	Cell 1
E-UTRA RF Channel Number		1	1	1
BW <sub>channel</sub>	MHz	10	10	10
Gap Pattern Id		0	0	0
Measurement bandwidth	$n_{PRB}$	22—27	22—27	22—27
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	R.0 FDD	R.0 FDD
PDSCH allocation	$n_{PRB}$	13—36	13—36	13—36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	R.6 FDD	R.6 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	OP.1 FDD	OP.1 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA <sup>Note1</sup> OCNG_RB <sup>Note1</sup>	dB	0	0	0
$N_{oc}^{ m Note2}$	dBm/15 kHz	-80	-104.70	-114.5
$\hat{E}_{s}/I_{ot}$	dB	-1.75	-4.0	-4.0
RSRP <sup>Note3</sup>	dBm/15 kHz	-81.75	-108.70	-118.5
RSRQ <sup>Note3</sup>	dB	-14.76	-16.25	-16.25
lo <sup>Note3</sup>	dBm/9 MHz	-50	-75.46	-85.26
$\hat{E}_s/N_{oc}$	dB	-1.75	-4.0	-4.0
Propagation condition	-	AWGN	AWGN	AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table A.9.2.4A.2-2: RSRQ FDD—TDD Inter frequency test parameters (TDD cell2)

Parameter	Unit	Test 1	Test 2	Test 3
	Onit	Cell 2	Cell 2	Cell 2
E-UTRA RF Channel Number		2	2	2
BW <sub>channel</sub>	MHz	10	10	10
Gap Pattern Id		-	-	-
Special subframe configuration		6	6	6
Uplink-downlink configuration Note1		1	1	1
Measurement bandwidth	$n_{\it PRB}$	22—27	22—27	22—27
PDSCH Reference measurement channel		-	-	-
PDSCH allocation	$n_{PRB}$	-	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	R.6 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB	dB	0	0	0
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note2</sup>				
OCNG_RB <sup>Note2</sup>				
$N_{oc}^{ m Note3}$	dBm/15 kHz	-80	-104.70	-114.50
$\hat{E}_{s}/I_{ot}$	dB	-1.75	-4.0	-4.0
RSRP <sup>Note4</sup>	dBm/15 kHz	-81.75	-108.70	-118.50
RSRQ <sup>Note4</sup>	dB	-14.76	-16.25	-16.25
Io <sup>Note4</sup>	dBm/9 MHz	-50	-75.46	-85.26
$\hat{E}_s/N_{oc}$	dB	-1.75	-4.0	-4.0
Propagation condition	-	AWGN	AWGN	AWGN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Interference from other cells and noise sources not specified in the test is assumed to be constant over Note 3: subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 4: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

#### A.9.2.4A.3 **Test Requirements**

The RSRQ measurement accuracy shall fulfil the requirements in sections 9.1.6.1 and 9.1.6.2.

# A.9.2.5 FDD RSRQ for E-UTRA Carrier Aggregation

#### A.9.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier specified in clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.11.2 and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.11.3.

#### A.9.2.5.2 Test parameters

In this test case the PCell and the SCell are on different carrier frequencies. There are three cells used in this test case. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.5.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC) and Cell 3 is the neighbouring cell on the SCC. The SCC is configured and activated.

Table A.9.2.5.2-1: FDD RSRQ Carrier Aggregation test parameters

			Tes	st 1	
	ameters	Units	Cell 1	Cell 2	Cell 3
E-UTRA RF Channe	l Number		1	2	2
BW <sub>channel_CA</sub>		MHz	10	10	10
Timeing offset to Ce	1	μs	-	0	3
Time alignment erro		-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-	
Measurement bandy		$n_{PRB}$	22—27	22—27	22—27
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.0 FDD	-
PDSCH allocation		$n_{PRB}$	13—36	13—36	-
	el defined in A.3.1.2.1		R.6 FDD	R.6FDD	R.6 FDD
FDD) and A.3.2.1.2	ned in A.3.2.1.1 (OP.1 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB OCNG_RB		dB	0	0	0
	Bands FDD_A		-119.5	-116	-116
	Bands FDD_C		-118.5	-115	-115
$N_{oc}^{ m Note2}$	Bands FDD_D	dBm/15	-118	-114.5	-114.5
oc	Bands FDD_E, FDD_F Note 6	kHz	-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
^ /	Bands FDD_H		-116	-112.5	-112.5
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	-4.0	-5.46	-5.46
	Bands FDD_A		-123.5	-120	-120
	Bands FDD_C		-122.5	-119	-119
RSRP <sup>Note3</sup>	Bands FDD_D Bands FDD_E,	dBm/15	-122	-118.5	-118.5 -118
NONE	FDD_F Note 6	kHz	-121.5	-118	-110
	Bands FDD_G		-120.5	-117	-117
	Bands FDD_H		-120	-116.5	-116.5
Bands FDD_A Bands FDD_C Bands FDD_D  RSRQNote3  RSRQNote3  Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H		dB	-16.25	-17.34	-17.34
	Bands FDD_A		-90.26	-85.67	-85.67
lo <sup>Note3</sup>	Bands FDD_C	dBm/9	-89.26	-84.67	-84.67
-	Bands FDD_D	MHz	-88.76	-84.17	-84.17
	Bands FDD_E,		-88.26	-83.67	-83.67

	FDD_F Note 6						
	Bands FDD_G		-87.26	-82.67	-82.67		
	Bands FDD_H		-86.76	-82.17	-82.17		
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0		
	on condition	-		AWGN			
Note 1:	OCNG shall be used such that both	cells are full	y allocated a	nd a constan	t total		
transmitted power spectral density is achieved for all OFDM symbols.							
Note 2:	Interference from other cells and no						
be constant over subcarriers and time and shall be modelled as AWGN of							
	appropriate power for $N_{oc}$ to be fu						
Note 3:	RSRQ, RSRP and lo levels have be		•	rameters for i	information		
	purposes. They are not settable pa	rameters ther	nselves.				
Note 4:	RSRP and RSRQ minimum require			ning indepen	dent		
	interference and noise at each rece						
Note 5:	The selection of the bands for testing	ng depends o	n the configu	ration of the	carrier		
	aggregation supported by the UEs						
Note 6:	For Band 26, the tests shall be perf	ormed with th	ne carrier fred	quency of the	assigned		
	E-UTRA channel bandwidth within	865-894 MHz	<u>.</u> .				
Note 7:	This test verifies the RRM requirem	ent which is i	independent	of channel ba	andwidth		
	and is performed according to the p	rinciple defin	ed in section	A.3.6.1.			
Note 8:	E-UTRA operating band groups are	e as defined in	n Section 3.5				

#### A.9.2.5.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

# A.9.2.6 TDD RSRQ for E-UTRA Carrier Aggregation

The test case in this clause are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

#### A.9.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRQ measurement accuracy in carrier aggregation is within the specified limits in a synchronized network environment with AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier defined in Clause 9.1.11.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

#### A.9.2.6.2 Test parameters

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell, Cell 2 is SCell, and Cell 3 is the target cell. PCell and SCell are in different RF channels. Cell 3 is in the same RF channel as Cell 2. The parameters for the test are listed in Table A.9.2.6.2-1.

Table A.9.2.6.2-1: TDD RSRQ test parameters

Para	meter	Unit		Test 1	
		- Cilit	Cell 1	Cell 2	Cell 3
E-UTRA RF Chan	inel Number	MHz	1	10	2
BW <sub>channel</sub> Timing offset to ce	1 الد		-	0	3
Time alignment er and cell 1	ror between cell 2	μѕ	-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Special subframe	configuration Note1			6	
Uplink-downlink c	onfiguration			11	
Measurement bar	ndwidth	$n_{\it PRB}$		22—27	
PDSCH Referenc channel defined in			R.0 TDD	R.0 TDD	-
PDSCH allocation		$n_{PRB}$	13—36	13—36	-
measurement cha A.3.1.2.2			R.6 TDD	R.6 TDD	R.6 TDD
OCNG Patterns d (OP.1 TDD) and A TDD)	efined in A.3.2.2.1 A.3.2.2.2 (OP.2		OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB Note2		dB	0	0	0
$N_{oc\ { m Note3}}$	Bands TDD_A	ID (45.11)	-119.5	-11	6
	Bands TDD_C	dBm/15 kHz	-118.5	-11	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	Bands TDD_E	dB	-117.5 -4.0	-11 -5.46	-5.46
s / Ot	Bands TDD_A		-123.50	-120	-120
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-122.50	-119	-119
	Bands TDD_E		-121.50	-118	-118
RSRQ <sup>Note4</sup>	dB	-16.25	-17.		
		-90.26	-85.	67	
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-89.26	-84.	67
	Bands TDD_E		-88.26	-83.67	
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0
Propagation cond	ition	-		AWGN	

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled
	as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
	as AWGN of appropriate power for $\frac{\partial c}{\partial t}$ to be fulfilled.
Note 4:	RSRQ, RSRP and lo levels have been derived from other parameters for
	information purposes. They are not settable parameters themselves.
Note 5:	RSRP and RSRQ minimum requirements are specified assuming
	independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the
11010 0.	carrier aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel
	bandwidth and is performed according to the principle defined in section
	A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.2.6.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in section 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.2.7 FDD RSRQ under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.9.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits. This test will verify the requirements in Clause 9.1.5.2 for FDD intra frequency measurements under time domain measurement resource restriction.

### A.9.2.7.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction is tested by using the parameters in Table A.9.2.7.2-1 and Table A.9.2.7.2-2 for non-MBSFN ABS with non-colliding CRS. In all test cases, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.7.2-1: General test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are selected
·		!=0	randomly so that the condition is met.
ABS pattern		'10000000100000001000	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.
		00001000000010000000	Configured in Cell 1.
		00001000000010000000	The first/leftmost bit corresponds to the
			subframe #0 of a radio frame satisfying SFN
			mod x = 0, where x is the size of the bit string
			(40) divided by 10. No MBSFN subframes are
			cofigured in the ABS subframes in Cell 1.
Time-domain measurement			Configured for Cell 2 measurements by
resource restriction pattern for		10000000100000001000	measSubframePattern-Neigh IE in
neighbour cell measurements on		00001000000010000000	measSubframePatternConfig-Neigh, as defined
RF Channel 1			in TS 36.331 [2], clause 6.3.5.
			measSubframeCellList contains Cell 2.
Time-domain measurement		'010000001000000100	Configured for measurements on Cell 1.
resource restriction pattern for		00000100000001000000	
serving cell measurements			

Table A.9.2.7.2-2: Cell-specific test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time domain measurement resource restriction with non-MBSFN ABS

		11.24	Tes	st 1	Test 2		Test 3	
	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Ch	nannel Number		•	•		1	1	
BW <sub>channel</sub>		MHz		0		0	10	
Measurement b		$n_{\it PRB}$	22-	–27	22—27		22—27	
	ence measurement		R.0	-	R.0	_	R.0	-
channel define		$n_{PRB}$	FDD		FDD		FDD	
	PDSCH allocation PDCCH/PCFICH/PHICH		13—36	-	13—36	-	13—36	-
	Surement channel		R 6	FDD	R 6	FDD	R.6	FDD
	defined in A.3.1.2.1		14.0		14.0	100	14.0	
OCNG Patterns			OP.5	OP.6	OP.5	OP.6	OP.5	OP.6
A.3.2.1.5 (OP.5			FDD	FDD	FDD	FDD	FDD	FDD
A.3.2.1.6 (OP.6 PBCH_RA	סרח)							
PBCH_RB								
PCFICH_RB								
PHICH_RA								
PHICH_RB PDCCH_RA		dB	Note 6	0	Note 6	0	Note 6	0
PDCCH_RB		ub	INOIG 6	U	INOIG 6		INOIG 6	U
PDSCH_RA								
PDSCH_RB								
OCNG_RA <sup>Note1</sup>								
OCNG_RB <sup>Note1</sup> PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
	Bands FDD_A	42					-1	
	Bands FDD_C						-1	
λι Note2	Bands FDD_D						-11	4.5
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 7	dBm/15 kHz	-84	.76	-10	3.85	-114	
	Bands FDD G						-113	
	Note 9							
^ /	Bands FDD_H						-112.5	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
CRS $(\hat{E}_s/I_{ot})$	Note 5 meas	dB	2.88	-2.00	2.88	-2.00	3.54	-4.00
SCH $\hat{E}_{s}/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
	Bands FDD_A						-111	-120
	Bands FDD_C						-110	-119
	Bands FDD_D Bands FDD_E,						-109.5	-118.5
RSRP <sup>Note3,4,5</sup>	FDD_F Note 7	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-109	-118
	Bands FDD_G						-108	-117
	Bands FDD_H						-107.5	-116.5
	ם מוועס דטט_ח						-107.5	-110.5
	Bands FDD_A,							
(DCDO)	FDD_C, FDD_E,							
$(RSRQ)_{meas}$ Note3,4,5	FDD F Note 7	dB	-12.60	-15.30	-12.60	-15.30	-12.38	-16.69
,-,-	FDD_G Note 9,							
	FDD_H							
	Rands EDD A						91.62	95 27
	Bands FDD_A Bands FDD_C						-81.63 -80.63	-85.37 -84.37
$(Io)_{meas}$ Note3	Bands FDD_D	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-80.13	-83.87
/ meus	Bands FDD_E, FDD_F Note 7	1					-79.63	-83.37
	FDD_F Note 7						-13.03	-03.31

	Bands FDD_G						-78.63	-82.37
	Bands FDD_H						-78.13	-81.87
Propagat	ion condition	-	- AWGN AWGN					'GN
Note 1:	OCNG shall be used such	that both cells ar	e fully allo	cated and	a constant	total trans	mitted pow	/er
Note 2:	spectral density is achieved for all OFDM symbols.							
	subcarriers and time and	shall be modelled	as AWGN	of approp	riate powe	r for $N_{oc}^{}$	to be fulfille	ed.
Note 3:	Applies to all subframes. RSRQ, RSRP and lo leve are not settable parameter restricted subframes.							
Note 4:	RSRP and RSRQ minimu each receiver antenna po	•	re specifie	d assuming	g independ	dent interfe	erence and	noise at
Note 5:	Applies to restricted meas	surement subfram	es of the re	espective o	ell.			
Note 6:	Non-ABS and ABS subfra	me channel powe	ers defined	in Table A	.3.4.1.1-1.			
Note 7:	For Band 26, the tests shadwidth within 865-894	•	vith the car	rier freque	ncy of the	assigned E	E-UTRA ch	annel

#### A.9.2.7.3 Test Requirements

Note 8:

Note 9:

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.2.

E-UTRA operating band groups are as defined in Section 3.5.

# A.9.2.8 TDD RSRQ under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.9.2.8.1 Test Purpose and Environment

Except Band 29 and Band 32.

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits. This test will verify the requirements in Clause 9.1.5.2 for TDD intra frequency measurements under time domain measurement resource restriction.

### A.9.2.8.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction is tested by using the parameters in Table A.9.2.8.2-1 and Table A.9.2.8.2-2 for non-MBSFN ABS with non-colliding CRS. In all test cases, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.8.2-1: General test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Also the aggressor cell.
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe
			configurations see Table 4.2-1 in [16].
Uplink/downlink subframe		1	For Cell 1 and Cell 2. For uplink-downlink
configuration			subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are randomly
•		!=0	selected so that the condition is met
ABS pattern		'000000001000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'000000001000000001'	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'10000000001000000000'	Configured for Cell 1 measurements.

Table A.9.2.8.2-2: Cell-specific test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with non-MBSFN ABS

Do	· · · · · · · · · · · · · · · · · · ·	l lmit	Tes	st 1	Tes	st 2	Tes	st 3
Pai	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Ch	nannel Number		•	1		1	•	
BW <sub>channel</sub>		MHz	1	0	1	0	10	
Measurement b	Measurement bandwidth		22-	<b>–27</b>	22-	–27	22—27	
PDSCH Refere	nce measurement d in A.3.1.1.2		R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocat	ion	$n_{PRB}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFIC Reference mea defined in A.3.1	surement channel		R.6	TDD	R.6	TDD	R.6	TDD
OCNG Patterns A.3.2.2.1 (OP.1 A.3.2.2.2 (OP.2	TDD) and		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA <sup>Note1</sup>		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA	1	dB	-4	0	-4	0	-4	0
$N_{oc}^{ m Note2}$	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-84.76 -103.85		3.85	-116 -115 -114		
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
CRS $(\hat{E}_{s}/I_{ot})$	Note 5	dB	2.88	-2.00	2.88	-2.00	3.54	-4.00
SCH $\hat{E}_{s}/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
Note3 4 5	Bands TDD_A	dBm/15 kHz					-111	-120
RSRP <sup>NOIES,4,5</sup>	RSRP <sup>Note3,4,5</sup> Bands TDD_C Bands TDD_E		-79.76	-86.76	-98.85	-105.85	-110 -109	-119 -118
(RSRQ) <sub>meas</sub> Note3,4,5	Bands TDD_A, TDD_C, TDD_E	dB	-12.60	-15.30	-12.60	-15.30	-12.38	-16.70
(Io) <sub>meas</sub> Note3	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-81.63 -80.63 -79.63	-85.37 -84.37 -83.37
Propagation co Note 1: OCN	ndition IG shall be used such	that both cells ar	AW re fully allo			GN total trans	AW mitted pow	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.
- Note 3: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
- Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Applies to restricted measurement subframes of the respective cell.
- Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
- Note 7: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.2.8.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.2.

# A.9.2.9 FDD RSRQ under Time Domain Measurement Resource Restriction with MBSFN ABS

#### A.9.2.9.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits under AWGN propagation conditions. This test will verify the absolute FDD RSRQ accuracy under time domain measurement resource restriction specified in Clause 9.1.5.2.

#### A.9.2.9.2 Test parameters

The test parameters are given in Tables A.9.2.9.2-1 and A.9.2.9.2-2 below. In this test case there are two cells on the same frequency used in this test case. In the test, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured by higher layers with a time domain measurement restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.9.2-1: General test parameters for FDD RSRQ under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Serving cell (PCell)		Cell 1	Also the aggressor cell on E-UTRA RF channel number 1
Neighbour cell		Cell 2	Cell to be identified on E-UTRA RF channel number 1
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
CP length		Normal	
DRX		OFF	
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> ) mod 6 = 0, PCI <sub>cell1</sub> not equal to PCI <sub>cell2</sub>	Cell PCIs are selected so that the condition is met (colliding CRS)
Cell 1 MBSFN ABS pattern		'01000000100000001000 00000010000001000000	ABS subframe is only MBSFN subframe. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. Configured in Cell 1.
Time domain measurement resource restriction pattern for PCell (Cell 1) measurements on RF Channel 1		'00010000000100000001 00000001000000010000'	Time domain measurement resource restriction pattern for PCell measurement signalled to the UE in measSubframePatternPCell. The IE MeasSubframePattern is used to specify the time domain measurement resource restriction as defined in TS 36.331 [2], clause 6.3.6. Configured for Cell 1 measurements.
Time domain measurement resource restriction pattern for neighbour cell (Cell 2) measurements on RF Channel 1		'01000000100000001000 00000010000001000000	Time domain measurement resource restriction pattern for neighbour cell measurement signalled to the UE in measSubframePatternNeigh The IE MeasSubframePattern is used to specify the time domain measurement resource restriction as defined in TS 36.331 [2], clause 6.3.6. Configured for Cell 2 measurements.

Table A.9.2.9.2-2: Cell specific test parameters for FDD RSRQ under time domain measurement resource restriction with MBSFN ABS

D		1124	Tes	st 1	Te	st 2	Tes	st 3
	ameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Ch	annel Number			1		1		1
BW <sub>channel</sub>	alatina ad in	MHz	1	0	1	0	1	0
OCNG Patterns A.3.2.1.8 (OP.8			OP.8	OP.6	OP.8	OP.6	OP.8	OP.6
A.3.2.1.6 (OP.6	FDD) Note5		FDD	FDD	FDD	FDD	FDD	FDD
Measurement b		$n_{PRB}$	22—27		22-	<b>–27</b>	22-	<b>–27</b>
PDSCH allocati	on	$n_{PRB}$	13—36	-	13—36	-	13—36	-
PBCH_RA								
PBCH_RB								
PCFICH_RB								
PHICH_RA PHICH_RB								
PDCCH_RA		dB	Note 6	0	Note 6	0	Note 6	0
PDCCH_RB		, ab	Note o	U	Note o		Note o	0
PDSCH_RA								
PDSCH_RB								
OCNG_RA <sup>Note1</sup>								
OCNG_RB <sup>Note1</sup>		dD.	4		4	0	A	0
PSS_RA SSS_RA		dB dB	-4 -4	0	-4 -4	0	-4 -4	0
000_NA	Bands FDD_A	ub	-4	U	-4	ı U	•	16
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
$N_{oc}^{ m Note2}$	Bands FDD_E,	dBm/15 kHz	-84	.76	-10:	3.85	-1	14
	FDD_F Note 8							
	Bands FDD_G Note 10						-1	13
	Bands FDD_H						-11	2.5
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
$CRS(\hat{E}/I)$	Note 5, 7 in the	-ID	0.00	0.40	0.00	0.40	0.54	40.40
1st OFDM symbo	I	dB	2.88	-8.19	2.88	-8.19	3.54	-10.19
CRS $(\hat{F}/I_{Ot})$	note <sup>5</sup> in OFDM							
$\frac{O(O(E_s/10t)_n}{O(E_s/10t)_n}$	neas	dB	2.88	-2	2.88	-2	3.54	-4
symbols 4,7,11								
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
	Bands FDD_A						-111	-120
	Bands FDD_C	-					-110 -100 5	-119 -118 5
Note 3.4 F	Bands FDD_D Bands FDD_F.						-109.5	-118.5
RSRP Note 3,4,5	Bands FDD_E, FDD_F Note 8	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-109	-118
	Bands FDD_G Note 10						-108	-117
	Bands FDD_H	1					-107.5	-116.5
	Bands FDD_A							
	Bands FDD_C							
(PSPO)	Bands FDD_D	-						
(RSRQ) meas Note 3,4,5	Bands FDD_E, FDD F Note 8	dB	-12.60	-15.02	-12.60	-15.02	-12.38	-16.36
	Bands FDD_G	1						
		-						
	Bands FDD_H Bands FDD_A		1				-81.63	-85.37
(In) Note 3	Bands FDD_C	1					-80.63	-84.37
(Io) <sub>meas</sub> Note 3	Bands FDD_D	]					-80.13	-83.87
symbol	Bands FDD_E, FDD F Note 8	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-79.63	-83.37
	Bands FDD_G Note 10						-78.63	-82.37
	Note 10						70.00	02.01

	Bands FDD_H						-78.13	-81.87
(Io) meas Note 3	Bands FDD_A	dBm/9 MHz				-73.94	-81.63	-86.76
	Bands FDD_C						-80.63	-85.76
	Bands FDD_D						-80.13	-85.26
OFDM symbols other than the 1 <sup>st</sup>	Bands FDD_E, FDD_F Note 8		-50.17	-54.85	-69.26		-79.63	-84.76
one	Bands FDD_G Note 10						-78.63	-83.76
	Bands FDD_H						-78.13	-83.26
Propagation con	dition	-	AW	'GN	AW	'GN	AW	GN

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.
- Note 3: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes
- Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Applies to restricted measurement subframes of the respective cell.
- Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
- Note 7: In the 1<sup>st</sup> OFDM symbol, Cell 2 is not expected to meet the Es/lot side condition in 9.1.5.2.
- Note 8: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 9: E-UTRA operating band groups are as defined in Section 3.5.
- Note 10: Except Band 29 and Band 32.

#### A.9.2.9.3 Test Requirements

In the test, the RSRQ measurement accuracy under time domain measurement resource restriction shall fulfil the requirements in Clause 9.1.5.2

# A.9.2.10 TDD Intra frequency case under time domain measurement resource restriction with MBSFN ABS

#### A.9.2.10.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits. This test will verify the requirements in Clause 9.1.5.2 for TDD intra frequency measurements under time domain measurement resource restriction.

#### A.9.2.10.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction is tested by using the parameters in Table A.9.2.10.2-1 and Table A.9.2.10.2-2 for MBSFN ABS with colliding CRS. In all test cases, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.10.2-1: General test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe
			configurations see Table 4.2-1 in [16].
Uplink/downlink subframe		1	For Cell 1 and Cell 2. For uplink-downlink
configuration			subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are selected
		=0 PCI <sub>cell1</sub> not equal to	randomly so that the condition is met
		PCI <sub>cell2</sub>	
ABS pattern			MBSFN ABS pattern. TDD ABS Pattern Info IE,
		'0000100000000100000'	as defined in TS 36.423 [28], clause 9.2.54.
			Configured in Cell 1.
			The first/leftmost bit corresponds to the
			subframe #0 of a radio frame satisfying SFN
			mod x = 0, where x is the size of the bit string
			(20) divided by 10. All ABS subframes are
			MBSFN subframes.
Time-domain measurement			Configured for Cell 2 measurements by
resource restriction pattern for		'0000100000000100000'	measSubframePattern-Neigh IE in
neighbour cell measurements on			measSubframePatternConfig-Neigh, as defined
RF Channel 1			in TS 36.331 [2], clause 6.3.5.
			measSubframeCellList contains Cell 2.
Time-domain measurement		'100000000100000000'	Configured for measurements on Cell 1.
resource restriction pattern for			
serving cell measurements			

Table A.9.2.10.2-2: Cell-specific test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with MBSFN ABS

Dove		l loit	Tes	st 1	Tes	st 2	Test 3		
	ımeter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2	
E-UTRA RF Cha	nnel Number	NAL I	,		,			1	
BW <sub>channel</sub>		MHz		0		0		0	
Measurement ba		$n_{{\it PRB}}$	22-	<del>-27</del>	22—27		22-	<del>-27</del>	
	ce measurement		R.0	-	R.0	-	R.0	-	
channel defined PDSCH allocation		n	TDD 13—36	_	TDD 13—36	_	TDD 13—36	_	
PDCCH/PCFICH		$n_{\it PRB}$	13—30		13—30	_	13—30	_	
Reference meas defined in A.3.1.	urement channel 2.2		R.6	TDD	R.6	TDD	R.6	TDD	
OCNG Patterns A.3.2.2.5 (OP.5 A.3.2.2.2 (OP.2	TDD) and		OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD	
PBCH_RA									
PBCH_RB PCFICH_RB									
PHICH_RA									
PHICH_RB									
PDCCH_RA		dB	Note 6	0	Note 6	0	Note 6	0	
PDCCH_RB									
PDSCH_RA PDSCH_RB									
OCNG_RA <sup>Note1</sup>									
OCNG_RB <sup>Note1</sup>									
PSS_RA		dB	-4	0	-4	0	-4	0	
SSS_RA		dB	-4	0	-4	0	-4	0	
$N_{oc}^{ m Note2}$	Bands TDD_A						-116		
TV oc	Bands TDD_C	dBm/15 kHz	-84.76		-103.85		-115		
	Bands TDD_E						-114		
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4	
CRS	`								
In the 1St OFDM	Note 5, 7 meas symbol	dB	2.88	-8.19	2.88	-8.19	3.54	-10.19	
CRS $(\hat{E}_s/Iot)$	Note 5 in OFDM	٩D	0.00	0	0.00	0	2.54	4	
symbols 4,7,11	eus	dB	2.88	-2	2.88	-2	3.54	-4	
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54	
Note 2.4.5	Bands TDD_A			_			-111	-120	
RSRP Note 3,4,5	Bands TDD_C	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-110	-119	
	Bands TDD_E						-109	-118	
(RSRQ) <sub>meas</sub> Note 3,4,5	Bands TDD_A, TDD_C, TDD_E	dB	-12.60	-15.02	-12.60	-15.02	-12.38	-16.36	
$(Io)_{meas}$ Note 3	Bands TDD_A						-81.63	-85.37	
in the 1 <sup>st</sup>	Bands TDD_C	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-80.63	-84.37	
OFDM symbol	Bands TDD_E						-79.63	-83.37	
$(Io)_{meas}$ Note 3	Bands TDD_A						-81.63	-86.76	
in OFDM	Bands TDD_C						-80.63	-85.76	
symbols other		dBm/9 MHz	-50.17	-54.85	-69.26	-73.94	<b>70.</b> 5.5	0.4 ===	
than the 1 <sup>st</sup>	Bands TDD_E						-79.63	-84.76	
One Propagation con	dition		A1A/	GN	A1A4	'GN	A1A	'GN	
Propagation con	uiiiUII	-	I AVV	UIV	I AVV	GIN	I AVV	JIN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	Applies to all subframes. RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at
NOIG 4.	each receiver antenna port.
Note 5:	Applies to restricted measurement subframes of the respective cell.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
Note 7:	In the 1 <sup>st</sup> OFDM symbol, Cell 2 is not expected to meet the Es/lot side condition in 9.1.5.2.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

### A.9.2.10.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in clause 9.1.5.2.

# A.9.2.11 FDD RSRQ for E-UTRA Carrier Aggregation (20MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

#### A.9.2.11.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.5.1.

#### A.9.2.11.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.5.2 except that the values of the parameters in the Table A.9.2.11.2-1 will replace the values of the corresponding parameters in A.9.2.5.2-1.

Table A.9.2.11.2-1: FDD RSRQ Carrier Aggregation test parameters

Parameters		Test 1						
		Units	Cell 1	Cell 2 Cell 3				
BW <sub>channel</sub>	Note 1 _CA	MHz	20	20	20			
Measure	ment bandwidth	$n_{PRB}$	47-52	47-52	47-52			
	Reference		R.4	R.4				
	ment channel		FDD	FDD	-			
	n A.3.1.1.1		00.04	20 61 20 61				
	allocation	$n_{PRB}$	38-61	38-61	-			
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.10 FDD	R.10 FDD	R.10 FDD			
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and A.3.2.1.12 (OP.12 FDD)			OP.11 FDD	OP.11 FDD	OP.12 FDD			
	Bands FDD_A		-87.26	-82.67				
	Bands FDD_C		-86.26	-81.67				
Io <sup>Note2</sup>	Bands FDD_D Note 5	dBm/18 MHz	-85.76	-81.17				
	Bands FDD_E	IVII IZ	-85.26	-80.67				
	Bands FDD_G Note 5		-84.26	-79.67				
	Bands FDD_H Note 5		-83.76	-79.17				
Note 1:								
Note 2:	of channel bandwidth and is performed according to the principle defined in section A.3.6.1.  Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves							
Note 3:	See Table A.9.2.5	See Table A.9.2.5.2-1 for the other parameters						
Note 4:	E-UTRA operating band groups are as defined in Section 3.5.							
Note 5:	The test applies for E-UTRA operating bands in this band							
group which are supporting 20 MHz channel bandwidth.								

#### A.9.2.11.3 Test Requirements

The test requirements defined in section A.9.2.5.3 shall apply in this test case.

# A.9.2.12 TDD RSRQ for E-UTRA Carrier Aggregation (20MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

#### A.9.2.12.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

#### A.9.2.12.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.12.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.12.2-1: TDD RSRQ Carrier Aggregation test parameters

Parameters		Test 1						
Par		Units	Cell 1	Cell 2	I 2 Cell 3			
BW <sub>channel_CA</sub>	Note1	MHz	20 20		20			
Measureme	ent bandwidth	$n_{PRB}$	47-52	47-52	47-52			
PDSCH Re measurement defined in A	ent channel		R.3 R.3 TDD TDD		-			
PDSCH allo	ocation	$n_{PRB}$	38-61	38-61	-			
	FICH/PHICH measurement fined in		R.10 TDD	R.10 TDD	R.10 TDD			
	erns defined in DP.7 TDD) and DP.8 TDD)		OP.7 TDD	OP.7 TDD	OP.8 TDD			
	Bands TDD_A Note 5	dBm/18	-87.26	-82.67				
Io <sup>Note2</sup>	Bands TDD_C Note 5	MHz	-86.26	-81.67				
	Bands TDD_E Note 5		-85.26	-80.67				
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.								
Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves								
Note 3: See Table A.9.2.6.2-1 for the other parameters.								
Note 4: E-UTRA operating band groups are as defined in Section 3.5.								
Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 20 MHz channel bandwidth.								

# A.9.2.12.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

A.9.2.13 Void

A.9.2.13.1 Void

A.9.2.13.2 Void

Table A.9.2.13.2-1: Void

A.9.2.13.3 Void

A.9.2.14 Void

A.9.2.14.1 Void

A.9.2.14.2 Void

Table A.9.2.14.2-1: Void

A.9.2.14.3 Void

# A.9.2.15 FDD RSRQ under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.9.2.15.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction with CRS assistance information is within the specified limits. This test will verify the requirements in Clause 9.1.5.3 for FDD intra frequency measurements under time domain measurement resource restriction with CRS assistance information.

#### A.9.2.15.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction with CRS assistance information is tested by using the parameters in Table A.9.2.15.2-1 and Table A.9.2.15.2-2 for non-MBSFN ABS with colliding CRS between Cell1 and Cell3 and non-colliding CRS between Cell1 and Cell2. In all test cases, Cell 1 is the serving/aggressor cell, Cell2 is the neighbour/aggressor cell and Cell3 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements with a neighbour cell list, where the cell list includes Cell 3. The UE is also provided via higher layers with the CRS assistance information of Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.2.15.2-1: General test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Value	Comment				
PCell			Cell 1	Serving/aggressor cell				
Neighbour cells			Cell 2	Neighbour/aggressor cell				
			Cell3	Cell to be measured				
ABS transmission configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.1-1				
CP length			Normal	For all cells in the test				
DRX				OFF				
Time offset between cells		μѕ	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to	Three synchronous cells				
			Cell 1: -2.5	<u> </u>				
Physical cell IDs			(PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> )mod6 != 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub>	Cell PCIs are selected so that all conditions are met				
ABS pattern			'100000001000000100000 001000000010000000	FDD ABS Pattern Info IE, as defined in TS 36.423[28], clause 9.2.54.  The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes.  Configured in Cell 1 and Cell 2.				
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'100000001000000100000 001000000010000000	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Configured for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.				
Time-domain measurement resource restriction pattern for serving cell measurements			'0100000001000000010000 000100000001000000	Configured for measurements on Cell 1.				
	physCellId		see PCI conditions above	Only the CRS information of cell 2 is provided in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element				
CRS assistance	antennaPortsC ount		1					
information	mbsfn- SubframeConfi gList		oneFrame = '000000'	with subframe allocation <i>one</i> Frame='000000'.				

Table A.9.2.15.2-2: Cell-specific test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

		Test 1				Test 2			Test 3		
Par	rameter	Unit	Cell	Cell	Cell	Cell	Cell	Cell	Cell	Cell	Cell
F-UTRA RE Ch	annel Number		1	1	3	1	1	3	1	1	3
E-UTRA RF Channel Number BW <sub>channel</sub>		MHz	10			10		10			
Measurement bandwidth		$n_{PRB}$	22—27		22—27		•	22—27			
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD -		R.0 -		-	R.0 FDD -		-	
	PDSCH allocation		13— 36		-	13— 36		-	13— 36		-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD			R.6 FDD			
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and A.3.2.1.6 (OP.6 FDD)			OP. 5 FDD	OP. 6 FDD	OP.6 FDD	OP. 5 FDD	OP. 6 FDD	OP.6 FDD	OP. 5 FDD	OP. 6FD D	OP.6 FDD
PBCH_RA PBCH_RB PSS_RA											
SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1		dB	Note 6		0	Note 6		0	Note 6		0
OCNG_RB Note	Bands FDD_A Bands FDD_C Bands FDD_D	dBm/	-84.76			-103.85			-116 -115 -114.5		
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 7 Bands FDD_G Note 9	15 kHz							-114 -113		
A / 2.2	Bands FDD_H								-112.5		
CRS $\hat{E}_s/N_{oc}$		dB	4	2	-1.5	4	2	-1.5	4	2	-4
CRS $(\hat{E}_{s}/I_{ot})$		dB	- 1.18	0.32	-6.96	- 1.18	0.32	-6.96	- 0.75	0.54	-9.46
	Bands FDD_A Bands FDD_C			- 82.7 6	- 86.2 6	- 99.8 5	- 101. 85	- 105. 35	-112 -111	-114 -113	-120 -119
	Bands FDD_D	dBm/							- 110. 5	- 112. 5	- 118. 5
RSRP Note 3,4,5	Bands FDD_E, FDD_F Note 7	15 kHz	80.7 6						-110	-112	-118
	Bands FDD_G Note 9	KI IZ	O						-109	-111	-117
	Bands FDD_H								- 108. 5	- 110. 5	- 116. 5
(RSRQ) <sub>meas</sub> Note 3,4,5	Bands FDD_A, FDD_C, FDD_D, FDD_E, FDD_F Note 7, FDD_G Note 9, FDD_H	dB	- 14.4 3	- 11.5 9	- 15.0 9	- 14.4 3	- 11.5 9	- 15.0 9	- 14.1 9	- 10.8 1	- 16.8 1

(Io) <sub>meas</sub> Note 3	Bands FDD_A	dBm/ 9 MHz	49.3	-53.19	- 68.4 3	-72.28	- 80.8 2	-85.03
	Bands FDD_C						- 79.8 2	-84.03
	Bands FDD_D						- 79.3 2	-83.54
	Bands FDD_E, FDD_F Note 7						- 78.8 2	-83.04
	Bands FDD_G Note 9						- 77.8 2	-82.04
	Bands FDD_H						- 77.3 2	-81.54
Propagation co	ndition	-	AWGN		AWGN		AWGN	

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.
- Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
- Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
- Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
- Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 8: E-UTRA operating band groups are as defined in Section 3.5.
- Note 9: Except Band 29 and Band 32.

### A.9.2.15.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.3.

# A.9.2.16 TDD RSRQ under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.9.2.16.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction with CRS assistance information is within the specified limits. This test will verify the requirements in Clause 9.1.5.3 for TDD intra frequency measurements under time domain measurement resource restriction with CRS assistance information.

#### A.9.2.16.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction with CRS assistance information is tested by using the parameters in Table A.9.2.16.2-1 and Table A.9.2.16.2-2 for non-MBSFN ABS with colliding CRS between Cell1 and Cell3 and non-colliding CRS between Cell1 and Cell2. In all test cases, Cell 1 is the serving/aggressor cell, Cell2 is the neighbour/aggressor cell and Cell3 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell1 with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements with a

neighbour cell list, where the cell list includes Cell 3. The UE is also provided via higher layers with the CRS assistance information of Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.2.16.2-1: General test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Para	ameter	Unit	Value	Comment
PCell			Cell 1	Serving/aggressor cell
Neighbour cells	6		Cell 2	Neighbour/aggressor cell
			Cell3	Cell to be measured
Special subfrar	ne configuration		6	For Cell 1, Cell 2 and Cell 3. For special
				subframe configurations see Table 4.2-1 in [16].
Uplink/downlink configuration	k subframe		1	For Cell 1, Cell 2 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
ABS transmiss	ion configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length			Normal	For all cells in the test
DRX				OFF
Time offset bet	ween cells	μs	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to Cell 1: -2.5	Three synchronous cells
Physical cell ID	)s		(PCI <sub>cell1</sub> - PCI <sub>cell3</sub> ) mod6 = 0 (PCI <sub>cell2</sub> - PCI <sub>cell3</sub> ) mod6 != 0 PCI <sub>cell1</sub> not equal to PCI <sub>cell3</sub>	Cell PCIs are selected so that all conditions are met
ABS pattern			'00000000010000000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Provided fto the UE for Cell 1 and Cell 2.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'00000000010000000001'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Provided to the UE for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements			'10000000001000000000'	Configured for Cell 1 measurements.
	physCellId		see PCI conditions above	Only the ODC posietors as information ( # 0
CRS	antennaPortsC ount		1	Only the CRS assistance information of cell 2 is provided for Cell 2 only in CRS-
assistance information	mbsfn- SubframeConfi gList		oneFrame = '000000'	AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation one Frame='000000'.

Table A.9.2.16.2-2: Cell-specific test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

				Test 1		Test 2		Test 3			
Pa	rameter	Unit	Cell	Cell	Cell	Cell	Cell	Cell	Cell	Cell	Cell
E LITEA DE CL	annal Number	-	1	1	3	1	1	3	1	1	3
E-UTRA RF Ch BW <sub>channel</sub>	iannei ivuitiber	MHz		10			10			10	
Measurement I	pandwidth	$n_{PRB}$		22—27	,		22—27	•	22—27		
	ence measurement	PRB	R.0		R.0		R.0				
channel define			TDD		-	TDD		-	TDD		-
PDSCH allocat	ion	$n_{PRB}$	13— 36		-	13— 36		-	13— 36		-
PDCCH/PCFIC	CH/PHICH		- 55	I		- 55	I		- 55	<u>l</u>	
Reference mea defined in A.3.	asurement channel			R.6 TDI	)		R.6 TDI	)	l	R.6 TDI	)
OCNG Pattern			OP.	OP.	OD 2	OP.	OP.	OD 2	OP.	OP.	OD 2
A.3.2.2.1 (OP.			1	2	OP.2 TDD	1	2	OP.2 TDD	1	2	OP.2 TDD
A.3.2.2.2 (OP.2 PBCH_RA	עטו)		TDD	TDD		TDD	TDD		TDD	TDD	
PBCH_RB		1									
PSS_RA		]									
SSS_RA		-									
PCFICH_RB PHICH_RA		1									
PHICH_RB		dB	Note		0	Note		0	Note		0
PDCCH_RA			6			6			6		
PDCCH_RB											
PDSCH_RA		1									
PDSCH_RB		4									
OCNG_RA <sup>Note1</sup>		_									
	Bands TDD_A	15 /								-116	
$N_{oc}^{ m Note2}$	Bands TDD_C	- dBm/ 15	-84.76			-103.85			-115		
	Bands TDD_E	kHz		04.70		- 100.00		-114			
CRS $\hat{E}_s/N_{oc}$	_	dB	4	2	-1.5	4	2	-1.5	4	2	-4
CRS $(\hat{E}_s/I_{ot})$		dB	-	-	-6.96	-	-	-6.96	- 0.75	0.54	-9.46
( 37 61)	Bands TDD_A		1.18	0.32		1.18	0.32		0.75 -112	-114	-120
RSRP <sup>Note3,4,5</sup>	Bands TDD_C	dBm/	-	-	-	-	-	-	-111	-113	-119
RSRP	Bands TDD_E	15 kHz	80.7 6	82.7 6	86.2 6	99.8 5	101. 85	105. 35	-110	-112	-118
	Ballus IDD_E	IXI IZ					00	00	-110	-112	-110
(RSRQ) <sub>meas</sub>	Bands TDD_A,		-	-	-	-	-	-	-	-	-
Note3,4,5	TDD_C, TDD_E	dB	14.4	11.5	15.0	14.4	11.5	15.0	14.1	10.8	16.8
	_ , _		3	9	9	3	9	9	9	1	1
	Bands TDD_A							- 80.8	-85	5.03	
		-I-C /							2		
$(Io)_{meas}$ Note3	Bands TDD_C	dBm/ 9	- 49.3	-53	3.19	- 68.4	-72	2.28	- 79.8	-84	1.03
(== ) meas		MHz	4			3	-72.28		2		
	Dands TDD -								- 70.0	0.0	0.04
	Bands TDD_E								78.8 2	-83	3.04
Propagation co	ndition	-		AWGN			AWGN			AWGN	
Propagation condition			•			•					

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant
	over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be
	fulfilled. Applies to all subframes.
Note 3:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7:	E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.2.16.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.3.

# A.9.2.17 FDD Intra frequency case for 5 MHz bandwidth

#### A.9.2.17.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.5.1.

#### A.9.2.17.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.17.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.17.2-1: RSRQ FDD Intra frequency test parameters, 5MHz

David		l limit	Tes	st 1	Test 2		Test 3	
	ameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel	Number			1		1		1
BW <sub>channel</sub>		MHz	;	5		5		5
Measurement bandw		$n_{PRB}$		<b>–</b> 15	10-	<b>–15</b>	10—15	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.5 FDD	-	R.5 FDD	-	R.5 FDD	-
PDSCH allocation		$n_{PRB}$	7—17	-	7—17	-	7—17	-
PDCCH/PCFICH/PHI			R.11	FDD	R.11 FDD		R.11	FDD
OCNG Patterns defin (OP.15 FDD) and A.3 PBCH_RA			OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB Note1		dB	0	0	0	0	0	0
$N_{oc}^{$	Bands FDD_N	dBm/15 kHz	-81	.76	-100	0.85	-109.5	
$\hat{E}_{s}/I_{ot}$		dB	-1.76	-1.76	-4.70	-4.70	-5.46	-5.46
RSRP <sup>Note3</sup>	Bands FDD_N	dBm/15 kHz	-78.76	-78.76	-103.75	-103.75	-113.50	-113.50
RSRQ <sup>Note3</sup>	Bands FDD_N	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
Io <sup>Note3</sup>	Bands FDD_N	dBm/4.5 MHz	-50	).01	-73	.01	-82	.19
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
Propagation condition		-		'GN	AW		AW	
Note 1: OCNG sha	all be used such that both	n cells are ful	lly allocate	d and a co	nstant total	transmitte	d nower sp	ectral

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

### A.9.2.17.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.1.

# A.9.2.18 FDD—FDD Inter frequency case for 5MHz bandwidth

#### A.9.2.18.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2.

#### A.9.2.18.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.18.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.18.2-1: RSRQ FDD—FDD Inter frequency test parameters, 5MHz

Cell 1   Cell 2   Cell 2   Cell 2   Cell 3   Cell 2   Cell 4   Cell 2			1114	Tes	st 1	Test 2		Test 3	
BWretwent   BWre	_		Unit			Cell 1	Cell 2		
Gap Pattern Id		hannel Number		-		<u> </u>		•	
Measurement bandwidth			MHz			1	5		5
PDSCH Reference measurement channel defined in A.3.1.1.1	Gap Pattern Id	1		0	-	0	-	0	-
PDSCH Reference measurement channel defined in A.3.1.1.1	Measurement	Measurement bandwidth		10-	–15	10-	<b>–</b> 15	10—	-15
PDSCH allocation	PDSCH Refer	ence measurement		R.5		R.5		R.6	
PDCCH/PCFICH/PHICH   Reference measurement channel defined in A.3.12.11   CONG Patterns defined in A.3.12.11   CONG Patterns defined in A.3.12.11   CONG Patterns defined in A.3.21.16 (OP.16 FDD) and A.3.21.16 (OP.16 FDD) and A.3.21.16 (OP.16 FDD)   PDC H RA	channel defined in A.3.1.1.1			FDD	-	FDD	-	FDD	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1   OCNG Patterns defined in A.3.1.2.1   OCNG Patterns defined in A.3.2.1.16 (OP.15 FDD) and A.3.2.1.16 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD) and A.3.2.1.16 (OP.16 FDD)   PDCH RA   PBCH RB PSS RA   SSS RA   PCFICH RB PHICH RA   PHICH RA   PDCCH RA   PDCCH RA   PDSCH RB   PDSCH RB   PDSCH RA   PDSCH RA   PDSCH RA   PDSCH RB   DO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PDSCH alloca	ition	$n_{PRB}$	7—17	-	7—17	-	7—17	-
defined in A.3.1.2.1	PDCCH/PCFI	CH/PHICH							
OP.15   OP.16   OP.16   OP.1				R.11	FDD	R.11	FDD	R.11 I	FDD
A.3.2.1.16 (OP.16 FDD) and A.3.2.1.16 (OP.16 FDD)   FDD							I		
A.3.2.1.15 (OP-16 FDD) PBCH_RA PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDSCH_RA PDSCH_RA PDSCH_RA PDSCH_RA PDSCH_RA PDSCH_RB CONG_RA POSCH_RB DO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				OP.15	OP.16	OP.15	OP.16	OP.15	OP.16
PBCH_RB									
PBCH RB		10 [00]							
PSS_RA   SSS_RA   PCFICH_RB   PHICH_RA   PHICH_RB   PHICH_RA   PHICH_RB   PDCCH_RA   PDCCH_RB   PDCCH_RB   PDSCH_RB   PDSCH_RB   PDSCH_RB   POSCH_RB   P									
SSS_RA   PCFICH_RB   PHICH_RA   PHICH_RA     PHICH_RB   PDCCH_RB   PDCCH_RB     PDCCH_RB   PDCCH_RB   PDSCH_RB     PDSCH_RB   PDSCH_RB   PDSCH_RB     PDSCH_RB   PDSCH_RB   POSCH_RB     OCNG_RA^Noret   OCNG_RB^Noret     OCNG_RB^Noret   OCNG_RB									
PHICH_RA									
PHICH_RB	PCFICH_RB								
PDCCH_RA									
PDCCH_RB			dB	0	0	0	0	0	0
PDSCH_RA									
PDSCH_RB									
OCNG_RRN   Notest									
Bands FDD_A		·1							
Bands FDD_A   Bands FDD_C   Bands FDD_D   Bands FDD_B   FDD_F   Note 5   Bands FDD_N									
Bands FDD_C   Bands FDD_D   Bands FDD_B   Bands FDD_G   Bands FDD_N	OCNG_RB	_						110 5	NI/A
Bands FDD_D   Bands FDD_E   FDD_F Notes									
Rands FDD_E, FDD_F Note 5   Bands FDD_D			1						
FDD_F Note   Bands FDD_G     Bands FDD_B     Bands FDD_N     Bands FDD_N     Bands FDD_A     Bands FDD_C     Bands FDD_C     Bands FDD_C     Bands FDD_B     Bands FDD_B     Bands FDD_G     Bands FDD_G     Bands FDD_B     Bands FDD_B     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_N     Bands FDD_D	Note2	Bands FDD F	† <u>.                                    </u>						
Bands FDD_G     Bands FDD_H     Bands FDD_N     Bands FDD_N     Bands FDD_N     Bands FDD_A     Bands FDD_A     Bands FDD_B     FDD_F Note 5     FDD_F Note 5     Bands FDD_A     Bands FDD_B     Bands FDD_A     Bands FDD_N     Bands FDD_D     Bands FDD_B     Bands FDD_D     Bands FDD_D     Bands FDD_D     Bands FDD_B     Bands FDD_D     Bands FDD_B     Bands FDD_D     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_B     Bands FDD_D     Bands FDD_	- · oc	FDD_F Note 5	dBm/15 kHz	-77	-77	-101.70	-101.70	-117.5	N/A
Bands FDD_N   dB								-116.5	N/A
Bands FDD_A   Bands FDD_B									
Bands FDD_A   Bands FDD_C   Bands FDD_D   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_C   Bands FDD_B		Bands FDD_N						- N/A	-113
Bands FDD_A   Bands FDD_C   Bands FDD_D   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_C   Bands FDD_B	$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB	-1.75	-1.75	-4.00	-4.00	-4.00	-4.00
RSRP <sup>Note3</sup>	57 00	Bands FDD A						-123.5	N/A
RSRPNote3    Bands FDD_D   Bands FDD_E   FDD_F Note 5   Bands FDD_G   Bands FDD_N									
FDD_F   Note 5   GBm/15 kHz   -78.75   -78.75   -105.70   -105.70   -121.5   N/A									
Bands FDD_G Bands FDD_N Bands FDD_A Bands FDD_C Bands FDD_C Bands FDD_E, FDD_F Note 5 Bands FDD_H Bands FDD_N Bands FDD_N Bands FDD_N Bands FDD_N Bands FDD_N Bands FDD_A Bands FDD_A Bands FDD_C Bands FDD_C Bands FDD_N Bands FDD_C Bands FDD_C Bands FDD_C Bands FDD_C Bands FDD_C Bands FDD_C Bands FDD_C Bands FDD_D Band	RSRP <sup>Note3</sup>	Bands FDD_E,	dBm/15 kHz	-78.75	-78.75	-105.70	-105.70	-121.5	N/A
Bands FDD_H   Bands FDD_N   Bands FDD_C   Bands FDD_D   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_H   Bands FDD_N   Bands FDD_A   Bands FDD_C   Bands FDD_C   Bands FDD_C   Bands FDD_D			-					-120.5	N/A
Bands FDD_N   Bands FDD_A   Bands FDD_C   Bands FDD_D   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_B   Bands FDD_H   Bands FDD_A   Bands FDD_C   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_D   Bands FDD_B   Bands FDD_D   Bands FDD_B									
RSRQ <sup>Note3</sup>   Bands FDD_C   Bands FDD_E   FDD_F   Note 5   Bands FDD_H   Bands FDD_N			1						
RSRQ <sup>Note3</sup>   Bands FDD_D   Bands FDD_E   FDD_F   Note 5   Bands FDD_G   Bands FDD_H   Bands FDD_N		Bands FDD_A							
RSRQ <sup>Note3</sup>   Bands FDD_E, FDD_F   dB			]						
Bands FDD_G Bands FDD_H Bands FDD_N  Bands FDD_A Bands FDD_C Bands FDD_D  Bands FDD_D  Bands FDD_E Ban			_						
Bands FDD_G Bands FDD_H Bands FDD_N  Bands FDD_A Bands FDD_C Bands FDD_D  Bands FDD_D  Bands FDD_E Ban	RSRQ <sup>Note3</sup>	Bands FDD_E,	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
Bands FDD_H   Bands FDD_N   -93.27 N/A     -92.27 N/A     -91.77 N/A     -91.77 N/A     -91.77 N/A     -91.77 N/A     -91.77 N/A     -91.77 N/A			1						
Bands FDD_N  Bands FDD_A  Bands FDD_C  Bands FDD_D  Bands FDD_E  Bands			1						
Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E Bands			1						
Bands FDD_C Bands FDD_D -92.27 N/A -91.77 N/A  Bands FDD_E dBm/4 5								-93.27	N/A
Bands FDD F dBm/4.5								-92.27	
Bands FDD_E,			]					-91.77	N/A
Ionus	Io <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5		-50.01	-50.01	-75.47	-75.47	-91.27	N/A
Bands FDD_G -90.27 N/A			1					-90.27	N/A
Bands FDD_H -89.77 N/A			]					-89.77	N/A
Bands FDD_N N/A -86.77	i		7	I	ı	1	Ì		r <del></del>

$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation	on condition	-	AW	'GN	AW	'GN	AWO	ΞN
Note 1:	OCNG shall be used such	n that both cell	s are fully	allocated a	nd a const	ant total tra	ansmitted pov	wer
	spectral density is achieve							
Note 2:	Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over						ant over	
	subcarriers and time and shall be modelled as AWGN of appropriate power for $^{N_{oc}}$ to be fulfilled.							
	subcarriers and time and shall be modelled as AWGN of appropriate power for $\frac{\partial c}{\partial t}$ to be fulfilled.						ed.	
Note 3:	3: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							
Note 4:	RSRP and RSRQ minimule each receiver antenna po		its are spec	cified assur	ming indep	endent inte	erference and	d noise at
Note 5:	For Band 26, the tests sh	all be performe	ed with the	assigned E	E-UTRA ch	annel band	dwidth within	865-894
	MHz.	•		J				
Note 6:	This test is only applicable	e for testing in	ter-frequer	cy requirer	ments for E	Bands FDD	_N. Cell 2 is	on the
	Band under test, and Cell 1 is on another band supported by the UE.							
Note 7:	E-UTRA operating band of	groups are as	defined in S	Section 3.5				

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#### A.9.2.18.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.6.1 and 9.1.6.2.

## A.9.2.19 FDD-FDD Inter Frequency WB-RSRQ

#### A.9.2.19.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. In the test the UE shall also be configured with the *AllowedMeasBandwidth* parameter defined in TS 36.331 [2]. The test shall verify the WB-RSRQ inter frequency absolute accuracy requirements defined in Section 9.1.6.3.

#### A.9.2.19.2 Test parameters

In this test case the two cells are on two different carrier frequencies and measurement gaps are provided. The WB-RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.19.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell on which the UE shall be ordered to measure WB-RSRQ.

Table A.9.2.19.2-1: WB-RSRQ FDD-FDD Inter frequency test parameters

Par	ameter	Unit	Te	est 1	
Par	ameter	Unit	Cell 1	Cel	l 2
E-UTRA RF Chan	nel Number		1	2	
BW <sub>channel</sub>		MHz	10	10	
Antenna Configur	ation		1x2	1x	2
Gap Pattern Id			0	-	
PBCH_RA		-		C	
PBCH_RB		-		C	
PSS_RA SSS_RA		-		0	
PCFICH_RB		+			
PHICH_RA		-		_ c	
PHICH_RB		dB	0	_0	
PDCCH_RA		1 45		_ 0	0
PDCCH_RB				_0	0
PDSCH_RA					0
PDSCH_RB				_0	•
OCNG_RA <sup>Note1</sup>				_ c	•
OCNG_RB <sup>Note1</sup>				_0	•
AllowedMeasBan	dwidth in TS 36.331	RB	6	5	0
PDSCH Referenc channel defined in			R.0 FDD	-	
PDSCH allocation	1	$n_{PRB}$	13-36	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	-	
OCNG Patterns d (OP.1 FDD)	efined in A.3.2.1.1		OP.1 FDD	-	
$I_{ot}^{ m Note2}$	bandwidth	$n_{PRB}$	0-49	0-21 28-49	22-27
1 ot		dBm/15 kHz	-94	-87	-110
$\hat{E}_{s}/I_{ot}$	bandwidth	$n_{PRB}$	0-49	0-21 28-49	22-27
		dB	-4	-3	20
RSRP <sup>Note3</sup>		dBm/15 kHz	-98	-9	0
RSRQ <sup>Note3</sup>		dB	-16.25	-	
WB-RSRQ <sub>0</sub> <sup>Note3</sup> ir		dB	-	-13	.68
WB-RSRQ <sub>1</sub> <sup>Note3</sup> in subframe ≠ 0		dB	-	-13	.63
lo <sup>Note3</sup>		dBm/ 9 MHz	-64.76	-	
Io <sup>Note3</sup> in symbol 0, 4, 11 of subframe 0		dBm/ 9 MHz	-	-82.38	
Io <sup>Note3</sup> in symbol 7		dBm/ 9 MHz	-	-82.20	
Io <sup>Note3</sup> in symbol 0 subframes ≠ 0	, 4, <del>7, 11 of</del>	dBm/ 9 MHz	-	-82.38	
Propagation cond		-	AWGN	AW	
Note 1: OCNG	shall be used such that	Cell 1 is fully	allocated and a co	nstant tota	ı

Note 1: OCNG shall be used such that Cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells not specified in the test, assumed to be constant over time and modelled as noise.

Note 3: RSRQ, RSRP, WB-RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The stated values represent the weighted average over the allowed measurement bandwidth, and the WB-RSRQ values assume averaging over symbols 0, 4, 7 and 11 of the subframe.

Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 5: This test case is applicable to all FDD frequency bands except band 31.

### A.9.2.19.3 Test Requirements

The WB-RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.6.3, compared with WB-RSRQ<sub>0</sub> or WB-RSRQ<sub>1</sub>.

# A.9.2.20 TDD—TDD Inter Frequency WB-RSRQ

#### A.9.2.20.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. In the test the UE shall also be configured with the *AllowedMeasBandwidth* parameter defined in TS 36.331 [2]. The test shall verify the WB-RSRQ inter frequency absolute accuracy requirements defined in Section 9.1.6.3.

#### A.9.2.20.2 Test parameters

In this test case the two cells are on two different carrier frequencies and measurement gaps are provided. The WB-RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.20.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell on which the UE shall be ordered to measure WB-RSRQ.

Table A.9.2.20.2-1: WB-RSRQ TDD-TDD Inter frequency test parameters

D		1114	To	est 1			
Par	ameter	Unit	Cell 1	Cel	12		
E-UTRA RF Chan	nel Number		1	2			
BW <sub>channel</sub>		MHz	10	1	0		
Special subframe	configuration Note1		6	6	6		
Uplink-downlink co			1	1			
Antenna Configura	ation		1x2	1x	2		
Gap Pattern Id			0	-			
PBCH_RA				C			
PBCH_RB				C			
PSS_RA		<u> </u>		C			
SSS_RA		-		C			
PCFICH_RB		-					
PHICH_RA PHICH_RB		-ID	_	0			
PDCCH_RA		dB	0				
PDCCH_RB		-					
PDSCH_RA		-					
PDSCH_RB				_ 0			
OCNG_RA <sup>Note2</sup>		1		_ c			
OCNG_RB <sup>Note2</sup>		-		_ 0			
	dwidth in TS 36.331						
[2]		RB	6	5	0		
PDSCH Reference	e measurement		D o TDD				
channel defined in	A.3.1.1.2		R.0 TDD	-			
PDSCH allocation		$n_{PRB}$	13-36	-			
	PDCCH/PCFICH/PHICH Reference measurement channel defined in		R.6 TDD	-			
A.3.1.2.2							
OCNG Patterns de (OP.1 TDD)	efined in A.3.2.2.1		OP.1 TDD	-			
$I_{ot}^{\text{Note3}}$	bandwidth	$n_{PRB}$	0-49	0-21 28-49 22-2			
		dBm/15 kHz	-94	-87	-110		
$\hat{E}_s/I_{ot}$	bandwidth	$n_{PRB}$	0—49	0-21 28-49	22-27		
		dB	-4	-3	20		
RSRP <sup>Note4</sup>		dBm/15 kHz	-98	-9	0		
RSRQ <sup>Note4</sup>		dB	-16.25	-			
WB-RSRQ <sub>0</sub> <sup>Note4</sup> in		dB	-	-13	.68		
WB-RSRQ <sub>1</sub> <sup>Note4</sup> in subframe ≠ 0		dB	-	-13	.63		
lo <sup>Note4</sup>		dBm/ 9 MHz	-64.76	-			
Io <sup>Note4</sup> in symbol 0, 4, 11 of subframe 0		dBm/ 9 MHz	-	-82.38			
Io <sup>Note4</sup> in symbol 7		dBm/ 9 MHz	-	-82.20			
lo <sup>Note4</sup> in symbol 0, subframes ≠ 0	4, 7, 11 of	dBm/ 9 MHz	-	-82.38			
Propagation condi	tion	-	AWGN	AW	GN		
	cial subframe and uplir	k-downlink co		AWGN			

- Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
- Note 2: OCNG shall be used such that Cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 3: Interference from other cells not specified in the test, assumed to be constant over time and modelled as noise.
- Note 4: RSRQ, RSRP, WB-RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The stated values represent the weighted average over the allowed measurement bandwidth, and the WB-RSRQ values assume averaging over symbols 0, 4, 7 and 11 of the subframe.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

#### A.9.2.20.3 Test Requirements

The WB-RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.6.3, compared with WB-RSRQ<sub>0</sub> or WB-RSRQ<sub>1</sub>.

# A.9.2.21 FDD RSRQ for E-UTRAN Carrier Aggregation for 10MHz+5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

## A.9.2.21.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.5.1.

### A.9.2.21.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.5.2 except that the values of the parameters in the Table A.9.2.21.2-1 will replace the values of the corresponding parameters in A.9.2.5.2-1.

Table A.9.2.21.2-1: FDD RSRQ Carrier Aggregation test parameters

	Parameters		Test 1				
		Units	Cell 1	Cell 2	Cell 3		
BW <sub>channe</sub>	Note 1 el_CA	MHz	10	Į.	5		
Measure	ement bandwidth	$n_{PRB}$	22-27	10-15			
	Reference measurement defined in A.3.1.1.1		R.0 FDD	R.5 FDD	-		
PDSCH	allocation	$n_{PRB}$	13-36	7-17	-		
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	R.11	FDD		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD), A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.1 FDD	OP.15 FDD	OP.16 FDD		
	Bands FDD_A		-90.26	N/A			
	Bands FDD_C	dBm/9MHz	-89.26				
	Bands FDD_D		-88.76				
	Bands FDD_E, FDD_F		-88.26				
Io <sup>Note2</sup>	Bands FDD_G		-87.26				
10	Bands FDD_H		-86.76				
	Bands FDD_A			-88	.67		
	Bands FDD_C			-87	.67		
	Bands FDD_D			-87	'.17		
	Bands FDD_E, FDD_F	dBm/4.5MHz	N/A	-86	5.67		
	Bands FDD_G			-85	.67		
	Bands FDD_H			-85	5.17		
	Bands FDD_N				17		
Note 1:	This test verifies the RRM requ						
Note 2:	bandwidth and is performed act to levels have been derived from						
	They are not settable paramete						
N. C. O. T.H. ACCECAC							

Note 3: See Table A.9.2.5.2-1 for the other parameters

#### A.9.2.21.3 Test Requirements

The test requirements defined in section A.9.2.5.3 shall apply in this test case.

# A.9.2.22 TDD RSRQ for E-UTRAN Carrier Aggregation for 10MHz+5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

#### A.9.2.22.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

#### A.9.2.22.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.22.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.22.2-1: TDD RSRQ Carrier Aggregation test parameters

			Test 1	1		
P	arameters	Units	Cell 1	Cell 2	Cell 3	
BW <sub>channel</sub>	Note1 _CA	MHz	10	5		
Measure	ment bandwidth	$n_{PRB}$	22-27	10-15		
measure	PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	R.4TDD	-	
PDSCH a	allocation	$n_{PRB}$	13-36	7-17	-	
Reference channel of A.3.1.2.2	PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	R.1 TD	-	
A.3.2.2.1 A.3.2.2.9	OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD), A.3.2.2.9 (OP.9 TDD) and A.3.2.2.10 (OP.10 TDD)		OP.1 TDD	OP.9 TDD	OP.10 TDD	
lo <sup>Note2</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/9MHz	-90.26 -89.26 -88.26	N/A		
10	Bands TDD_A			-88.	67	
	Bands TDD_C	dBm/4.5MHz	N/A	-87.67		
	Bands TDD_E			-86.67		
Note 1:	This test verifies t					
Note 2:	of channel bandwidth and is performed according to the principle defined in section A.3.6.1.  ote 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves					
Note 3:	See Table A.9.2.6	6.2-1 for the other	er parame	ters		

#### A.9.2.22.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

# A.9.2.23 FDD RSRQ for E-UTRA Carrier Aggregation (5MHz + 5MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

## A.9.2.23.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.5.1.

## A.9.2.23.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.5.2 except that the values of the parameters in the Table A.9.2.23.2-1 will replace the values of the corresponding parameters in A.9.2.5.2-1.

Table A.9.2.23.2-1: FDD RSRQ Carrier Aggregation test parameters

			Test 1				
Pi	arameters	Units	Cell 1	Cell 2	Cell 3		
BW <sub>channel</sub>	Note 1 _CA	MHz	5	5	5		
Measure	ment bandwidth	$n_{PRB}$	10-15	10-15	10-15		
measure	PDSCH Reference measurement channel defined in A.3.1.1.1		R.5 FDD	R.5 FDD	N/A		
PDSCH a	allocation	$n_{PRB}$	7-17	7-17	-		
Reference channel of A.3.1.2.1	PCFICH/PHICH e measurement defined in		R.11 FDD	R.11 FDD	R.11 FDD		
A.3.2.1.1	atterns defined in 5 (OP.15 FDD) 2.1.16 (OP.16		OP.15 FDD	OP.15 FDD	OP.16 FDD		
	Bands FDD_A		-93.26	-88.67			
	Bands FDD_C		-92.26	-87.67			
lo <sup>Note2</sup>	Bands FDD_D Note 5	dBm/4.5MHz	-91.76	-87.17			
	Bands FDD_E, FDD_F Note 5		-91.26	-86.67			
	Bands FDD_G Note 5		-90.26	-85.67			
	Bands FDD_H Note 5		-89.76	-85.17			
Note 1:	This test verifies						
channel bandwidth and is performed according to the principle defined in section A.3.6.1.  Note 2: lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							
Note 3:	See Table A.9.2.5.2-1 for the other parameters						
Note 4:	E-UTRA operating band groups are as defined in Section 3.5.						
Note 5:	The test applies to group which are						

#### A.9.2.23.3 Test Requirements

The test requirements defined in section A.9.2.5.3 shall apply in this test case.

# A.9.2.24 TDD RSRQ for E-UTRA Carrier Aggregation (5MHz + 5MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

## A.9.2.24.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

## A.9.2.24.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.24.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.24.2-1: TDD RSRQ Carrier Aggregation test parameters

D-	Parameters		Test 1				
Pa			Cell 1	Cell 2	Cell 3		
BW <sub>channel_CA</sub> Note1		MHz	10	5	5		
Measuren	nent bandwidth	$n_{PRB}$	10-15	10-15	10-15		
PDSCH R measuren defined in	nent channel		R.4 TDD	R.4 TDD	N/A		
PDSCH a	llocation	$n_{PRB}$	7-17	7-17	N/A		
Reference	PDCCH/PCFICH/PHICH Reference measurement channel defined in		R.11 TDD	R.11 TDD	R.11 TDD		
OCNG Patterns defined in A.3.2.2.9 (OP.9 TDD) and A.3.2.2.10 (OP.10 TDD)			OP.9 TDD	OP.9 TDD	OP.10 TDD		
	Bands TDD_A Note 5		-93.26	-88	.67		
lo <sup>Note2</sup>	Bands TDD_C Note 5	dBm4.5MHz	-92.26	-87.67			
	Bands TDD_E Note 5		-91.26	-86.67			
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.  Note 2: Io levels have been derived from other parameters for							
information purposes. They are not settable parameters themselves.  Note 3: See Table A.9.2.6.2-1 for the other parameters					ers		
Note 4: Note 5:	E-UTRA operations. The test applies	ng band groups for E-UTRA ope	are as defi erating ban	ned in Sec ds in this b			
group which are supporting 5MHz + 5MHz channel bandwidth.							

#### A.9.2.24.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

# A.9.2.25 RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD

The test case in this section are applicable to TDD-FDD carrier aggregation capable UEs which have been configured with a downlink SCell.

#### A.9.2.25.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of RSRQ measurements for the primary component carrier defined in

clause 9.1.11.1, the absolute accuracy of RSRQ measurements for the secondary component carrier defined in clause 9.1.11.2, and also the relative RSRQ accuracy requirement between primary and secondary component carriers defined in clause 9.1.11.3.

### A.9.2.25.2 Test parameters

In this test case the PCell is FDD and SCell is TDD. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.25.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC). The SCC is configured and activated.

The parameters of this test are given in Table A.9.2.25.2-1.

Table A.9.2.25.2-1: RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD test parameters

Р	arameter	Unit	Cell 1	Cell 2
E-UTRA RF	Channel Number		1	2
BW <sub>channel</sub>			5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$
Special subt	frame n <sup>Note1</sup>		-	6
Uplink-down configuration	ılink		-	1
	nt bandwidth	$n_{{\scriptscriptstyle PRB}}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Ref measureme in A.3.1.1	erence nt channel defined		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD
PDSCH allo		$n_{{}_{PRB}}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
Reference n	FICH/PHICH neasurement ned in A.3.1.2		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
A.3.2	erns defined in		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RE	PSS_RA SSS_RA			
PDCCH_RB	PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA		0	0
OCNG_RA <sup>N</sup>	lote2			
	Bands TDD_A		-	-116
	Bands TDD_C	i	-	-115
	Bands TDD_E Bands FDD_A		- -119.5	-114
No. O	Bands FDD_A  Bands FDD_C		-118.5	-
$N_{oc}^{ m Note3}$	Bands FDD_D	dBm/15 kHz	-118	-
	Bands FDD_E, Bands FDD_F Note		-117.5	-
	Bands FDD_G		-116.5	-
$\hat{E}_s/N_{oc}$	Bands FDD_H	dB	-116 -6.0	-6.0
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{oc}}$				
L <sub>s</sub> /L <sub>ot</sub>	Rands TDD A	dB	-6.0	-6.0
	Bands TDD_A		-	-122
	Bands TDD_C		-	-121
RSRP <sup>Note4</sup>	Bands TDD_E	dBm/15 kHz	125 5	-120
	Bands FDD_A		-125.5	-
	Bands FDD_C		-124.5	-
	Bands FDD_D		-124	-

	Bands FDD_E, Bands FDD_F Note		-123.5	-	
	Bands FDD_G		-122.5	-	
	Bands FDD_H		-122	-	
	Bands TDD_A				
	Bands TDD_C		-	-17.77	
	Bands TDD_E				
	Bands FDD_A Bands FDD_C				
RSRQ <sup>Note4</sup>	Bands FDD_C Bands FDD_D	dB			
rioria	Bands FDD_E,	, ab			
	Bands FDD_F Note		-17.77	-	
	Bands FDD_G				
	Bands FDD_H				
	Bands TDD_A		-	-87.25 +	
		-		10log(N <sub>RB,</sub> /50) -86.25 +	
	Bands TDD_C		-	10log(N <sub>RB,c</sub> /50)	
	Bands TDD_E			-85.25 +	
	Danus IDD_E			•	10log(N <sub>RB,c</sub> /50)
	Bands FDD_A		-90.75 +	-	
			10log(N <sub>RB,</sub> √50) -89.75 +		
Io <sup>Note4</sup>	Bands FDD_C	dBm/BW <sub>channel</sub>	10log(N <sub>RB,o</sub> /50)	-	
	Bands FDD_D	. Griainio	-89.25 +		
			10log(N <sub>RB,c</sub> /50)	-	
	Bands FDD_E, Bands FDD_F Note		-88.75 +		
	Bands FDD_F		10log(N <sub>RB,0</sub> /50)	-	
	Davida EDD. O		-87.75 +		
	Bands FDD_G		10log(N <sub>RB,</sub> /50)	-	
	Bands FDD_H		-87.25 +	_	
			10log(N <sub>RB,o</sub> /50)	ANACON	
Propagation Condition			AWGN	AWGN	
	Antenna Configuration		1x2	1x2	
Timing offse		μs	-	0	
	ent error relative to		-	≤TAE	
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in					

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate

N

power for  $N_{oc}$  to be fulfilled.

Note 4: Es/lot, RSRP, RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.

Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 9: E-UTRA operating band groups are as defined in Section 3.5.

Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.9.2.25.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.A.9.2.26 RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD

The test case in this section are applicable to TDD-FDD carrier aggregation capable UEs which have been configured with a downlink SCell.

#### A.9.2.26.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD measurement accuracy in carrier aggregation is within the specified limits. This test will verify the absolute accuracy of RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of RSRQ measurements for the secondary component carrier defined in Clause 9.1.11.2, and also the relative RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

#### A.9.2.26.2 Test parameters

In this test case the PCell is TDD and SCell is FDD. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.26.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC). The SCC is configured and activated.

The parameters of this test are given in Table A.9.2.26.2-1.

Table A.9.2.26.2-1: RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD test parameters

Pa	arameter	Unit	Cell 1	Cell 2
E-UTRA RF	Channel Number		1	2
BW <sub>channel</sub>			5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$
Special subf configuration	Note1		6	-
Uplink-down configuration	link		1	-
Measuremei		$n_{PRB}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reformers measurement in A.3.1.1	erence nt channel defined		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD
PDSCH allo		$n_{PRB}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
	FICH/PHICH neasurement ned in A.3.1.2		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
A.3.2	erns defined in		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD
PBCH_RB PSS_RA SSS_RA	PSS_RA			
PHICH_RA PHICH_RB PDCCH_RA			0	0
PDSCH_RA PDSCH_RB	PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA <sup>Note2</sup>			
OCNG_KB	Bands TDD_A		-119.5	-
	Bands TDD_C	=	-118.5	-
	Bands TDD_E		-117.5	-
	Bands FDD_A		-	-116
$N_{oc}^{ m Note3}$	Bands FDD_C	dBm/15 kHz	-	-115
2 00	Bands FDD_D Bands FDD_E, Bands FDD_F Note 6		-	-114.5 -114
	Bands FDD_G Bands FDD H	-	-	-113 -112.5
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0
$\hat{E}_{s}/I_{ot}$		dB	-6.0	-6.0
.,	Bands TDD_A		-125.50	-
	Bands TDD_C	1	-124.50	-
Note 4	Bands TDD_E	1	-123.50	-
RSRP <sup>Note4</sup>	Bands FDD_A	dBm/15 kHz	-	-122
	Bands FDD_C	1	-	-121
	Bands FDD_D	1	-	-120.5

	Bands FDD_E, Bands FDD_F Note 6		-	-120
	Bands FDD_G		-	-119
	Bands FDD_H		-	-118.5
	Bands TDD_A			
	Bands TDD_C		-17.77	-
	Bands TDD_E			
	Bands FDD_A			
	Bands FDD_C			
RSRQ <sup>Note4</sup>	Bands FDD_D	dB		
	Bands FDD_E, Bands FDD_F Note 6		-	-17.77
	Bands FDD_G	-		
	Bands FDD_H	-		
	Bands TDD_A		-90.75 +	
	Dallus IDD_A		10log(N <sub>RB,c</sub> /50)	•
	Bands TDD_C		-89.75 +	_
	Darius TDD_C	_	10log(N <sub>RB,c</sub> /50)	
	Bands TDD_E		-88.75 +	_
	Bando 188_E		10log(N <sub>RB,c</sub> /50)	
	Bands FDD_A		-	-87.25 +
				10log(N <sub>RB,c</sub> /50)
Io <sup>Note4</sup>	Bands FDD_C	ID /DVA/	-	-86.25 +
10	_	dBm/BW <sub>channel</sub>		10log(N <sub>RB,c</sub> /50)
	Bands FDD_D		-	-85.75 +
		-		10log(N <sub>RB,c</sub> /50)
	Bands FDD_E, Bands FDD_F		_	-85.25 +
	Note 6		-	10log(N <sub>RB,c</sub> /50)
		1		-84.25 +
	Bands FDD_G		-	10log(N <sub>RB,c</sub> /50)
		-		-83.75 +
	Bands FDD_H		-	10log(N <sub>RB,c</sub> /50)
Propagation	Propagation Condition		AWGN	AWGN
Antenna Co	nfiguration		1x2	1x2
Timing offse	t to Cell 1	μs	-	0
Time alignm cell 1 Note 10	ent error relative to		-	≤TAE
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in				

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate

power for  $N_{oc}$  to be fulfilled.

Note 4: Es/lot, RSRP, RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.

Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 9: E-UTRA operating band groups are as defined in Section 3.5.

Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

## A.9.2.26.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in section 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.2.27 TDD RSRQ for E-UTRAN Carrier Aggregation for 20MHz+10MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

#### A.9.2.27.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

#### A.9.2.27.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.27.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.27.2-1: TDD RSRQ Carrier Aggregation test parameters

	Barranatana		Test 1				
Pa	rameters	Units	Cell 1	Cell 2	Cell 3		
BW <sub>channel_C</sub>	Note1 A	MHz	20	1	0		
Measurem	ent bandwidth	$n_{\scriptscriptstyle PRB}$	47-52	22	-27		
PDSCH Remeasurem	ent channel		R.3 TDD	R.0 TDD	-		
PDSCH all	ocation	$n_{\scriptscriptstyle PRB}$	38-61	13-36	-		
Reference	CFICH/PHICH measurement fined in A.3.1.2.2		R.10 TDD	R.6	TDD		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD), A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.7 TDD	OP.1 TDD	OP.2 TDD		
	Bands TDD_A	ID (4004)	-87.26	N/A			
	Bands TDD_C	dBm/18MHz	-86.26	IN.	/A		
Io <sup>Note2</sup>	Bands TDD_E		-85.26				
	Bands TDD_A			-85	5.67		
	Bands TDD_C	dBm/9MHz	N/A	-84	.67		
	Bands TDD_E			-83	3.67		
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.  Note 2: lo levels have been derived from other parameters for information							
purposes. They are not settable parameters themselves  Note 3: See Table A.9.2.6.2-1 for the other parameters							

#### A.9.2.27.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

# A.9.2.28 FDD intra-frequency absolute RSRQ accuracy with CRS based discovery signal

#### A.9.2.28.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.14.4.

#### A.9.2.28.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement for Cell 2 is tested by using the parameters in Table A.9.2.28.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.28.2-1: RSRQ FDD Intra frequency test parameters

	Parameter		Tes	et 1
	Farameter	Unit	Cell 1	Cell 2
E-UTRA RF C	Channel Number		1	1
BW <sub>channel</sub>		MHz	1	0
Measurement	bandwidth	$n_{PRB}$	22—27	
DMTC period		ms	N/A	160
DMTC period	offset	ms	N/A	100
	nal occasion duration	ms	N/A	1
Time offset be	etween cell 1 and cell 2	μs	0	2.3
	rence measurement channel defined in		R.0	-
A.3.1.1.1			FDD	
PDSCH alloca	ation	$n_{\it PRB}$	13—36	-
	CH/PHICH Reference measurement		R.6	FDD
	ed in A.3.1.2.1			Ī
	ns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	OP.2 FDD
and A.3.2.1.2 PBCH RA	(OP.2 FDD)		FDD	FDD
PBCH_RA				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB		dB	0	0
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB OCNG_RA <sup>Not</sup>	e1			
OCNG_RA	e1			
$N_{oc}^{ m Note2}$	Bands FDD_A		-1	16
	Bands FDD_C		-1	15
	Bands FDD_D	dBm/15 kHz	-11	4.5
	Bands FDD_E, FDD_F Note 5			14
	Bands FDD_G Note 7			13
^ /	Bands FDD_H		-11	2.5
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	-5.46	-5.46
RSRP <sup>Note3</sup>	Bands FDD_A		-120	-120
	Bands FDD_C		-119	-119
	Bands FDD_D	dBm/15 kHz	-118.5	-118.5
	Bands FDD_E, FDD_F Note 5	abili, 15 ki iz	-118	-118
	Bands FDD_G Note 7		-117	-117
RSRQ <sup>Note3</sup>	Bands FDD_H		-116.5	-116.5
KOKU	Bands FDD_A Bands FDD_C			
	Bands FDD_C Bands FDD_D			
	Bands FDD_B, FDD_F Note 5	dB	-17.34	-17.34
	Bands FDD_G Note 7			
	Bands FDD_H			
Io <sup>Note3</sup>	Bands FDD_A		-85	.67
	Bands FDD_C		-84	.67
	Bands FDD_D	dBm/9 MHz		.17
	Bands FDD_E, FDD_F Note 5	GDIII/O IVII IZ		.67
Bands FDD_G Note 7				.67
<u>^</u> /	Bands FDD_H		-82	.17
$\hat{E}_s/N_{oc}$		dB	-4	-4
Propagation of	condition		AW	GN
Note 1: OC	NG shall be used such that both cells are			ant total
	nsmitted power spectral density is achiev			
Note 2: Inte	erference from other cells and noise sour	ces not specified	in the test	IS

	assumed to be constant over subcarriers and time and shall be modelled as
	AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	RSRQ, RSRP and lo levels have been derived from other parameters for
	information purposes. They are not settable parameters themselves.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent
	interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the
	assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

#### A.9.2.28.3 Test Requirements

The absolute accuracy of RSRQ intra frequency measurement for Cell 2 shall fulfil the requirements in Clause 9.1.14.4.

# A.9.2.29 TDD intra-frequency absolute RSRQ accuracy with CRS based discovery signal

#### A.9.2.29.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.14.4.

#### A.9.2.29.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement for Cell 2 is tested by using the parameters in Table A.9.2.29.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.29.2-1: RSRQ TDD Intra frequency test parameters

Table A.9.2.	29.2-1: RSRQ TDD Intra	a trequency	test pa	rameters
	Parameter	Unit	Cell 1	est 1 Cell 2
	Channel Number	NAL I-		1
BW <sub>channel</sub>	ma configuration Note1	MHz		10
I Inlink-downling	nme configuration <sup>Note1</sup>	+	6 1	
Measurement	bandwidth	$n_{PRB}$	22	<u>—27</u>
DMTC period		ms	N/A	160
DMTC period		ms	N/A	10
	nal occasion duration	ms	N/A	2
	etween cell 1 and cell 2	μS	0	2.3
	ence measurement ed in A.3.1.1.2		R.0 TDD	-
			13—36	
PDSCH alloca		$n_{PRB}$	13—36	-
	CH/PHICH Reference		Б.	
Measurement	channel defined in		R.6	S TDD
	defined in A.3.2.2.1 (OP.1	+	OP.1	OP.2
	.2.2 (OP.2 TDD)		TDD	TDD
PBCH_RA	·			
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA			_	0
PHICH_RB		dB	0	
PDCCH_RA		_		
PDCCH_RB PDSCH_RA		-		
PDSCH_RB		-		
OCNG_RA <sup>Note</sup>	e1	-		
OCNG_RB <sup>Note</sup>	91	_		
	Bands FDD_A		_	116
$N_{oc}^{ m Note2}$	Bands FDD_C	dBm/15		115
	Bands FDD_E	kHz	-114	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	_	dB	-5.46	-5.46
$\mathbf{L}_{s}/\mathbf{I}_{ot}$	T =	ив		
N o	Bands FDD_A	dBm/15	-120	-120
RSRP <sup>Note3</sup>	Bands FDD_C	kHz	-119	-119
	Bands FDD_E		-118	-118
	Bands FDD_A			
RSRQ <sup>Note3</sup>	Bands FDD_C	dB	-17.34	-17.34
	Bands FDD_E			
Net 2	Bands FDD_A	dBm/9		5.67
Io <sup>Note3</sup>	Bands FDD_C	MHz		4.67
	Bands FDD_E		-8	3.67
$\hat{E}_s/N_{oc}$		dB	-4	-4
Propagation of	_	Δ\/	VGN	
Note 1: For special subframe and uplink-downlink configuration				
	oles 4.2-1 and 4.2-2 in TS 3			
Note 2: OC	NG shall be used such that	both cells a	re fully allo	ocated
	d a constant total transmitte		ctral densi	ity is
achieved for all OFDM symbols.  Note 3: Interference from other cells and noise sources not sp				
	test is assumed to be cons			
	d shall be modelled as AWG	σιν οι αμμιορ	nate powe	51 101
$N_{c}$	$_{oc}$ to be fulfilled.			
	RQ, RSRP and lo levels ha			
	ameters for information pur	poses. They	are not se	ettable
	ameters themselves.	a!ua		ا
Note 5: RSRP and RSRQ minimum requirements are specified				

	assuming independent interference and noise at each receiver
	antenna port.
Note 6:	F-UTRA operating band groups are as defined in Section 3.5

#### A.9.2.29.3 Test Requirements

The absolute accuracy of RSRQ intra frequency measurement for Cell 2 shall fulfil the requirements in Clause 9.1.14.4.

# A.9.2.30 FDD-FDD inter-frequency absolute and relative RSRQ accuracies with CRS based discovery signal

#### A.9.2.30.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute and relative accuracy of RSRQ measurement in discovery signal occasions is within the specified limits. This test will verify the requirements in Sections 9.1.14.4.

#### A.9.2.30.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.30.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell. For measurement of the carrier frequency of Cell 2, DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.30.2-1: RSRQ in discovery signal occasions FDD—FDD Inter frequency test parameters

D		1124	Tes	st 1
Par	ameter	Unit	Cell 1	Cell 2
E-UTRA RF Chann	iel Number		1	2
BW <sub>channel</sub>		MHz	10	10
Gap Pattern Id			0	-
Gap Offset		ms	9	-
DMTC period		ms	-	160
DMTC period offse	t	ms	-	10
Discovery signal or	casion duration	ms	-	1
Time offset betwee	n cell 2 and cell 1	μs	(	3
Measurement band	dwidth	$n_{PRB}$	22	-27
PDSCH Reference	measurement	TAB	D 0 EDD	
channel defined in	A.3.1.1.1		R.0 FDD	-
PDSCH allocation		$n_{PRB}$	13-36	-
PDCCH/PCFICH/P	HICH Reference	FRD		
measurement char			R.6	FDD
A.3.1.2.1				
OCNG Patterns de	fined in A.3.2.1.1		0D 4 EDD	00.0 500
(OP.1 FDD) and A.	3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA				
PBCH_RB		]		
PSS_RA		j		
SSS_RA		]		
PCFICH_RB				
PHICH_RA				
PHICH_RB		dB	0	0
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note1</sup>				
OCNG_RB <sup>Note1</sup>				
	Bands FDD_A	]	-117.5	-117.5
	Bands FDD_C	_	-116.5	-116.5
$N_{_{OC}}^{\mathrm{Note2}}$	Bands FDD_D	dBm/15	-117	-117
oc	Bands FDD_E,	kHz	-115.5	-115.5
	FDD_F Note 5	-		444.5
	Bands FDD_G Note 7		-114.5	-114.5
<u> </u>	Bands FDD_H		-114	-114
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	-6	-6
07 00	Bands FDD_A		-123.5	-123.5
	Bands FDD_C	1	-122.5	-123.5
	Bands FDD_D	1 <u>.</u> , }	-122	-122
RSRP <sup>Note3</sup>	Rande EDD E	dBm/15		
=	FDD_F Note 5	kHz	-121.5	-121.5
	Bands FDD_G Note 7	1 l	-120.5	-120.5
	Bands FDD_H	1	-120	-120
	Bands FDD_A			
	Bands FDD_C	]		
	Bands FDD_D	]		
RSRQ <sup>Note3</sup>	Bands FDD_E,	dB	-17.77	-17.77
	FDD_F Note 5	]		
	Bands FDD_G Note /	<u> </u>		
	Bands FDD_H			
	Bands FDD_A	1 1	-88.75	-88.75
	Bands FDD_C	] [	-87.75	-87.75
Note2	Bands FDD_D	dBm/ 9	-87.25	-87.25
Io <sup>Note3</sup>	Bands FDD_E,	MHz	-86.75	-86.75
	FDD_F Note 5	1711 12		.00.73
	Bands FDD_G Note 7	<u> </u>	-85.75	-85.75
	Bands FDD_H		-85.25	-85.25
$\hat{E}_s/N_{oc}$		dB	-6	-6
S I OC		ı		l

Propagat	ion condition	-	AWGN		
Note 1:	OCNG shall be used such that b	ooth cells are	fully allocated and a constant total		
	transmitted power spectral dens	ity is achieve	d for all OFDM symbols.		
Note 2:	Interference from other cells and				
	assumed to be constant over su	bcarriers and	I time and shall be modelled as		
	AWGN of appropriate power for	$N_{oc}$ to be full	filled.		
Note 3:	RSRQ, RSRP and lo levels have been derived from other parameters for				
	information purposes. They are not settable parameters themselves.				
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent				
	interference and noise at each receiver antenna port.				
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the				
	assigned E-UTRA channel bandwidth within 865-894 MHz.				
Note 6:	E-UTRA operating band groups	are as define	ed in Section 3.5.		
Note 7:	Except Band 29 and Band 32.				

### A.9.2.30.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.14.4.

# A.9.2.31 TDD-TDD inter-frequency absolute and relative RSRQ accuracies with CRS based discovery signal

### A.9.2.31.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy in discovery signal occasions is within the specified limits. This test will verify the requirements in Sections 9.1.14.4.

# A.9.2.31.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.31.2-1 for TDD configuration 1. In all tests, Cell 1 is the PCell and Cell 2 the target cell. DMTC configuration for Cell 2 is provided to UE in the *measDS-Config* before the start of the test.

Table A 9.2.31.2-1: RSRQ TDD—TDD Inter frequency test parameters for TDD configuration 1

Parameter		l lm!4	Test 1	
		Unit	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
BW <sub>channel</sub>		MHz	10	10
Gap Pattern Id			0	-
Gap Offset		mo	9	160
DMTC period DMTC period offse	at	ms ms	-	160 10
Discovery signal of		ms	-	2
Time offset between		μs	0	3
Special subframe of	configuration Note1	μο	(	5
Uplink-downlink co	onfiguration Note1		,	1
Measurement band		$n_{{\it PRB}}$	22-27	
PDSCH Reference defined in A.3.1.1.2	e measurement channel 2		R.0 TDD	-
PDSCH allocation		$n_{\it PRB}$	13—36	-
	nnel defined in A.3.1.2.2		R.6	TDD
OCNG Patterns de TDD) and A.3.2.2.2	efined in A.3.2.2.1 (OP.1 2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDSCH_RA		dB	0	0
OCNG_RA <sup>Note2</sup> OCNG_RB <sup>Note2</sup>	PDSCH_RB OCNG_RA <sup>Note2</sup> OCNG_RB <sup>Note2</sup>			
λι Note3	Bands TDD_A		-117.50	-117.50
$N_{oc}^{ m Note3}$	Bands TDD_C	dBm/15 kHz	-116.50	-116.50
	Bands TDD_E		-115.50	-115.50
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	-6.0	-6.0
	Bands TDD_A		-123.50	-123.50
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-122.50	-122.50
	Bands TDD_E		-121.50	-121.50
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-17.77	-17.77
	Bands TDD_A		-88.75	-88.75
Io <sup>Note4</sup> Bands TDD_C		dBm/9 MHz	-87.75	-87.75
	Bands TDD_E		-86.75	-86.75
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0
Propagation condit		-	AW	
Note 1: For spe	Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and			

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as

AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP minimum requirements are specified assuming independent

interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.2.31.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.14.4.

# A.9.2.32 FDD absolute and relative RSRQ accuracy for E-UTRAN Carrier Aggregation in CRS based discovery signal

#### A.9.2.32.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRQ measurement accuracy for carrier aggregation in CRS based discovery signal is within the specified limits under AWGN propagation conditions. This test will verify the absolute and relative accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.15.1.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.15.1.3.

## A.9.2.32.2 Test parameters

In this test case the PCell and the SCell are on different carrier frequencies. There are three cells used in this test case. RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.32.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC) and Cell 3 is the neighbouring cell on the SCC. Cell 2 on SCC is configured and activated. Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.32.2-1: FDD RSRQ Carrier Aggregation Test Parameters

Test 1					
Parameters		Units	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	2
BW <sub>channel_CA</sub>		MHz	10	10	10
DMTC period			N/A	N/A	160
DMTC period offset			N/A	N/A	10
Discovery signal occasion duration		_	N/A	N/A	3
Timeing offset to Cell	1	μs	-	0 < Time	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Measurement bandwid	dth	$n_{PRB}$	22—27	22—27	22—27
PDSCH Reference me defined in A.3.1.1.1	easurement channel		R.0 FDD	R.0 FDD	-
PDSCH allocation		$n_{PRB}$	13—36	13—36	-
PDCCH/PCFICH/PHIC measurement channe			R.6 FDD	R.6FDD	R.6 FDD
OCNG Patterns define FDD) and A.3.2.1.2 (C			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	71.2100)		100	100	100
PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB OCNG_RB		dΒ	0	0	0
	Bands FDD_A		-119.5	-116	-116
	Bands FDD_C		-118.5	-115	-115
$N_{oc}^{ m Note2}$	Bands FDD_D	dBm/15	-118	-114.5	-114.5
oc	Bands FDD_E, FDD_F Note 6	kHz	-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$		dB	-4.0	-5.46	-5.46
	Bands FDD_A		-123.5	-120	-120
	Bands FDD_C		-122.5	-119	-119
D C D D Noto?	Bands FDD_D	dBm/15	-122	-118.5	-118.5
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 6	kHz	-121.5	-118	-118
	Bands FDD_G		-120.5	-117	-117
	Bands FDD_H		-120.5	-116.5	-116.5
RSRQ <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G	dB	-16.25	-17.34	-17.34
Bands FDD_H		ID /2	60.55	0= 0=	0= ==
lo <sup>Note3</sup>	Bands FDD_A	dBm/9	-90.26	-85.67	-85.67

	Bands FDD_C	MHz	-89.26	-84.67	-84.67
Bands FDD_D			-88.76	-84.17	-84.17
Bands FDD_E, FDD_F Note 6			-88.26	-83.67	-83.67
	Bands FDD_G		-87.26	-82.67	-82.67
	Bands FDD_H		-86.76	-82.17	-82.17
$\hat{E}_s/N_{oc}$	$\hat{E}_s/N_{oc}$		-4.0	-4.0	-4.0
Propagation	on condition	-		AWGN	
Note 1:	OCNG shall be used such that both	n cells are full	y allocated a	nd a constan	t total
	transmitted power spectral density				
Note 2:	Note 2: Interference from other cells and noise sources not specified in the test is assumed			assumed to	
	be constant over subcarriers and time and shall be modelled as AWGN of				
	. N				
	appropriate power for $^{N_{oc}}$ to be fulfilled.				
Note 3:	Note 3: RSRQ, RSRP and lo levels have been derived from other parameters for information				
	purposes. They are not settable parameters themselves.				
Note 4:	Note 4: RSRP and RSRQ minimum requirements are specified assuming independent				dent
	interference and noise at each receiver antenna port.				
Note 5:	Note 5: The selection of the bands for testing depends on the configuration of the carrier				
	aggregation supported by the UEs				
Note 6:	3				
	E-UTRA channel bandwidth within 865-894 MHz.				
Note 7:	Note 7: This test verifies the RRM requirement which is independent of channel bandwidth			andwidth	
	and is performed according to the principle defined in section A.3.6.1.				
Note 8:	Note 8: E-UTRA operating band groups are as defined in Section 3.5.				

#### A.9.2.32.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.15.1.1, 9.1.15.1.2, and 9.1.15.1.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.2.
- The relative accuracy of inter-frequency RSRQ measurements between Cell 1 on primary component carriers and Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.3.

# A.9.2.33 TDD absolute and relative RSRQ accuracy for E-UTRAN Carrier Aggregation in CRS based discovery signal

## A.9.2.33.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRQ measurement accuracy for carrier aggregation in CRS based discovery signal is within the specified limits under AWGN propagation conditions. This test will verify the absolute and relative accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.15.1.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.15.1.3.

#### A.9.2.33.2 Test parameters

In this test case the PCell and the SCell are on different carrier frequencies. There are three cells used in this test case. RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.33.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC) and Cell 3 is the neighbouring cell on the SCC. Cell 2 on SCC is configured and activated. Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.33.2-1: TDD RSRQ Carrier Aggregation Test Parameters

Parameter		Unit	Test 1			
		- Onne	Cell 1	Cell 2	Cell 3	
E-UTRA RF Channel Number		MHz	1	10		
BW <sub>channel</sub> DMTC period		IVII IZ	N/A	10 N/A 160		
DMTC period offset			N/A	N/A	10	
Discovery signal of			N/A	N/A	2	
Timing offset to ce		μs	-	0	3	
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-	
Special subframe Uplink-downlink c	configuration Note1			6		
Measurement bar		$n_{PRB}$		1 22—27		
PDSCH Reference		FIND	R.0 TDD	R.0 TDD	-	
PDSCH allocation	-	$n_{PRB}$	13—36	13—36	-	
PDCCH/PCFICH/	PHICH Reference	PKD			_	
measurement cha			R.6 TDD	R.6 TDD	R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.1 TDD	OP.2 TDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RA PDSCH_RA PDSCH_RA PDSCH_RB OCNG_RA OCNG_RB OCNG_RB POCNG_RB		dB	0	0	0	
$N_{oc\ { m Note3}}$	Bands TDD_A		-119.5	-116		
00	Bands TDD_C	dBm/15 kHz	-118.5	-115		
<b>↑</b> /•	Bands TDD_E		-117.5	-114		
$\hat{E}_{s}/I_{ot}$		dB	-4.0	-5.46	-5.46	
Note 4	Bands TDD_A	ļ	-123.50	-120	-120	
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-122.50	-119	-119	
	Bands TDD_E		-121.50	-118	-118	
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-16.25	-17.34		
	Bands TDD_A		-90.26	-85.67		
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-89.26	-84.67		
	Bands TDD_E		-88.26	-83.67		
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0	
Propagation condition		-		AWGN		

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled
	N
	as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 4:	RSRQ, RSRP and lo levels have been derived from other parameters for
	information purposes. They are not settable parameters themselves.
Note 5:	RSRP and RSRQ minimum requirements are specified assuming
	independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the
	carrier aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel
	bandwidth and is performed according to the principle defined in section
	A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

## A.9.2.33.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.15.1.1, 9.1.15.1.2, and 9.1.15.1.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.2.
- The relative accuracy of inter-frequency RSRQ measurements between Cell 1 on primary component carriers and Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.3.

# A.9.2.34 FDD—FDD Inter frequency new RSRQ

#### A.9.2.34.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Sections 9.1.16.

#### A.9.2.34.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. The new RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.34.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.34.2-1: New RSRQ FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	
E-UTRA RF Channel Number			1	2	
BW <sub>channel</sub>		MHz	10	10	
Gap Pattern Id			0	-	
Antenna Configuration			1x2	1x2	
Time offset between		μS		3	
Measurement ban		$n_{\scriptscriptstyle PRB}$	22.	-27 I	
PDSCH Reference channel defined in			R.0 FDD	-	
PDSCH allocation	Λ.3.1.1.1	n	_	_	
PDCCH/PCFICH/F	DUICH Poteronee	$n_{PRB}$	-	-	
measurement cha			R.6 FDD	_	
A.3.1.2.1	illioi delliled III		14.0100		
OCNG Patterns de	efined in A.3.2.1.1		00.4.500		
(OP.1 FDD)			OP.1 FDD	-	
PBCH_RA				0	
PBCH_RB				0	
PSS_RA				0	
SSS_RA				0	
PCFICH_RB				-∞	
PHICH_RA		ID.		-∞	
PHICH_RB		dB	0	-∞	
PDCCH_RA PDCCH_RB				-∞	
PDSCH RA					
PDSCH_RB				-∞	
OCNG_RA <sup>Note1</sup>			ŀ	-∞	
OCNG_RB <sup>Note1</sup>				_∞	
<del>-</del>	Symbols with CRS,	dBm/15 kHz	102.05	102.05	
$I_{ot}^{ m Note2}$	PSS, SSS or PBCH		-103.85	-103.85	
	All the other		-94.75	-94.75	
	symbols				
${ m \hat{E}}_{ m s}/{ m I}_{ m ot}$		dB	-3	-3	
RSRP <sup>Note3</sup>		dBm/15 kHz	-106.85	-106.85	
	Subframe 0	IXI IZ	-14.54	-14.54	
RSRQ <sup>Note3</sup>	Subframes other	dB	-14.14	-14.14	
	than 0				
	Subframe 0	dB	-19.57	-19.57	
New RSRQ <sup>Note3</sup>	Subframe 5		-20.93	-20.93	
non none	Subframe other than 0 or 5		-21.66	-21.66	
	Symbol 0/4/11		-75.72	-75.72	
lo in subframe	Symbol 1/2/3/12/13	dBm/9	-66.97	-66.97	
0 <sup>Note3</sup>	Symbol 5/6/8/9/10	MHz	-75.81	-75.81	
	Symbol 7		-75.52	-75.52	
	Symbol 0/4/7/11	dBm/ 9 MHz	-75.72	-75.72	
lo in subframe 5 <sup>Note3</sup>	Symbol 1/2/3/8/9/10/12/13		-66.97	-66.97	
J	Symbol 5/6		-75.81	-75.81	
Symbol 0/4/7/11			-75.72	-75.72	
lo in subframes	Symbol	dBm/9	10.12	10.12	
other than 0 or 5	1/2/3/5/6/8/9/10/12/	MHz	-66.97	-66.97	
Dran a matter "	13		A14	ICN	
Propagation condi	tion shall be used such that b			'GN	

OCNG shall be used such that both cells are fully allocated and a constant total Note 1: transmitted power spectral density is achieved for all OFDM symbols. Interference from other cells and noise sources not specified in the test is

Note 2: assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $^{N_{oc}}$  to be fulfilled. RSRQ, RSRP, new RSRQ and lo levels have been derived from other

parameters for information purposes. They are not settable parameters themselves. The new RSRQ values assume RSSI averaging over all OFDM symbols of the subframe.

RSRP and RSRQ minimum requirements are specified assuming independent

Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

# A.9.2.34.3 Test Requirements

The new RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.16, compared with any nominal new RSRQ value in subframe 0, 5 or others.

# A.9.2.35 TDD—TDD Inter frequency new RSRQ

#### A.9.2.35.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Sections 9.1.16.

## A.9.2.35.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. The new RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.35.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.35.2-1: New RSRQ TDD—TDD Inter frequency test parameters

-		11.74	Tes	st 1
Para	ameter	Unit	Cell 1	Cell 2
E-UTRA RF Chann	el Number		1	2
BW <sub>channel</sub>	r . Note1	MHz	10	10
Special subframe of Uplink-downlink co	onfiguration Note1		6	6
Gap Pattern Id	ntiguration		<u>1</u> 0	1
Antenna Configura	tion		1x2	1x2
Time offset betwee		μs		3
Measurement band		$n_{PRB}$		-27
PDSCH Reference		TRB	D A TDD	
channel defined in	A.3.1.1.2		R.0 TDD	-
PDSCH allocation		$n_{_{PRB}}$	-	-
PDCCH/PCFICH/P	HICH Reference			
measurement char	nel defined in		R.6 TDD	-
A.3.1.2.2				
OCNG Patterns de	fined in A.3.2.2.1		OP.1 TDD	-
(OP.1 TDD) PBCH RA				0
PBCH_RB				0
PSS_RA				0
SSS_RA				0
PCFICH_RB				-∞
PHICH_RA				-∞
PHICH_RB		dB	0	-∞
PDCCH_RA				-∞
PDCCH_RB				-∞
PDSCH_RA PDSCH_RB				-∞
OCNG_RA <sup>Note1</sup>				-∞
OCNG_RB <sup>Note1</sup>				-∞
_	Symbols with CRS,		100.05	
$I_{ot}^{ m Note2}$	PSS, SSS or PBCH	dBm/15	-103.85	-103.85
	All the other	kHz	-94.75	-94.75
• /	symbols		01.70	0 1.7 0
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-3	-3
RSRP <sup>Note3</sup>		dBm/15	-106.85	-106.85
	Subframe 0	kHz	-14.54	-14.54
RSRQ <sup>Note3</sup>	Subframes other	dB	-14.14	-14.14
	than 0 Subframe 0		-20.08	-20.08
	Subframe 5		-21.31	-21.31
New RSRQ <sup>Note3</sup>	Subframe 1 or 6	dB	-20.82	-20.82
	Subframe other than 0, 1, 5 or 6		-21.66	-21.66
	Symbol 0/4/11		-75.72	-75.72
lo in subframe	Symbol 1/2/3/5/6/12	dBm/ 9	-66.97	-66.97
0 <sup>Note3</sup>	Symbol 8/9/10/13	MHz	-75.81	-75.81
Ĭ	Symbol 7		-75.52	-75.52
Symbol 7 Symbol 0/4/7/11			-75.52 -75.72	-75.72
lo in subframe	Symbol	dBm/ 9		
5 <sup>Note3</sup>	1/2/3/5/6/8/9/10/12	MHz	-66.97	-66.97
	Symbol 13		-75.81	-75.81
lo in subframe 1	Symbol 0/4/7	dBm/ 9	-75.72	-75.72
or 6 <sup>Note3</sup>	Symbol 1/3/5/6/8 Symbol 2	MHz	-66.97 -75.81	-66.97 -75.81
	Symbol 0/4/7/11		-75.72	-75.72
lo in subframes other than 0, 1, 5 or 6 Note3	Symbol 1/2/3/5/6/8/9/10/12/ 13	dBm/ 9 MHz	-66.97	-66.97
Propagation condit	_	-	AW	'GN

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as
Note 4:	AWGN of appropriate power for $N_{oc}$ to be fulfilled. RSRQ, RSRP, new RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The new RSRQ values assume RSSI averaging over all OFDM
Note 5:	symbols of the subframe. RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

## A.9.2.35.3 Test Requirements

The new RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.16, compared with any nominal new RSRQ value in subframe 0, 5, 1, 6 or others.

# A.9.2.36 FDD—FDD Inter frequency RSRQ measured on all OFDM symbols

## A.9.2.36.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Section 9.1.16.

A.9.2.3 is also conducted even if UE is capable of measuring RSRQ on all OFDM symbols.

## A.9.2.36.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ measured on all OFDM symbols inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.36.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.36.2-1: FDD—FDD Inter frequency test parameters

Parameter	Unit	Test 1			
	Onit	Cell 1	Cell 2		
E-UTRA RF Channel Number		1	2		
BW <sub>channel</sub>	MHz	10	10		
Gap Pattern Id		0	- 4.0		
Antenna Configuration Time offset between cell 2 and cell 1		1x2	1x2		
Measurement bandwidth	μs	22-			
PDSCH Reference measurement	$n_{PRB}$	22.	-21		
channel defined in A.3.1.1.1		R.0 FDD	-		
PDSCH allocation	$n_{PRB}$	13—36	-		
PDCCH/PCFICH/PHICH Reference	FRD				
measurement channel defined in		R.6	FDD		
A.3.1.2.1					
OCNG Patterns defined in A.3.2.1.1		OP.1 FDD	OP.2 FDD		
(OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)		01.11.22	01.21.22		
PBCH_RA PBCH_RB	-				
PSS_RA	<u> </u>				
SSS_RA					
PCFICH RB					
PHICH_RA					
PHICH_RB	dB	0	0		
PDCCH_RA					
PDCCH_RB	ļ				
PDSCH_RA					
PDSCH_RB OCNG_RA <sup>Note1</sup>					
OCNG_RA OCNG_RB <sup>Note1</sup>	-				
OCNG_RB					
$N_{oc}^{$	dBm/15	-80	-80		
- · oc	kHz				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	-1.75	-1.75		
RSRP <sup>Note3</sup>	dBm/15 kHz	-81.75	-81.75		
RSRQ <sup>Note3</sup>		44.70	44.70		
RSRQ	dB	-14.76	-14.76		
	dBm/ 9				
Io <sup>Note3</sup>	MHz	-50	-50		
fi /N	dBm/ 9				
$\hat{E}_s/N_{oc}$	MHz	-1.75	-1.75		
Dropogotion condition		A1A/	CN		
Propagation condition - AWGN  Note 1: OCNG shall be used such that both cells are fully allocated and a constant					
transmitted power spectral dens					
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as					
AWGN of appropriate power for $N_{oc}$ to be fulfilled. Note 3: RSRP, RSRQ and lo levels have been derived from other parameters for					
information purposes. They are					
	values assume RSSI averaging over all OFDM symbols of the subframe.				
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent					
interference and noise at each receiver antenna port.					

# A.9.2.36.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.16.

# A.9.2.37 TDD—TDD Inter frequency RSRQ measurement on all OFDM symbols

# A.9.2.37.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Section 9.1.16.

A.9.2.4 is also conducted even if UE is capable of measuring RSRQ on all OFDM symbols..

## A.9.2.37.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ measured on all OFDM symbols inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.37.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.37.2-1: TDD-TDD Inter frequency test parameters

Parameter	Unit	Test 1			
	Offic	Cell 1	Cell 2		
E-UTRA RF Channel Number		1	2		
BW <sub>channel</sub>	MHz	10	10		
Special subframe configuration Note1		6	6		
Uplink-downlink configuration Note1		1	1		
Gap Pattern Id		0	-		
Antenna Configuration		1x2	1x2		
Time offset between cell 2 and cell 1	μs	3			
Measurement bandwidth	$n_{\it PRB}$	22-	-27		
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	-		
PDSCH allocation	$n_{PRB}$	13—36	-		
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2	TNB	R.6	TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	OP.2 TDD		
PBCH_RA	1				
PBCH_RB	1				
PSS_RA	<u> </u>				
SSS_RA	1				
PCFICH_RB	1				
PHICH_RA					
PHICH_RB	dB	0	0		
PDCCH_RA	_				
PDCCH_RB	1				
PDSCH_RA PDSCH_RB	4				
OCNG_RA <sup>Note1</sup>	4				
OCNG_RA OCNG_RB <sup>Note1</sup>	1				
$N_{oc}^{ m Note2}$	dBm/15 kHz	-80	-80		
$\hat{E}_{s}/I_{ot}$	dB	-1.75	-1.75		
RSRP <sup>Note3</sup>	dBm/15 kHz	-81.75	-81.75		
RSRQ <sup>Note3</sup>	dB	-14.76	-14.76		
Io <sup>Note3</sup>	dBm/ 9 MHz	-50	-50		
$\hat{E}_s/N_{oc}$	dBm/ 9 MHz	-1.75	-1.75		
Propagation condition	-	AW	GN		
Note 1: For special subframe and uplink 4.2-2 in TS 36.211.	k-downlink co	nfigurations see Ta	bles 4.2-1 and		
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.					
Note 3: Interference from other cells an assumed to be constant over su	3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as				
Note 4: RSRP, RSRQ and lo levels hav information purposes. They are	AWGN of appropriate power for $N_{oc}$ to be fulfilled. RSRP, RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The RSRQ				
information purposes. They are not settable parameters themselves. The RSRQ values assume RSSI averaging over all OFDM symbols of the subframe.  Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.					

# A.9.2.37.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.16.

# A.9.2.38 3 DL PCell in FDD RSRQ for E-UTRAN in Carrier Aggregation

The test case in this clause is applicable to carrier aggregation capable UEs which have been configured with two downlink SCells.

# A.9.2.38.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier specified in clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.11.2 and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.11.3.

## A.9.2.38.2 Test parameters

In this set of test cases there are three cells on three carrier frequencies. Cell 1 is PCell on channel 1, Cell 2 is activated SCell on channel 2, and Cell 3 is activated SCell on channel 3. The parameters for the test are listed in Table A.9.2.38.2-1.

Table A.9.2.38.2-1: 3 DL PCell in FDD RSRQ for E-UTRAN in Carrier Aggregation test parameters (cell #1, cell #2 and cell #3)

Par	ameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF	Channel Number		1	2	3
BW <sub>channel</sub>			5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100
Special subfr configuration	Note1		-	6	6
Uplink/downli configuration	ink		-	1	1
Measuremen		$n_{PRB}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Refe	erence		5MHz: R.5 FDD	5MHz: R.4 TDD	5MHz: R.4 TDD
measuremen	t channel		10MHz: R.0 FDD	10MHz: R.0 TDD	10MHz: R.0 TDD
defined in A.3	3.1.1		20MHz: R.4 FDD	20MHz: R.3 TDD	20MHz: R.3 TDD
			5MHz: 7-17	5MHz: 7-17	5MHz: 7-17
PDSCH alloc	ation	$n_{PRB}$	10MHz: 13-36 20MHz: 38-61	10MHz: 13-36 20MHz: 38-61	10MHz: 13-36 20MHz: 38-61
PDCCH/PCF	ICH/PHICH		5MHz: R.11 FDD	5MHz: R.11 TDD	5MHz: R.11 TDD
Reference m	easurement		10MHz: R.6 FDD	10MHz: R.6 TDD	10MHz: R.6 TDD
channel defin	ned in A.3.1.2		20MHz: R.10 FDD	20MHz: R.10 TDD	20MHz: R.10 TDD
OCNG Patter A.3.2	rns defined in		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA			100		
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB		dB	0	0	0
PDCCH_RA		ав	0	0	0
PDCCH_RB					
PDSCH_RA					
PDSCH_RB	te2				
OCNG_RA <sup>No</sup>	ite2				
OCNG_RB <sup>No</sup>					
	Bands TDD_A		-	-116	-116
	Bands TDD_C		-	-115	-115
	Bands TDD_E		-	-114	-114
	Bands FDD_A		-119.5	-	-
	Bands FDD_C	ID /	-118.5	-	-
$N_{oc}^{ m Note3}$	Bands FDD_D	dBm/	-118	-	-
<i>o</i> c	Bands FDD_E, Bands FDD_F	15kHz	-117.5	-	-
	Bands FDD_G		-116.5	-	-
	Bands FDD_H		-116	-	-
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0	-6.0
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-6.0	-6.0	-6.0
	Bands TDD_A		=	-122	-122
	Bands TDD_C		-	-121	-121
	Bands TDD_E		-	-120	-120
DOD DNote4	Bands FDD_A	dBm/	-125.5	-	-
RSRP <sup>Note4</sup>	Bands FDD_C	15kHz	-124.5	-	-
	Bands FDD_D		-124	-	-
	Bands FDD_E,		-123.5	-	-

	Panda EDD E				
	Bands FDD_F				
	Bands FDD_G		-122.5	-	-
	Bands FDD_H		-122	-	-
	Bands TDD_A				
	Bands TDD_C		-	-17.77	-17.77
	Bands TDD_E				
	Bands FDD_A				
	Bands FDD_C				
RSRQ <sup>Note4</sup>	Bands FDD_D	dB			
KOKQ	Bands FDD_E, Bands FDD_F	dБ	-17.77	-	-
	Bands FDD_G Bands FDD_H				
	Bands TDD_A		_	-87.25 +	-87.25 +
	Darius TDD_A		-	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Bands TDD_C	dBm/ BW <sub>channel</sub>	_	-86.25 +	-86.25 +
	Danas IDD_0			10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Bands TDD_E		-	-85.25 +	-85.25 +
				10log(N <sub>RB,</sub> √50)	10log(N <sub>RB,c</sub> /50)
	Bands FDD_A		-90.75 + 10log(N <sub>RB,</sub> √50)	-	-
lo <sup>Note4</sup>	Bands FDD_C		-89.75 + 10log(N <sub>RB,c</sub> /50)	-	-
	Bands FDD_D		-89.25 + 10log(N <sub>RB,</sub> √50)	-	-
	Bands FDD_E, Bands FDD_F		-88.75 + 10log(N <sub>RB,c</sub> /50)	-	-
	Bands FDD_G		-87.75 + 10log(N <sub>RB,c</sub> /50)	-	-
	Bands FDD_H		-87.25 + 10log(N <sub>RB,o</sub> /50)	-	-
Propagation			AWGN	AWGN	AWGN
Antenna Con			1x2	1x2	1x2
Timing offset		μs	-	0	0
Time alignment error relative to cell 1 Note 10				≤TAE	≤TAE
Time alignme to cell 2 Note 10	ent error relative		≤TAE	-	≤TAE
Time alignme	ent error relative		≤TAE		≤ TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.

Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 9: E-UTRA operating band groups are as defined in Section 3.5.

Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

#### A.9.2.38.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

# A.9.2.39 3 DL PCell in TDD RSRQ for E-UTRAN in Carrier Aggregation

The test case in this clause is applicable to carrier aggregation capable UEs which have been configured with two downlink SCells.

#### A.9.2.39.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD-FDD RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier defined in Clause 9.1.11.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

## A.9.2.39.2 Test parameters

In this set of cases cell 1 is PCell on the primary component carrier, and cell 2 and cell 3 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. The test parameters for the test are listed in Table A.9.2.39.2-1.

Table A.9.2.39.2-1: 3 Downlink TDD-FDD RSRQ carrier aggregation test parameters with PCell in TDD (cell #1, cell #2 and cell #3)

Pa	rameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	3
BW <sub>channel</sub>			5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50 20MHz: N <sub>RB,c</sub> = 100
Special subsconfiguration	frame n <sup>Note1</sup>		6	-	-
Uplink/down configuration	nlink		1	-	-
	nt bandwidth	$n_{PRB}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Ref measureme defined in A A.3.1.1.2	nt channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD
PDSCH allo		$n_{PRB}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
Reference n	FICH/PHICH measurement ined in A.3.1.2.1 .2		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patte A.3.2.1 and	erns defined in A.3.2.2		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RB PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RB OCNG_RB	A B Note2	dB	0	0	0
	Bands TDD_A		-119.5	-	-
	Bands TDD_C		-118.5	-	-
	Bands TDD_E		-117.5	-	- 440
	Bands FDD_A	1	-	-116	-116 -115
$N_{oc}^{ m \ Note3}$	Bands FDD_C	dBm/	-	-115	-115
¹♥ <sub>oc</sub>	Bands FDD_D Bands FDD_E, Bands FDD_F Note 6	15kHz	-	-114.5 -114	-114.5 -114
	Bands FDD_G Bands FDD_H		-	-113 -112.5	-113 -112.5
$\hat{E}_s/N_{oc}$	Danas   DD_11	dB	-6.0	-6.0	-6.0
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB	-6.0	-6.00	-6.00
RSRP <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E Bands FDD_A Bands FDD_C Bands FDD_D	dBm/ 15kHz	-125.50 -124.50 -123.50 - -	- - - -122 -121 -120.5	- - - -122 -121 -120.5
	Bands FDD_E, Bands FDD_F		-	-120	-120

	Note 6				
	Bands FDD_G		-	-119	-119
	Bands FDD_H		-	-118.5	-118.5
	Bands TDD_A				
	Bands TDD_C		-17.77	-	-
	Bands TDD_E				
	Bands FDD_A				
	Bands FDD_C				
RSRQ <sup>Note4</sup>	Bands FDD_D	dB			
	Bands FDD_E,		_	-17.77	-17.77
	Bands FDD_F		-	-17.77	-17.77
	Bands FDD_G				
	Bands FDD_H				
	Bands TDD_A		-90.75 +	_	_
	Barrae 125_7		10log(N <sub>RB,c</sub> /50)		
	Bands TDD_C		-89.75 +	-	-
		dBm/ BW <sub>channel</sub>	10log(N <sub>RB,o</sub> /50)		
	Bands TDD_E		-88.75 +	-	-
			10log(N <sub>RB,c</sub> /50)	-87.25 +	-87.25 +
	Bands FDD_A		-	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
				-86.25 +	-86.25 +
Io <sup>Note4</sup>	Bands FDD_C		-	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Danda EDD D			-85.75 +	-85.75 +
	Bands FDD_D		-	10log(N <sub>RB,</sub> √50)	10log(N <sub>RB,</sub> √50)
	Bands FDD_E,			-85.25 +	-85.25 +
	Bands FDD_F		-	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Note o				
	Bands FDD_G		-	-84.25 +	-84.25 +
				10log(N <sub>RB,</sub> /50) -83.75 +	10log(N <sub>RB,</sub> √50) -83.75 +
	Bands FDD_H		-	10log(N <sub>RB,c</sub> /50)	-63.75 + 10log(N <sub>RB,c</sub> /50)
Propagation	Condition		AWGN	AWGN	AWGN
Propagation Condition  Antenna Configuration			1x2	1x2	1x2
	Timing offset to Cell 1		-	0	0
	ent error relative	μS	-	≤ TAE	≤ TAE
	ent error relative		≤TAE	-	≤TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.

Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Note 9: E-UTRA operating band groups are as defined in Section 3.5.

Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

## A.9.2.39.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

# A.9.2.40 3 DL FDD RSRQ for E-UTRAN in Carrier Aggregation

#### A.9.2.40.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier specified in clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carriers specified in clause 9.1.11.2 and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.11.3.

#### A.9.2.40.2 Test parameters

In this test case the PCell and the SCells are on different carrier frequencies. There are three cells used in this test case. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carriers are tested by using test parameters specified in Table A.9.2.40.2-1. In the test, Cell 1 is the PCell, Cell 2 and Cell 3 are the SCells on secondary component carrier SCC1 and SCC2 respectively. The SCC1 and SCC2 are configured and activated.

Table A.9.2.40.2-1: 3 DL FDD RSRQ carrier aggregation test parameters

	ameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Ch	annel Number		1	2	3
BW <sub>channel</sub>		MHz	$5MHz:N_{RB,c} = 25$ $10MHz:N_{RB,c} = 50$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$	5MHz: N <sub>RB,c</sub> = 25 10MHz: N <sub>RB,c</sub> = 50
Measurement b	pandwidth	$n_{PRB}$	20MHz:N <sub>RB,c</sub> = 100 5MHz:10-15 10MHz:22-27	20MHz: N <sub>RB,c</sub> = 100 5MHz: 10-15 10MHz: 22-27	20MHz: N <sub>RB,c</sub> = 100 5MHz: 10-15 10MHz: 22-27
PDSCH Refere	nce measurement d in A.3.1.1.1		20MHz:47-52 5MHz:R.5 FDD 10MHz:R.0 FDD 20MHz:R.4 FDD	20MHz: 47-52 5MHz:R.5 FDD 10MHz:R.0 FDD 20MHz:R.4 FDD	20MHz: 47-52 5MHz:R.5 FDD 10MHz:R.0 FDD 20MHz:R.4 FDD
PDSCH allocat	ion	$n_{PRB}$	5MHz:7-17 10MHz:13-36 20MHz:38-61	5MHz:7-17 10MHz:13-36 20MHz:38-61	5MHz:7-17 10MHz:13-36 20MHz:38-61
PDCCH/PCFIC Reference mea defined in A.3.1	surement channel		5MHz:R.11 FDD 10MHz:R.6 FDD 20MHz:R.10 FDD	5MHz:R.11 FDD 10MHz:R.6 FDD 20MHz:R.10 FDD	5MHz:R.11 FDD 10MHz:R.6 FDD 20MHz:R.10 FDD
OCNG Patterns A.3.2.1			5MHz:OP.15 FDD 10MHz:OP.1 FDD 20MHz:OP.11 FDD	5MHz:OP.15 FDD 10MHz:OP.1 FDD 20MHz:OP.11 FDD	5MHz:OP.15 FDD 10MHz:OP.1 FDD 20MHz:OP.11 FDD
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					0
PHICH_RB		dB	0	0	
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note1</sup>					
OCNG_RB <sup>Note1</sup>					
	Bands FDD_A		-119.5	-116	-116
	Bands FDD_C		-118.5	-115	-115
$N_{oc}^{ m Note2}$	Bands FDD_D Bands FDD_E, FDD_F Note 6	dBm/15 kHz	-118 -117.5	-114.5 -114	-114.5 -114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0	-6.0
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$ Note3		dB	-6.0	-6.0	-6.0
	Bands FDD_A		-125.5	-122	-122
	Bands FDD_C		-124.5	-121	-121
RSRP <sup>Note3</sup>	Bands FDD_D	dBm/15	-124	-120.5	-120.5
KOKP	Bands FDD_E, FDD_F Note 6	kHz	-123.5	-120	-120
	Bands FDD_G		-122.5 -122	-119 -118.5	-119 -118.5
	Bands FDD_H Bands FDD_A		-122	-110.3	-110.3
RSRQ <sup>Note3</sup>	Bands FDD_A Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H	dB	-17.77	-17.77	-17.77
lo <sup>Note3</sup>	Bands FDD_A	dBm/	-90.75+ 10log(N <sub>RB,c</sub> /50)	-87.25+ 10log(N <sub>RB,c</sub> /50)	-87.25+ 10log(N <sub>RB,c</sub> /50)
	Bands FDD_C	BW <sub>channel</sub>	-89.75+ 10log(N <sub>RB,c</sub> /50)	-86.25+ 10log(N <sub>RB,c</sub> /50)	-86.25+ 10log(N <sub>RB,c</sub> /50)

	Bands FDD_D		-89.25+ 10log(N <sub>RB,c</sub> /50)	-85.75+ 10log(N <sub>RB,c</sub> /50)	-85.75+ 10log(N <sub>RB,c</sub> /50)
	Bands FDD_E, FDD_F Note 6		-88.75+	-85.25+	-85.25+
	FDD_F Note 6		10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Bands FDD G		-87.75+	-84.25+	-84.25+
	Danus FDD_G		10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Bands FDD H		-87.25+	-83.75+	-83.75+
	Danus FDD_H		10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
Propagation co	ndition	-	AWGN	AWGN	AWGN
Antenna Config	uration	-	1x2	1x2	1x2
Timing offset to	Cell 1	μs	-	0	0
Time alignment cell 1 Note 7	error relative to		-	≤ TAE	≤TAE
Time alignment cell 2 Note 7	error relative to		-	-	≤TAE

- Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.
- Note 3: Es/lot, RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
- Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
- Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
- Note 8: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.2.40.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC1 for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC2 for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.2.41 3 DL TDD RSRQ for E-UTRAN in Carrier Aggregation

#### A.9.2.41.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRQ measurement accuracy in carrier aggregation is within the specified limits in a synchronized network environment with AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carriers defined in Clause 9.1.11.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

# A.9.2.41.2 Test parameters

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell, Cell 2 and Cell 3 are the SCells on secondary component carrier SCC1 and SCC2 respectively. PCell and SCells are in different RF channels. The parameters for the test are listed in Table A.9.2.41.2-1.

Table A.9.2.41.2-1: 3 DL TDD RSRQ carrier aggregation test parameters

	ameter	Unit	Cell 1	Cell2	Cell3
E-UTRA RF Ch	annel Number		1	2	3
BW <sub>channel</sub>		MHz	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$	5MHz: $N_{RB,c} = 25$ 10MHz: $N_{RB,c} = 50$ 20MHz: $N_{RB,c} = 100$
Special subfranconfiguration Not	ne e1		6		
Uplink-downlink	configuration Note1			1	
Measurement b		$n_{{\scriptscriptstyle PRB}}$	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Refere	nce measurement d in A.3.1.1.1		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD
PDSCH allocati	ion	$n_{PRB}$	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
PDCCH/PCFIC			5MHz: R.11 TDD	5MHz:R.11 TDD	5MHz:R.11 TDD
	surement channel		10MHz: R.6 TDD	10MHz:R.6 TDD	10MHz:R.6 TDD
defined in A.3.1	1.2.1		20MHz: R.10 TDD 5MHz: OP.9 TDD	20MHz:R.10 TDD 5MHz: OP.9 TDD	20MHz:R.10 TDD 5MHz: OP.9 TDD
OCNG Patterns A.3.2.1	s defined in		10MHz: OP.1 TDD 20MHz: OP.7 TDD	10MHz: OP.1 TDD 20MHz: OP.7 TDD	10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA			20111121 01 11 122	20111121 01 11 122	20111121 01 17 188
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB		dB	0	0	0
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note2</sup>					
OCNG_RB <sup>Note2</sup>	_				
a.z. Note3	Bands TDD_A	dBm/15	-119.5	-116	-116
$N_{oc}^{ m Note3}$	Bands TDD_C Bands TDD_E	kHz	-118.5 -117.5	-115 -114	-115 -114
$\hat{E}_s/N_{oc}$	Ballus IDD_E	dB	-6.0	-6.0	-6.0
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}^{\mathrm{Note4}}$		dB	-6.0	-6.0	-6.0
Note/	Bands TDD_A	dBm/15	-125.5	-122	-122
RSRP <sup>Note4</sup>	Bands TDD_C	kHz	-124.5	-121	-121 120
	Bands TDD_E		-123.5	-120	-120
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-17.77	-17.77	-17.77
	Bands TDD_A		-90.75+ 10log(N <sub>RB,c</sub> /50)	-87.25+ 10log(N <sub>RB,c</sub> /50)	-87.25+ 10log(N <sub>RB,c</sub> /50)
	Bands TDD_C		-89.75+	-86.25+	-86.25+
Io <sup>Note4</sup>	Dallus IDD_C	dBm/	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)	10log(N <sub>RB,c</sub> /50)
	Bands TDD_E	BW <sub>channel</sub>	-88.75+ 10log(N <sub>RB,c</sub> /50)	-85.25+ 10log(N <sub>RB,c</sub> /50)	-85.25+ 10log(N <sub>RB,c</sub> /50)
Propagation co	ndition	-	AWGN	AWGN	AWGN
Antenna Config		-	1x2	1x2	1x2

Timing offset to Cell 1	μs	=	0	0
Time alignment error relative to cell 1 Note 7		-	≤ TAE	≤TAE
Time alignment error relative to cell 2 Note 7		-	-	≤TAE

- Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
- Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.
- Note 4: Es/lot, RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
- Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
- Note 8: E-UTRA operating band groups are as defined in Section 3.5.

## A.9.2.41.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in section 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC1 for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC2 for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

# A.9.2.42 FD-FDD RSRQ Intra frequency case for UE category 0

#### A.9.2.42.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.13.3 for FD-FDD intra frequency RSRQ measurements for UE category 0.

#### A.9.2.42.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.42.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.42.2-1: FD-FDD RSRQ Intra frequency test parameters for UE category 0

_			Tes	st 1	Tes	st 2	Tes	st 3
Pa	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF C	nannel Number			1		1		1
BW <sub>channel</sub>		MHz	10		10		10	
Measurement I	bandwidth	$n_{\it PRB}$	22-	<b>–27</b>	22—27		22—27	
PDSCH Refere	ence measurement d in A.3.1.1.3		R.13 FDD	-	R.13 FDD	-	R.13 FDD	-
PDSCH allocat	tion	$n_{PRB}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFIC			Б.0	EDD	D.O.	EDD	D.O.	EDD
defined in A.3.	asurement channel		R.6	FDD	R.6	FDD	R.6	FDD
OCNG Pattern			0.0.4	000	00.	000	05.	000
A.3.2.1.1 (OP.			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
A.3.2.1.2 (OP.2	2 FDD)		100	100	100	100	100	100
PBCH_RA								
PBCH_RB PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB		dB	0	0	0	0	0	0
PDCCH_RA								
PDCCH_RB								
PDSCH_RA PDSCH_RB								
OCNG_RA <sup>Note</sup>	1							
OCNG RB <sup>Note</sup>	1							
	Bands FDD_A							16
	Bands FDD_C							15
Note2	Bands FDD_D	_					-11	4.5
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-84	.76	-103.85		-1	14
	Bands FDD_G						-113	
	Bands FDD_H						-11	2.5
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
$\hat{E}_{s}/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
	Bands FDD_A						-120	-120
	Bands FDD_C						-119	-119
	Bands FDD_D						-118.5	-118.5
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 4	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-118	-118
	Bands FDD_G Note 6						-117	-117
	Bands FDD_H						-116.5	-116.5
	Bands FDD_A							
	Bands FDD_C							
	Bands FDD_D							
RSRQ <sup>Note3</sup>	Bands FDD_E, FDD_F Note 45	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
	Bands FDD_G							
	Bands FDD_H							
	Bands FDD_A							5.67
	Bands FDD_C							.67
Note2	Bands FDD_D Bands FDD_E						-84	.17
Io <sup>Note3</sup>	Bands FDD_E, FDD_F Note 4	dBm/9 MHz	-5	50	-7	73	-83	3.67
	Bands FDD_G Note 6							2.67
Bands FDD_H							-82	2.17

Propagat	tion condition	=	AWGN	AWGN	AWGN		
Correlation Matrix and Antenna Configuration			1x1	1x1	1x1		
Note 1: Note 2:	spectral density is achieve	NG shall be used such that both cells are fully allocated and a constant total transmitted power ctral density is achieved for all OFDM symbols.  Experience from other cells and noise sources not specified in the test is assumed to be constant over					
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{ m ac}$ to be fulfilled.						
Note 3:	3: Es/lot, RSRQ, RSRP and lo levels have been derived from other parameters for information purposes.  They are not settable parameters themselves.						
Note 4:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.						
Note 5:	E-UTRA operating band groups are as defined in Section 3.5.						
Note 6:	Except Band 29 and Band 32.						

## A.9.2.42.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.13.3.

# A.9.2.43 HD-FDD RSRQ Intra frequency case for UE category 0

#### A.9.2.43.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.13.3 for HD-FDD intra frequency RSRQ measurements for UE category 0.

## A.9.2.43.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.43.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.43.2-1: HD-FDD RSRQ Intra frequency test parameters for UE category 0

_			Tes	st 1	Tes	st 2	Tes	st 3
Pa	rameter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF C	nannel Number			1		1		1
BW <sub>channel</sub>		MHz	1	0	10		10	
Measurement I	bandwidth	$n_{\it PRB}$	22-	–27	22—27		22—27	
PDSCH Refere	ence measurement d in A.3.1.1.4		R.1 HD- FDD	-	R.1 HD- FDD	-	R.1 HD- FDD	-
PDSCH allocat		$n_{\it PRB}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFIC		7.1.5						
	asurement channel		R.3 HI	D-FDD	R.3 HI	D-FDD	R.3 HI	D-FDD
defined in A.3.  OCNG Pattern								
A.3.2.1.1 (OP.			OP.1	OP.2	OP.1	OP.2	OP.1	OP.2
A.3.2.1.2 (OP.2			FDD	FDD	FDD	FDD	FDD	FDD
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA PCFICH_RB								
PHICH_RA								
PHICH_RB		dB	0	0	0	0	0	0
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB OCNG_RA <sup>Note</sup>	1							
OCNG_RA	1							
OCNG_ND	Bands FDD_A		-84.76				-1	16
	Bands FDD_C				-103.85		-1	15
	Bands FDD_D						-11	4.5
$N_{oc}^{ m Note2}$	Bands FDD_E,	dBm/15 kHz					-1	14
	FDD_F Note 4							
	Bands FDD_G Note 7						-113	
	Bands FDD_H			Г			-11	2.5
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
$\hat{E}_{s}/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
	Bands FDD_A						-120	-120
	Bands FDD_C						-119	-119
	Bands FDD_D						-118.5	-118.5
RSRP <sup>Note3</sup>	Bands FDD_E, FDD_F Note 4	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-118	-118
	Bands FDD_G						-117	-117
							-116.5	-116.5
	Bands FDD_H Bands FDD_A						-110.3	-110.0
	Bands FDD_C							
	Bands FDD_D							
RSRQ <sup>Note3</sup>	Bands FDD_E, FDD_F Note 4	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
	Bands FDD_G Note 6							
	Bands FDD_H							
	Bands FDD_A						<del></del>	5.67
	Bands FDD_C							.67
	Bands FDD_D Bands FDD_E,						-84	.17
Io <sup>Note3</sup>	FDD_F Note 4	dBm/9 MHz	-5	50	-7	73	-83	3.67
	Bands FDD_G Note 6						-82.67	
	Bands FDD_H						-82	2.17

Propagat	tion condition	=	AWGN	AWGN	AWGN		
Correlation Matrix and Antenna Configuration			1x1	1x1	1x1		
Note 1: Note 2:	spectral density is achieve	NG shall be used such that both cells are fully allocated and a constant total transmitted power ctral density is achieved for all OFDM symbols.  Experience from other cells and noise sources not specified in the test is assumed to be constant over					
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{ m ac}$ to be fulfilled.						
Note 3:	3: Es/lot, RSRQ, RSRP and lo levels have been derived from other parameters for information purposes.  They are not settable parameters themselves.						
Note 4:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.						
Note 5:	E-UTRA operating band groups are as defined in Section 3.5.						
Note 6:	Except Band 29 and Band 32.						

## A.9.2.43.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.13.3.

# A.9.2.44 TDD RSRQ Intra frequency case for UE category 0

## A.9.2.44.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.13.3 for TDD intra frequency RSRQ measurements for UE category 0.

## A.9.2.44.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.44.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.44.2-1: TDD RSRQ Intra frequency test parameters for UE category 0

Donomoton		Unit	Test 1		Test 2		Test 3	
	Parameter		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Ch	nannel Number		,		,			1
BW <sub>channel</sub>		MHz	10		10		10	
Special subfrar configuration No	te1		(	6	(	6	6	
Uplink-downlinl	k configuration Note1		,	1	,	1	,	1
Measurement b	oandwidth	$n_{{\scriptscriptstyle PRB}}$		<b>–27</b>	22–	<b>–27</b>	22-	<b>–27</b>
PDSCH Refere channel defined	ence measurement d in A.3.1.1.5		R.12 TDD	-	R.12 TDD	-	R.12 TDD	-
PDSCH allocat	ion	$n_{PRB}$	13—36	-	13—36	-	13—36	-
PDCCH/PCFIC Reference mea defined in A.3.1	surement channel		R.6	TDD	R.6	TDD	R.6	TDD
OCNG Patterns A.3.2.2.1 (OP.1 A.3.2.2.2 (OP.2	I TDD) and		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RA PDSCH_RA OCNG_RA OCNG_RB		dB	0	0	0	0	0	0
$N_{oc}^{ m Note3}$	Bands TDD_C Bands TDD_E	dBm/15 kHz	-84	.76	-103.85		-115 -114	
$\hat{E}_s/N_{oc}$	ם במוועס דטט_ב	dB	3	3	-2.9	-2.9	-4	-4
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120 -119 -118	-120 -119 -118
RSRQ <sup>Note4</sup>	Bands TDD_A, TDD_C, TDD_E	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
lo <sup>Note4</sup>	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/9 MHz		50		73	-84 -83	.67 .67
Propagation co		-	AW	'GN	AWGN		AW	'GN
Correlation Mar Configuration	trix and Antenna		1)	<b>k</b> 1		x1	1x1	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 4: RSRQ, RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

#### A.9.2.44.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.13.3.

# A.9.3 UTRAN FDD CPICH RSCP

# A.9.3.1 E-UTRAN FDD

#### A.9.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.1. There are two different test setups with different UTRAN parameters.

#### A.9.3.1.2 Parameters

The test parameters are given in Tables A.9.3.1.2-1, A.9.3.1.2-2 and A.9.3.1.2-3 below.

Table A.9.3.1.2-1: General test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRAN RF Channel Number		1	One E-UTRAN FDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH RSCP	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.3.1.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Test 1	Test 2	
E-UTRAN RF Channel Number		1		
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD		

PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA <sup>Note 1</sup>	dB	
OCNG_RB <sup>Note 1</sup>	dB	
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98
RSRP Note 3	dBm/15 kHz	-94
$\hat{E}_{s}/I_{ot}$	dB	4
SCH_RP Note 3	dBm/15 kHz	-94
$\hat{E}_s/N_{oc}$	dB	4
Propagation Condition		AWGN

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.3.1.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD

	Parameter	Unit	Test 1	Test 2
			Cell 2	Cell 2
	CPICH_Ec/lor	dB	-10	-10
	PCCPCH_Ec/lor	dB	-12	-12
	SCH_Ec/lor	dB	-12	-12
	PICH_Ec/lor	dB	-15	-15
	DPCH_Ec/lor	dB	-	-
	OCNS_Ec/lor	dB	-0.94	-0.94
loc	Band I, IV, VI, X, XI, XIX,	dBm/3.84		-94.46
	XXI	MHz		
	Band II, V, VII			-92.46
	Band XXV, XXVI		-60.00	-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV,			-91.46
	XX, XXII			
	Band IX (Note 2)			-93.46
	Îor/loc	dB	9.54	-9.54
CPICH	Band I, IV, VI, X, XI, XIX,	dBm		-114.0
RSCP,	XXI			
Note 1	Band II, V, VII			-112.0
	Band XXV, XXVI		-60.46	-110.5 (Note 3)
	Band III, VIII, XII, XIII, XIV,			-111.0
	XX, XXII			
	Band IX (Note 2)			-113.0
Io, Note 1	Band I, IV, VI, X, XI, XIX,	dBm/3.84		-94.0
	XXI	MHz		
	Band II, V, VII			-92.0
	Band XXV, XXVI		-50.00	-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV,			-91.0
	XX, XXII			
	Band IX (Note 2)			-93.0
Pro	opagation condition	-	AWGN	AWGN

NOTE 1: CPICH RSCP and lo levels have been calculated from other parameters for information purposes.

They are not settable parameters themselves.

NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.

#### A.9.3.1.3 Test Requirements

The CPICH RSCP measurement absolute accuracy shall meet the requirements in Clause 9.2.1.

#### A.9.3.2 E-UTRAN TDD

# A.9.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.1. There are three different test setups with different UTRAN parameters.

#### A.9.3.2.2 Parameters

The test parameters are given in Tables A.9.3.2.2-1, A.9.3.2.2-2 and A.9.3.2.2-3 below.

Table A.9.3.2.2-1: General test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH RSCP	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.3.2.2-2: E-UTRAN TDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Test 1	Test 2
E-UTRAN RF Channel Number		1	
BW <sub>channel</sub>	MHz	10	
Special subframe configuration <sup>Note1</sup> Uplink-downlink configuration <sup>Note1</sup>		6	
Uplink-downlink configuration Note1		1	
OCNG Patterns defined in A.3.2.2.1		OP.1 TI	)D
(OP.1 TDD)		01.111	ענ

PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA <sup>Note 2</sup>	dB	
OCNG_RB <sup>Note 2</sup>	dB	
$N_{oc}^{$	dBm/15 kHz	-98
RSRP Note 4	dBm/15 kHz	-94
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4
SCH_RP Note 4	dBm/15 kHz	-94
$\hat{E}_s/N_{oc}$	dB	4
D (1 0 11)		AWC

Propagation Condition AWGN

- Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
- Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.3.2.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD

	Parameter	Unit	Test 1	Test 2
			Cell 2	Cell 2
	CPICH_Ec/lor	dB	-10	-10
	PCCPCH_Ec/lor	dB	-12	-12
	SCH_Ec/lor	dB	-12	-12
	PICH_Ec/lor	dB	-15	-15
	DPCH_Ec/lor	dB	-	-
	OCNS_Ec/lor	dB	-0.94	-0.94
loc	Band I, IV, VI, X, XI, XIX,	dBm/3.84		-94.46
	XXI	MHz		
	Band II, V, VII			-92.46
	Band XXV, XXVI		-60.00	-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV,			-91.46
	XX, XXII			
	Band IX (Note 2)			-93.46
	Îor/loc	dB	9.54	-9.54
CPICH	Band I, IV, VI, X, XI, XIX,	dBm		-114.0
RSCP,	XXI			
Note 1	Band II, V, VII			-112.0
	Band XXV, XXVI		-60.46	-110.5 (Note 3)
	Band III, VIII, XII, XIII, XIV,			-111.0
	XX, XXII			
	Band IX (Note 2)			-113.0
Io, Note 1	Band I, IV, VI, X, XI, XIX,	dBm/3.84		-94.0
	XXI	MHz		
	Band II, V, VII			-92.0
Band XXV, XXVI			-50.00	-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV,			-91.0
	XX, XXII			
	Band IX (Note 2)			-93.0
Pro	opagation condition	-	AWGN	AWGN

NOTE 1: CPICH RSCP and lo levels have been calculated from other parameters for information purposes.

They are not settable parameters themselves.

NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.

#### A.9.3.2.3 Test Requirements

The CPICH RSCP measurement absolute accuracy shall meet the requirements in Clause 9.2.1.

#### A.9.3.3 E-UTRAN FDD for 5MHz Bandwidth

# A.9.3.3.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.3.1.1.

#### A.9.3.3.2 Parameters

The parameters of this test are the same as defined in Subclause A.9.3.1.2 except that the values of the parameters in the Table A.9.3.3.2-1 will replace the values of the corresponding parameters in A.9.3.1.2-1, and the values of E-UTRAN FDD cell specific parameters in the Table A.9.3.3.2-2 shall be adopted, and the values of UTRA FDD cell specific parameters shall be reused as defined in Table A.9.3.1.2-3 of Subclause A.9.3.1.2.

Table A.9.3.3.2-1: General test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter	Unit	Value	Comment		
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1		
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1		
E-UTRAN Channel Bandwidth (BW <sub>channel</sub> )	MHz	5			
Note 1: See Table A.9.3.1.2-1 for other general test parameters.					

Table A.9.3.3.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Par	ameter	Unit	Test 1	Test 2	
E-UTRAN RF	Channel Number			1	
BW <sub>channel</sub>		MHz		5	
OCNG Patterns defined in			OP.15 FDD		
A.3.2.1.15 (OP.15 FDD)			01.	13 1 00	
PBCH_RA		dB			
PBCH_RB		dB			
PSS_RA		dB dB			
	SSS_RA				
PCFICH_RB		dB			
PHICH_RA		dB			
PHICH_RB		dB		0	
PDCCH_RA		dB dB			
	PDCCH_RB				
PDSCH_RA		dB			
	PDSCH_RB				
OCNG_RANOTE	OCNG_RA <sup>Note 1</sup>				
OCNG_RB <sup>Note</sup>		dB			
$N_{oc}$ Note 2	Band 31	dBm/15 kHz	-98		
RSRP Note 3	Band 31	dBm/15 kHz		-94	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB		4	
SCH_RP Note 3	Band 31	dBm/15 kHz		-94	
$\hat{E}_s/N_{oc}$		dB		4	
Io <sup>Note3</sup>	Band 31	dBm/4.5 MHz	-	67.8	
Propagation C				WGN	
			e fully allocated and		
transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of					
арр	appropriate power for $N_{ac}$ to be fulfilled.				
Note 3: RSI	RP, SCH_RP and I	o levels have beer	derived from other pole parameters thems		

# A.9.3.3.3 Test Requirements

The test requirements defined in section A.9.3.1.3 shall apply to this test case.

# A.9.4 UTRAN FDD CPICH Ec/No

# A.9.4.1 E-UTRAN FDD

# A.9.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/No absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.3. There are three different test setups with different UTRAN parameters.

#### A.9.4.1.2 Parameters

The test parameters are given in Tables A.9.4.1.2-1, A.9.4.1.2-2 and A.9.4.1.2-3 below.

Table A.9.4.1.2-1: General test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
E-UTRAN RF Channel		1	One E-UTRAN FDD carrier frequency is
Number			used.
UTRAN RF Channel		1	One UTRAN FDD carrier frequency is
Number			used.
E-UTRAN Channel	MHz	10	
Bandwidth (BW <sub>channel</sub> )			
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD)		CPICH Ec/N0	
measurement quantity			
Monitored UTRA FDD cell		12	UTRA cells on UTRA RF channel 1
list size			provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.4.1.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Test 1	Test 2	Test 3	
E-UTRAN RF Channel Number			1		
BW <sub>channel</sub>	MHz		10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)			OP.1 FDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
Noc Note 2	dBm/15 kHz		-98		
RSRP Note 3	dBm/15 kHz		-94		
$\hat{E}_{s}/I_{ot}$	dB	4			
SCH_RP Note 3	dBm/15 kHz		-94		
$\hat{E}_s/N_{oc}$	dB	4			
Propagation Condition			AWGN		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.4.1.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD

	Parameter		Test 1	Test 2	Test 3
	Parameter	Unit	Cell 2	Cell 2	Cell 2
	CPICH_Ec/lor	dB	-10	-10	-10
P	CCPCH_Ec/lor	dB	-12	-12	-12
	SCH_Ec/lor	dB	-12	-12	-12
	PICH_Ec/lor	dB	-15	-15	-15
	DPCH_Ec/lor	dB	-	-	-
	OCNS_Ec/lor	dB	-0.94	-0.94	-0.94
	Band I, IV, VI, X, XI, XIX, XXI				-94.46
	Band II, V, VII	dBm/			-92.46
loc	Band XXV, XXVI	3.84	-52.22	-87.27	-90.96 (Note 3)
	Band III, VIII, XII,	MHz			-91.46
	XIII, XIV, XX, XXII Band IX (Note 2)				-93.46
	Îor/loc	dB	-1.75	-4.7	-9.54
CP	ICH Ec/Io, Note 1	dBm	-14.0	-16.0	-20.0
	Band I, IV, VI, X, XI, XIX, XXI				-94
lo,	Band II, V, VII	dBm/			-92.0
Note	Band XXV, XXVI	3.84	-50	-86	-90.5 (Note 3)
1	Band III, VIII, XII, XIII, XIV, XX, XXII	MHz			-91.0
	Band IX (Note 2)				-93
Pro	pagation condition	-	AWGN	AWGN	AWGN

NOTE 1: CPICH Ec/lo and lo levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.

NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.

#### A.9.4.1.3 Test Requirements

The CPICH Ec/No measurement absolute accuracy shall meet the requirements in Clause 9.2.3.

The effect of assumed thermal noise and noise generated in the receiver (-99 dBm for frequency bands I, IV, VI, X, XI, XIX and XXI; -98 dBm for frequency band IX, -97dBm for frequency bands II, V and VII; -95.5dBm for frequency band XXV and XXVI; and -96dBm for frequency band III) shall be added into the required accuracy. The test requirements for the absolute CPICH\_Ec/Io measurement are shown in Table A.9.4.1.3-1.

Table A.9.4.1.3-1: CPICH Ec/lo absolute accuracy

		Accuracy [dB]	Conditions	
Parameter	Unit	Normal condition	Extreme condition	lo [dBm/3,84 MHz]

	9	-2.71.5 for -14 ≤ CPICH Ec/lo -3.22 for -16 ≤ CPICH Ec/lo < -14 -4.23 for -20 ≤ CPICH Ec/lo < -16	-4.23	-9487(Band I, IV, VI, X, XI, XIX, XXI) -9285 (Band II, V, VII) -90.583.5 (Band XXV, XXVI (Note 2)) -9184 (Band III, VIII, XII, XIII, XIV, XX, XXII) 9386 (Band IX (Note 1))
CPICH_Ec/lo	dB	± 1.5 for -14 ≤ CPICH Ec/lo ± 2 for -16 ≤ CPICH Ec/lo < -14 ± 3 for -20 ≤ CPICH Ec/lo < -16	± 3	-8750(Band I, IV, VI, X, XI, XIX, XXI) -8550 (Band II, V, VII) -83.550 (Band XXV, XXVI (Note 2)) -8450 (Band III, VIII, XII, XIII, XIV, XX, XXII) -8650 (Band IX (Note 1))

NOTE1: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 2: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

## A.9.4.2 E-UTRAN TDD

## A.9.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/No absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.3. There are three different test setups with different UTRAN parameters.

#### A.9.4.2.2 Parameters

The test parameters are given in Tables A.9.4.2.2-1, A.9.4.2.2-2 and A.9.4.2.2-3 below.

Table A.9.4.2.2-1: General test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH Ec/N0	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.4.2.2-2: E-UTRAN TDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Test 1	Test 2	Test 3	
E-UTRAN RF Channel Number			1		
BW <sub>channel</sub>	MHz	10			
Special subframe configuration Note1			6		
Uplink-downlink configuration Note1			1		
OCNG Patterns defined in			OP.1 TDD		
A.3.2.2.1 (OP.1 TDD)			OP.1 TDD		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB	7			
PDSCH_RA	dB	7			
PDSCH_RB	dB				
OCNG_RA <sup>Note 2</sup>	dB				
OCNG_RB <sup>Note 2</sup>	dB				
$N_{oc}^{ m Note  3}$	dBm/15		-98		
	kHz		-90		
RSRP Note 4	dBm/15	-94			
	kHz		J-T		
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	4			
SCH_RP Note 4	dBm/15 kHz	-94			
$\hat{E}_s/N_{oc}$	dB		4		
Propagation Condition			AWGN		

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.4.2.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN TDD

	Parameter		Test 1	Test 2	Test 3
	rafameter	Unit	Cell 2	Cell 2	Cell 2
	CPICH_Ec/lor	dB	-10	-10	-10
F	PCCPCH_Ec/lor	dB	-12	-12	-12
	SCH_Ec/lor	dB	-12	-12	-12
	PICH_Ec/lor	dB	-15	-15	-15
	DPCH_Ec/lor	dB	-	-	-
	OCNS_Ec/lor	dB	-0.94	-0.94	-0.94
	Band I, IV, VI, X, XI, XIX, XXI				-94.46
	Band II, V, VII	dBm/			-92.46
loc	Band XXV, XXVI	3.84	-52.22	-87.27	-90.96 (Note 3)
	Band III, VIII, XII,	MHz			-91.46
	XIII, XIV, XX, XXII				
	Band IX (Note 2)				-93.46
	lor/loc	dB	-1.75	-4.7	-9.54
CP	ICH Ec/Io, Note 1	dBm	-14.0	-16.0	-20.0
	Band I, IV, VI, X, XI, XIX, XXI				-94
1.	Band II, V, VII	dBm/			-92.0
lo, Note	Band XXV, XXVI	3.84	-50	-86	-92.0 -90.5 (Note 3)
1		3.64 MHz	-50	-00	-90.5 (Note 5)
'	Band III, VIII, XII, XIII, XIII, XIV, XX, XXII	IVI⊓Z			-91.0
	Band IX (Note 2)				-93
Pro	pagation condition	-	AWGN	AWGN	AWGN

NOTE 1: CPICH Ec/lo and lo levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.

NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.

#### A.9.4.2.3 Test Requirements

The CPICH Ec/No measurement absolute accuracy shall meet the requirements in Clause 9.2.3.

The effect of assumed thermal noise and noise generated in the receiver (-99 dBm for frequency bands I, IV, VI, X, XI, XIX and XXI; -98 dBm for frequency band IX, -97dBm for frequency bands II, V and VII; -95.5dBm for frequency band XXV and XXVI; and -96dBm for frequency band III) shall be added into the required accuracy. The test requirements for the absolute CPICH\_Ec/Io measurement are shown in Table A.9.4.2.3-1.

Table A.9.4.2.3-1: CPICH Ec/lo absolute accuracy

		Accuracy [dB]	Conditions	
Parameter	Unit	Normal condition	Extreme condition	lo [dBm/3,84 MHz]
			Condition	

	5	-2.71.5 for -14 ≤ CPICH Ec/lo -3.22 for -16 ≤ CPICH Ec/lo < -14 -4.23 for -20 ≤ CPICH Ec/lo < -16	-4.23	-9487(Band I, IV, VI, X, XI, XIX, XXI) -9285 (Band II, V, VII) -90.583.5 (Band XXV, XXVI (Note 2)) -9184 (Band III, VIII, XII, XIII, XIV, XX, XXII) 9386 (Band IX (Note 1))
CPICH_Ec/lo	dB	± 1.5 for -14 ≤ CPICH Ec/lo ± 2 for -16 ≤ CPICH Ec/lo < -14 ± 3 for -20 ≤ CPICH Ec/lo < -16	± 3	-8750(Band I, IV, VI, X, XI, XIX, XXI) -8550 (Band II, V, VII) -83.550 (Band XXV, XXVI (Note 2)) -8450 (Band III, VIII, XII, XIII, XIV, XX, XXII) -8650 (Band IX (Note 1))

NOTE1: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 2: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

#### A.9.4.3 E-UTRAN FDD for 5MHz Bandwidth

#### A.9.4.3.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.4.1.1.

#### A.9.4.3.2 Parameters

The parameters of this test are the same as defined in Subclause A.9.4.1.2 except that the values of the parameters in the Table A.9.4.3.2-1 will replace the values of the corresponding parameters in A.9.4.1.2-1, and the values of E-UTRAN FDD cell specific parameters in the Table A.9.4.3.2-2 shall be adopted, and the values of UTRA FDD cell specific parameters shall be reused as defined in Table A.9.4.1.2-3 of Subclause A.9.4.1.2.

Table A.9.4.3.2-1: General test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter	Unit	Value	Comment		
PDSCH parameters		DL Reference Measurement	As specified in clause A.3.1.1.1		
		Channel R.5 FDD			
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1		
parameters		Channel R.11 FDD	•		
E-UTRAN Channel	MHz	5			
Bandwidth (BW <sub>channel</sub> )					
Note 1: See Table A.9.4.1.2-1 for other general test parameters.					

Table A.9.4.3.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter		Unit	Test 1	Test 2	Test 3	
E-UTRAN RF Ch	annel Number			1		
BW <sub>channel</sub>		MHz	5			
OCNG Patterns of	lefined in			OD 45 EDD		
A.3.2.1.15 (OP.15	5 FDD)			OP.15 FDD		
PBCH_RA		dB				
PBCH_RB		dB				
PSS_RA		dB				
SSS_RA		dB				
PCFICH_RB		dB				
PHICH_RA		dB				
PHICH_RB		dB		0		
PDCCH_RA		dB				
PDCCH_RB		dB				
PDSCH_RA		dB				
PDSCH_RB						
OCNG_RA <sup>Note 1</sup>		dB				
OCNG_RB <sup>Note 1</sup>		dB				
$N_{oc}^{ m Note~2}$	Band 31	dBm/15 kHz		-98		
RSRP Note 3	Band 31	dBm/15 kHz		-94		
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB				
SCH_RP Note 3	Band 31	dBm/15 kHz		-94		
$\hat{E}_s/N_{oc}$		dB		4		
lo <sup>Note3</sup>	Band 31	dBm/4.5 MHz	-67.8			
Propagation Cond	Propagation Condition			AWGN		
transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of						

appropriate power for  $N_{oc}$  to be fulfilled.

RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

#### A.9.4.3.3 **Test Requirements**

The test requirements defined in section A.9.4.1.3 shall apply to this test case.

#### **UTRAN TDD measurement** A.9.5

#### P-CCPCH RSCP absolute accuracy for E-UTRAN FDD A.9.5.1

#### A.9.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRAN TDD P-CCPCH RSCP measurement absolute accuracy is within the specified limits. This test will verify the requirements in clause 9.3.1 and applies to UE supporting this capability.

Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is provided. In the measurement control information it is indicated to the UE that periodic reporting of the UTRA TDD P-CCPCH RSRP measurement is used.

#### A.9.5.1.2 Test parameters

In this set of test cases there are two cells. Cell 1 is a E-UTRA FDD cell and cell 2 is a UTRA TDD cell. The absolute accuracy of P-CCPCH RSCP measurements are tested by using test parameters in Table A.9.5.1-1, Table A.9.5.1-2, and Table A.9.5.1-3. In all test cases, Cell 1 is the PCell and Cell 2 is the target cell.

Table A.9.5.1-1: General test parameters for UTRA TDD P-CCPCH RSCP measurement absolute accuracy in E-UTRAN FDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.1
parameters		Channel R.6 FDD	
E-UTRAN RF Channel Number		1	One E-UTRAN FDD carrier
			frequency is used.
UTRAN RF Channel Number		2	One UTRAN TDD carrier
			frequency is used.
E-UTRAN Channel Bandwidth	MHz	10	
(BWchannel)			
Active cell		Cell 1	E-UTRAN FDD cell 1 on RF
			channel number 1
Neighbor cells		Cell 2	1.28Mcps UTRA TDD cell 2 on RF
			channel number 2
Gap Pattern Id		1	As specified in TS 36.133
			clause 8.1.2.1.
CP length of cell 1		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Inter-RAT (UTRAN TDD)		P-CCPCH RSRP	
measurement quantity			

Table A.9.5.1-2: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 1)

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Parameter	Unit	Test 1 Test 2 Test 3
E-UTRA RF Channel Number		1
BWchannel	MHz	10
OCNG Patterns defined in A.3.2.1.1 (OP.1		OP.1 FDD
FDD)		OP.1 FDD
PBCH_RA		
PBCH_RB		
PSS_RA		
SSS_RA		
PCFICH_RB		
PHICH_RA		
PHICH_RB	dB	0
PDCCH_RA		
PDCCH_RB		
PDSCH_RA		
PDSCH_RB		
OCNG_RA <sup>Note1</sup>		
OCNG_RB <sup>Note1</sup>		
$N_{oc}^{\text{Note2}}$	dBm/15 kHz	-98
$\hat{E}_s / I_{ot}$	dB	4
RSRP <sup>Note3</sup>	dBm/15 kHz	-94
Io <sup>Note3</sup>	dBm/9 MHz	-64.76
$\hat{E}_s / N_{oc}$	dB	4
Propagation condition	-	AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as

AWGN of appropriate power for N<sub>s</sub> to be fulfilled.

Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table A.9.5.1-3: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 2)

Parameter	Unit	Tes	st 1	Tes	st 2	Tes	st 3
DL timeslot number		0		DwPTS		0	DwPTS
UTRA RF Channel number Note2		Chan	nel 2	Chan	nel 2	Char	nnel 2
PCCPCH_Ec/lor	dB	-3		-3		-3	
DwPCH_Ec/lor	dB		0		0		0
OCNS_Ec/lor	dB	-3		-3		-3	
loc	dBm/1.28MHz	-54	4.1	-75	5.2	-(	97
Îor/loc	dB	2	2		5		C
PCCPCH RSCP Note1	dBm	-55.1		-73.2		-100	
lo Note1	dBm/1.28MHz	-5	50	-6	69	-(	94
Propagation condition				AW	GN		

Note 1: PCCPCH RSCP and lo levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.

Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.

#### A.9.5.1.3 Test Requirements

The UTRA TDD P-CCPCH RSCP measurement accuracy shall meet the requirements in clause 9.3.1.

### A.9.5.2 P-CCPCH RSCP absolute accuracy for E-UTRAN TDD

#### A.9.5.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRAN TDD P-CCPCH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in clause 9.3.1 and applies to UE supporting this capability.

Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is provided. In the measurement control information it is indicated to the UE that periodic reporting of the UTRA TDD P-CCPCH RSRP measurement is used.

#### A.9.5.2.2 Test parameters

In this set of test cases there are two cells. Cell 1 is a E-UTRA TDD cell and cell 2 is a UTRA TDD cell. The absolute accuracy of P-CCPCH RSCP measurements are tested by using test parameters in Table A.9.5.2-1, Table A.9.5.2-2, and Table A.9.5.2-3. In all test cases, Cell 1 is the PCell and Cell 2 is the target cell.

Table A.9.5.2-1: General test parameters for UTRA TDD P-CCPCH RSCP measurement

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in clause A.3.1.2.2
parameters		Channel R.6 TDD	
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
UTRAN RF Channel Number		2	One UTRAN TDD carrier
			frequency is used.
E-UTRAN Channel Bandwidth (BWchannel)	MHz	10	
Active cell		Cell 1	E-UTRA TDD cell1 on RF channel number 1
Neighbour cell		Cell 2	1.28Mcps UTRA TDD Cell2 on RF channel number 2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells	ms	3	Asynchronous cells
Inter-RAT (UTRAN TDD) measurement quantity		P-CCPCH RSCP	

Table A.9.5.2-2: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 1)

Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number			1	
BWchannel	MHz		10	
OCNG Patterns defined in A.3.2.2.1 (OP.1			OP.1 TDD	١
TDD)			טר.ו וטט	,
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB	dB		0	
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note1</sup>				
OCNG_RB <sup>Note1</sup>				
$N_{oc}^{ m Note2}$	dBm/15 kHz		-98	
$\hat{E}_s / I_{ot}$	dB		4	
RSRP <sup>Note3</sup>	dBm/15 kHz		-94	
Io <sup>Note3</sup>	dBm/9 MHz		-64.76	
$\hat{E}_s / N_{oc}$	dB		4	
Propagation condition	-		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $\,N_{oc}\,$  to be fulfilled.

Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table A.9.5.2-3: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 2)

Parameter	Unit	Tes	st 1	Tes	st 2	Tes	st 3
DL timeslot number		0		DwPTS		0	DwPTS
UTRA RF Channel number Note2		Char	nel 2	Char	nel 2	Char	nel 2
PCCPCH_Ec/lor	dB	-3		-3		-3	
DwPCH_Ec/lor	dB		0		0		0
OCNS_Ec/lor	dB	-3		-3		-3	
loc	dBm/1.28MHz	-54	4.1	-75	5.2	-6	97
Îor/loc	dB	2	2	į	5	(	)
PCCPCH RSCP Note1	dBm	-55.1		-73.2		-100	
lo Note1	dBm/1.28MHz	-5	50	-6	69	-6	94
Propagation condition				AW	'GN		

Note 1: PCCPCH RSCP and lo levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.

Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.

#### A.9.5.2.3 Test Requirements

The UTRA TDD P-CCPCH RSCP measurement accuracy shall meet the requirements in clause 9.3.1.

#### A.9.6 GSM Carrier RSSI

#### A.9.6.1 E-UTRAN FDD

#### A.9.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits when the active cell is E-UTRAN FDD. This test will verify the requirements in clause 9.4.1. There are 12 different test setups with different signal levels for the GSM cells.

Measurement gaps are configured to measure on the GSM cells. Table A.9.6.1.1-2 defines the cell specific test parameters for the E-UTRAN FDD cell. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement is used. The limits of the GSM test parameters in terms of GSM BCCH received level at the receiver inputs are defined in Table A.9.6.1.1-3.

Table A.9.6.1.1-1: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel	As specified in clause A.3.1.1.1.
(E-UTRAN FDD)		R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement Channel	As specified in clause A.3.1.2.1.
parameters		R.6 FDD	
(E-UTRAN FDD)			
Active cell	-	Cell 1	
DRX	-	OFF	
Gap pattern Id		1	As specified in TS 36.133
			clause 8.1.2.1.
Filtering coefficient	-	0	L3 filtering is not used.
Inter-RAT measurement		GSM Carrier RSSI	
quantity			
Monitored cell list size		6 GSM neighbours including ARFCN 1	Included in the Measurement
			control information

Table A.9.6.1.1.-2: E-UTRAN FDD Cell specific test parameters for GSM Carrier RSSI accuracy test in E-UTRAN FDD

Parameter	Unit	Tests 1-12
E-UTRAN RF Channel Number		1
BW <sub>channel</sub> OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)	MHz	10 OP.1 FDD

Propagation Condition		AWGN
$\hat{E}_s/N_{oc}$	dB	4
SCH_RP Note 3	dBm/15 kHz	-94
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	4
RSRP Note 3	dBm/15 kHz	-94
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98
OCNG_RB <sup>Note 1</sup>	dB	
OCNG_RA <sup>Note 1</sup>	dB	
PDSCH_RB	dB	
PDSCH_RA	dB dB	
PDCCH_RB	dВ	
PHICH_RB PDCCH_RA	dB dB	v
PHICH_RA	dB	0
PCFICH_RB	dB	
SSS_RA	dB	
PSS_RA	dB	
PBCH_RB	dB	
PBCH_RA	dB	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{\it ac}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.6.1.1-3: BCCH signal levels at receiver input in dBm

Step	BCCH1	BCCH2	ВССН3	BCCH4	BCCH5	ВССН6
1	-38.5	-38.5	NA	NA	NA	NA
2	-48.5	-48.5	NA	NA	NA	NA
3	-70.5	-70.5	NA	NA	NA	NA
4	-109.5	-109.5	NA	NA	NA	NA
5	-57.5	NA	-54.5	NA	NA	NA
6	-64.5	NA	-59.5	NA	NA	NA
7	-71.5	NA	NA	-64.5	NA	NA
8	-78.5	NA	NA	-69.5	NA	NA
9	-85.5	NA	NA	NA	-74.5	NA
10	-92.5	NA	NA	NA	-79.5	NA
11	-99.5	NA	NA	NA	NA	-84.5
12	-106.5	NA	NA	NA	NA	-89.5

#### A.9.6.1.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in clause 9.4.1.

#### A.9.6.2 E-UTRAN TDD

#### A.9.6.2.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits when the active cell is E-UTRAN TDD. This test will verify the requirements in clause 9.4.1. There are 12 different test setups with different signal levels for the GSM cells.

Measurement gaps are configured to measure on the GSM cells. Table A.9.6.2.1-2 defines the cell specific test parameters for the E-UTRAN TDD cell. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement is used. The limits of the GSM test parameters in terms of GSM BCCH received level at the receiver inputs are defined in Table A.9.6.2.1-3.

Table A.9.6.2.1-1: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell	-	Cell 1	
DRX	-	OFF	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
Gap pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Filtering coefficient	-	0	L3 filtering is not used.
Inter-RAT measurement quantity		GSM Carrier RSSI	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Included in the Measurement control information

Table A.9.6.2.1-2: E-UTRAN TDD Cell specific test parameters for GSM Carrier RSSI accuracy test in E-UTRAN TDD

Unit	Tests 1 - 12
	4
	1
MHz	10
	OP.1 TDD
	OF.1 1DD
dB	
dB	0
dB	1
dB	1
dB	1
dB	
dB	1
dB	1
dBm/15 kHz	-98
dBm/15 kHz	-94
dB	4
dBm/15 kHz	-94
dB	4
	AWGN
	MHz  dB dB dB dB dB dB dB dB dB dB dB dB dB

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.6.2.1-3: BCCH signal levels at receiver input in dBm

Step	BCCH1	BCCH2	ВССН3	BCCH4	BCCH5	ВССН6
1	-38.5	-38.5	NA	NA	NA	NA
2	-48.5	-48.5	NA	NA	NA	NA
3	-70.5	-70.5	NA	NA	NA	NA
4	-109.5	-109.5	NA	NA	NA	NA
5	-57.5	NA	-54.5	NA	NA	NA
6	-64.5	NA	-59.5	NA	NA	NA
7	-71.5	NA	NA	-64.5	NA	NA
8	-78.5	NA	NA	-69.5	NA	NA
9	-85.5	NA	NA	NA	-74.5	NA
10	-92.5	NA	NA	NA	-79.5	NA
11	-99.5	NA	NA	NA	NA	-84.5
12	-106.5	NA	NA	NA	NA	-89.5

#### A.9.6.2.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in clause 9.4.1.

#### A.9.7 UE Rx – Tx Time Difference

#### A.9.7.1 E-UTRAN FDD UE Rx – Tx time difference case

#### A.9.7.1.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD UE Rx - Tx time difference measurement accuracy is within the specified limits in Clause 9.1.9.

There is only one active cell in the test. The tested UE is connected with the PCell, configured to transmit SRS signals periodically, and signaled to report UE Rx – Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE.

#### A.9.7.1.2 Test parameters

The parameters for this test case are defined in Table A.9.7.1.2-1, and the SRS configuration used is defined in Table A.9.7.1.2-2.

Table A.9.7.1.2-1: FDD UE Rx – Tx time difference test parameters

Parameter	Unit	Test 1	Test 2
E-UTRAN RF Channel Number		1	1
BW <sub>channel</sub>	MHz	1.4	10
DRX		0	FF
PDSCH Reference measurement channel defined in A.3.1.1.1		R.2 FDD	R.0 FDD
PDSCH allocation	$n_{PRB}$	2—3	13—36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.8 FDD	R.6 FDD
OCNG Patterns defined in A.3.2.1.3 (OP.3 FDD) and A.3.2.1.1 (OP.1 FDD)		OP.3 FDD	OP.1 FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note1</sup>	dB		
OCNG_RB <sup>Note1</sup>	dB		
$N_{oc}^{ m Note2}$	dBm/15 kHz	-98	-98
RSRP Note3	dBm/15 kHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	-3	-3
To Note3	dBm/1.08 MHz	-77.66	N/A
	dBm/9 MHz	N/A	-68.45
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	-3	-3
Propagation Condition		AW	/GN
Note 1: OCNC shall be used such that the resources in the active call	ana fullu allagatad an	l	-4-1

Note 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Table A.9.7.1.2-2: Sounding Reference Symbol Configuration to be used in FDD UE Rx – Tx time difference test

Test 1	Test 2	Comment	
Value		Comment	
bw7	bw5		
SC	1		
FAL	SE		
N/	Ą	Not applicable for FDD	
0		No hopping	
hbw0			
0			
TRUE		Indefinite duration	
0		SRS periodicity of 2ms for all	
		Tests.	
0			
cs0		No cyclic shift	
an1		Number of antenna ports used	
		for SRS transmission	
	bw7   sc Sc FAL N// 0 hbv 0 TRU 0 cs an	bw7   bw5   sc1   FALSE   N/A   0   hbw0   0   TRUE   0   0   cs0	

#### A.9.7.1.3 Test Requirements

The UE Rx – Tx time difference measurement accuracy shall fulfill the requirements in Clause 9.1.9.1.

#### A.9.7.2 E-UTRA TDD

#### A.9.7.2.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD UE Rx-Tx time difference measurement accuracy is within the specified limits in clause 9.1.9.

There is only one cell in the test. The tested UE is connected with the PCell, configured to transmit SRS signals periodcally, and signaled to report UE Rx - Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx - Tx measurement reported by the UE.

#### A.9.7.2.2 Test parameters

The parameters for this test case are defined in Table A.9.7.2.2-1, and the SRS configuration used is defined in Table A.9.7.2.2-2.

Table A.9.7.2.2-1: Cell specific test parameters for UE Rx-Tx time difference measurement

Parameter	Unit	Tests 1	Tests 2
E-UTRAN RF Channel Number	-	1	1
BW <sub>channel</sub>	MHz	1.4	10
Uplink-downlink configuration of cell Note1		1	1
Special subframe configuration of cell Note1		6	6
PDSCH Reference measurement channel defined in	-	R.2 TDD	R.0 TDD
A.3.1.1.2			
PDSCH allocation	$n_{\scriptscriptstyle PRB}$	2-3	13-36
PDCCH/PCFICH/PHICH Reference measurement	-	R.8 TDD	R.6 TDD
channel defined in A.3.1.2.2			
OCNG Patterns defined in A.3.2.2.3 (OP.3 TDD) and	-	OP.3 TDD	OP.1 TDD
A.3.2.2.1 (OP.1 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note2</sup>	dB		
OCNG_RB <sup>Note2</sup>	dB		
N <sub>oc</sub> Note 3	dBm/15 kHz	-98	-98
RSRP Note 4	dBm/15 kHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	-3	-3
lo Note 4	dBm/1.08 MHz	-77.66	N/A
	dBm/9 MHz	N/A	-68.45
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	-3	-3
Propagation Condition		AW	'GN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.

Note 2: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.7.2.2-2: Sounding Reference Symbol Configuration to be used in TDD UE Rx – Tx time difference test

Field	Test 1	Test 2	Commont	
Field	Value		Comment	
srsBandwidthConfiguration	bw7	bw5		
srsSubframeConfiguration	sc	1		
ackNackSrsSimultaneousTransmission	FAL	SE		
srsMaxUpPTS	TRI	JE		
srsBandwidth	0		No hopping	
srsHoppingBandwidth	hbw0			
frequencyDomainPosition	0			
Duration	TRUE		Indefinite duration	
Srs-ConfigurationIndex	10		SRS periodicity of 10ms for all Tests.	
transmissionComb	0			
cyclicShift	cs0		No cyclic shift	
SRS-AntennaPort	an1		Number of antenna ports used for SRS transmission	

#### A.9.7.2.3 Test Requirements

The UE Rx – Tx time difference measurement accuracy shall fulfill the requirements in clause 9.1.9.1.

# A.9.7.3 E-UTRAN FDD UE Rx–Tx Time Difference under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.9.7.3.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD UE Rx–Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.3 when time-domain measurement resource restriction is configured for PCell measurements via higher-layer signalling [2] and non-MBSFN ABS are configured in the interfering cell.

#### A.9.7.3.2 Test parameters

In this test case, there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured, and Cell 2 is the interfering cell. Non-MBSFN ABS pattern is configured in Cell 2 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on PCell. The information for both patterns shall be provided to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.3.2-1 and Table A.9.7.3.2-2, respectively, and the SRS configuration used is specified in Table A.9.7.3.2-3.

Table A.9.7.3.2-1: General test parameters for FDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The measured cell
Neighbour cell		Cell 2	The cell interfering to Cell 1
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One FDD carrier frequency is used
Downlink Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	For both cells in the test
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells	μs	3	Synchronous cells
Dhysical cell ID DCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6	Cell PCIs for Cell 1 and Cell 2 are selected
Physical cell ID PCI		!=0	randomly so that the condition is met
ABS pattern		'10000000100000001000 0000100000001000000	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod 40 = 0. No MBSFN subframes are cofigured in Cell 1 or Cell 2 during the ABS subframes of Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'1000000010000001000 00001000000010000000	Configured for measurements on Cell 1.

Table A.9.7.3.2-2: Cell-specific test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2
E-UTRAN RF Channel Number		1	1
Channel bandwidth (BW <sub>channel</sub> )	MHz	10	10
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	N/A
PDSCH allocation	$n_{PRB}$	13—36	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	N/A
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.6 (OP.6 FDD)		OP.5 FDD	OP.6 FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note1</sup>	dB		
OCNG_RB <sup>Note1</sup>	dB		
$N_{oc}$ Note 2	dBm/15 kHz	-98	-98
${\sf CRS}\hat{E}_s/N_{oc}$	dB	-3	1
CRS $(\hat{E}_s/I_{ot})_{meas}^{Note 3}$	dB	-3	-0.76
CRS $(\hat{E}_{s}/I_{ot})_{nonABS}$ Note 3	dB	-6.54	-0.76
RSRP Note 4	dBm/15 kHz	-101	-97
$({ m Io})_{meas}^{ m Note \ 4}$	dBm/9 MHz	-67.89	-67.89
(Io) <sub>nonABS</sub> Note 4	dBm/9 MHz	-65.81	-65.81
Propagation condition		AWGN	

NOTE 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{\it oc}$  to be fulfilled. Applies to all subframes.

Note 3:  $(\hat{E}_s/I_{ot})_{meas}$  is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(\hat{E}_s/I_{ot})_{nonABS}$  is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  ${\rm (Io)}_{\it meas}$  is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  ${\rm (Io)}_{\it nonABS}$  is calculated in CRS symbols in the subframes not indicated for PCell measurements by measurement resource restriction pattern.

Table A.9.7.3.2-3: Sounding Reference Symbol Configuration to be used in FDD UE Rx–Tx time difference test

Field	Value	Comment			
UL bandwidth	50 RBs	Same as the DL bandwidth			
srsBandwidthConfiguration	bw5				
srsSubframeConfiguration	sc1				
ackNackSrsSimultaneousTransmission	FALSE				
srsMaxUpPTS	N/A	Not applicable for FDD			
srsBandwidth	0	No hopping			
srsHoppingBandwidth	hbw0				
frequencyDomainPosition	0				
Duration	TRUE	Indefinite duration			
srs-ConfigIndex	0	SRS periodicity of 2ms			
transmissionComb	0				
cyclicShift	cs0	No cyclic shift			
srsAntennaPort	an1	Number of SRS antenna ports			
Note: For further information see clause 6.3.2 in TS 36.331.					

#### A.9.7.3.3 Test Requirements

The UE Rx-Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.3.

## A.9.7.4 E-UTRAN TDD UE Rx-Tx Time Difference under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

#### A.9.7.4.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD UE Rx-Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.3 when time-domain measurement resource restriction is configured for PCell measurements via higher-layer signalling [2] and non-MBSFN ABS are configured in the interfering cell.

#### A.9.7.4.2 Test Parameters

In the test, there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured, and Cell 2 is the interfering cell. Non-MBSFN ABS pattern is configured in Cell 2 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD UE Rx-Tx time difference measurements on PCell. The information for both patterns shall be provided to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.4.2-1 and Table A.9.7.4.2-2, respectively, and the SRS configuration used is defined in Table A.9.7.4.2-3.

Table A.9.7.4.2-1: General test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Cell to be measured
Neighbour cell		Cell 2	The cell interfering to Cell 1
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One TDD carrier frequency is used
Downlink Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	For both cells in the test
CP length		Normal	For both cells in the test
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration		1	For Cell 1 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
DRX			OFF
Time offset between cells	μs	3	Synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6 !=0	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met.
ABS pattern		'000000001000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod 20 = 0. No MBSFN subframes are cofigured in the ABS subframes in Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'0000000010000000001'	Configured for measurements on Cell 1.

Table A.9.7.4.2-2: Cell-specific test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Parameter	Unit	Cell 1	Cell 2
PDECCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2         R.6 TDD         R.6 TDD           DCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) in A.3.2.2.2 (OP.2 TDD)         OP.1 TDD         OP.1 TDD           PBCH_RB         dB         OP.1 TDD         OP.2 TDD           PBCH_RB         dB         OP.2 TDD         OP.2 TDD           PBCH_RB         dB         OP.2 TDD         OP.2 TDD           PBCH_RB         dB         OP.2 TDD         OP.2 TDD           PBCH_RB         dB         OP.2 TDD         OP.2 TDD           PBCH_RB         dB         OB.2 TDD         OP.2 TDD           PBCH_RB         dB         OB.2 TDD         OP.2 TDD           PBCH_RB         dB         OB.2 TDD         OP.2 TDD           PDCH_RB         dB         OB.2 TDD         OP.2 TDD           PDCCH_RB         dB         OB.2 TDD         OP.2 T	PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	N/A
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDSCH allocation	$n_{PRB}$	13—36	N/A
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	R.6 TDD
PBCH_RB         dB           PSS_RA         dB           PSS_RA         dB           PSS_RA         dB           PSS_RA         dB           PSS_RA         dB           PSS_RA         dB           PHICH_RB         dB           PHICH_RB         dB           PDCCH_RB         dB           PDCCH_RB         dB           PDSCH_RB         dB           PDSCH_RB         dB           PDCNIG_RBNote1         dB           POCNIG_RRNote1         dB           POCNIG_RNOTE1         dB           POCNIG_RNOTE1         dB           POCNIG_RNOTE1         dB           POCNIG_RNOTE2         dB           PS         -98	OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.2 TDD
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	PBCH_RA	dB		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	PBCH_RB	dB		
PCFICH_RB         dB           PHICH_RA         dB           PHICH_RB         dB           PDCCH_RB         dB           PDCCH_RB         dB           PDSCH_RB         dB           POSCH_RB         dB           POSCH_RB         dB           POSCH_RB         -98           POSCH_RB         -98           POSC	PSS_RA	dB		
PHICH_RA         dB         dB           PHICH_RA         dB         dB           PHICH_RB         dB         dB           PDCCH_RA         dB         dB           PDCCH_RB         dB         dB           PDSCH_RB         dB         dB           PDSCH_RB         dB         DCNG_RA^{Note1}           DCNG_RB^{Note1}         dB         DCNG_RB^{Note2}           DCNG_RB^{Note2}         dB M/15         HZ           CRS $(\hat{E}_s/N_{oc})$ dB         -3         1           CRS $(\hat{E}_s/I_{ot})_{meas}$ dB         -3         -0.76           CRS $(\hat{E}_s/I_{ot})_{monABS}$ dB         -6.54         -0.76           CRS $(\hat{E}_s/I_{ot})_{monABS}$ dB         -6.54         -0.76           CRS $(\hat{E}_s/N_{oc})_{monABS}$ dB         -6.54         -67.89 $(Io)_{meas}^{Note 4}$ dBm/9         HZ         -67.89         -67.89 $(Io)_{monABS}^{Note 4}$ dBm/9         HZ         -65.81         -65.81	SSS_RA	dB	1	
PHICH_RB PDCCH_RA PDCCH_RA PDCCH_RB PDSCH_RB PDSCH_RA PDSCH_RA PDSCH_RB PD	PCFICH_RB	dB	1	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PHICH_RA	dB	1	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PHICH_RB	dB	0	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH_RA	dB		powers defined in Table A.3.4.1.1-1.
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH_RB			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDSCH_RA	dB		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDSCH_RB			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG_RA <sup>Note1</sup>	dB	1	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			1	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$N_{oc}^{-}$ Note2	dBm/15	-98	-98
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	${ m CRS}\hat{E}_s/N_{oc}$	dB	-3	1
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	CRS $(\hat{E}_s/I_{ot})_{meas}^{}$ Note 3	dB	-3	-0.76
$ \frac{\text{dBm/15}}{\text{kHz}} -101                                 $	CRS $(\hat{E}_s/I_{ot})_{nonABS}$ Note 3	dB	-6.54	-0.76
$(IO)_{meas}$ $MHz$ $-67.89$ $-67.89$ $(IO)_{nonABS}$ $^{Note 4}$ $dBm/9$ $_{MHz}$ $-65.81$ $-65.81$	RSRP Note 4		-101	-97
MHz $-65.81$ $-65.81$	$({ m Io})_{meas}^{ m Note~4}$		-67.89	-67.89
	(Io) <sub>nonABS</sub> Note 4		-65.81	-65.81
Propagation Condition AWGN	Propagation Condition			AWGN

Note 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3:  $(\hat{E}_s/I_{ot})_{meas}$  is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(\hat{E}_s/I_{ot})_{nonABS}$  is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  $(Io)_{meas}$  is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(Io)_{nonABS}$  is calculated in CRS symbols

Table A.9.7.4.2-3: Sounding Reference Symbol Configuration to be used in TDD UE Rx–Tx time difference test

Field	Value	Comment
UL bandwidth	50 RBs	Same as the DL bandwidth
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc1	
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	TRUE	
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	10	SRS periodicity of 10ms for all Tests.
transmissionComb	0	10000
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause	6.3.2 in TS 36.331.	•

#### A.9.7.4.3 Test Requirements

The UE Rx-Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.3.

# A.9.7.5 E-UTRAN FDD UE Rx–Tx time difference under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.9.7.5.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD UE Rx-Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.4 when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

#### A.9.7.5.2 Test parameters

In this test case, there are three synchronous cells, Cell 1, Cell 2 and Cell 3, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured. Cell 2 and Cell 3 are the interfering cells. A non-MBSFN ABS pattern is configured in each of the Cell 2 and Cell 3 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on PCell. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE before the measurement starts

The general and cell-specific parameters for this test case are defined in Table A.9.7.5.2-1 and Table A.9.7.5.2-2, respectively, and the SRS configuration used is specified in Table A.9.7.5.2-3.

Table A.9.7.5.2-1: General test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Para	ımeter	Unit	Value	Comment	
Serving cell (PC	Cell)		Cell 1	The measured cell	
Neighbour cell			Cell 2 and Cell 3	Cell 2 is the first interfering cell to Cell 1, whilst Cell 3 is the second interfering cell to Cell 1.	
ABS transmissi	on configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1	
E-UTRA RF Ch	annel Number		1	One FDD carrier frequency is used	
Downlink Chan	nel Bandwidth	MHz	10	For all cells in the test	
(BW <sub>channel</sub> )			Normal	For all calls in the test	
CP length DRX			Normal	For all cells in the test  OFF	
Time offset bety	ween cells	μs	Cell 2 offset with respect to Cell 1: 3 Cell 3 offset with respect to Cell 1: 2	Three synchronous cells	
Physical cell ID	Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6 =0 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 !=0	Cell PCIs are selected so that both conditions are met	
ABS pattern	pattern		'10000000100000001000 0000100000001000000	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 2 and Cell 3 during the testing.	
Time-domain measurement resource restriction pattern for PCell measurements			'1000000010000001000 00001000000010000000	Configured for measurements on Cell 1.	
	physCellId		see PCI conditions above	The CDC assistance information is presided for	
CRS antennaPortsC ount			1	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It	
information	mbsfn- SubframeConfi gList		oneFrame = '000000'	includes a single MBSFN-SubframeConfig element with subframe allocation one Frame='000000'.	

Table A.9.7.5.2-2: Cell-specific test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ARS

Parameter	Unit	Cell 1	Cell 2	Cell 3	
E-UTRAN RF Channel Number		1	1	1	
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	N/A	N/A	
PDSCH allocation	$n_{PRB}$	13—36	N/A	N/A	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	N/A	N/A	
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and in A.3.2.1.6 (OP.6 FDD)		OP.5 FDD	OP.6 FDD	OP.6 FDD	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB		Non-ABS and A	BS subframe	
PHICH_RB	dB	0	channel powers defined in Tabl A.3.4.1.1-1.		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note1</sup>	dB				
OCNG_RB <sup>Note1</sup>	dB				
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98	-98	-98	
${\sf CRS}\hat{E}_s/N_{oc}$	dB	-3	3	1	
CRS $(\hat{E}_s/I_{ot})_{meas}$ Note 3	dB	-7.76	1.24	-0.76	
CRS $(\hat{E}_s/I_{ot})_{nonABS}^{}$ Note 3	dB	-9.29	-1.41	-4.44	
RSRP Note 4	dBm/15 kHz	-101	-95	-97	
(Io) <sub>meas</sub> Note 4	dBm/9 MHz	-67.11	-67.11	-67.11	
$({ m Io})_{nonABS}$ Note 4	dBm/9 MHz	-63.45	-63.45	-63.45	
Propagation condition			AWGN		

NOTE 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled. Applies to all subframes.

Note 3:  $(\hat{E}_s/I_{ot})_{meas}$  is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(\hat{E}_s/I_{ot})_{nonABS}$  is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  $(Io)_{meas}$  is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(Io)_{nonABS}$  is calculated in CRS symbols in the subframes not indicated for PCell measurements by measurement resource restriction pattern.

Table A.9.7.5.2-3: Sounding Reference Symbol Configuration to be used in FDD UE Rx–Tx time difference test

Field	Value	Comment				
UL bandwidth	50 RBs	Same as the DL bandwidth				
srsBandwidthConfiguration	bw5					
srsSubframeConfiguration	sc1					
ackNackSrsSimultaneousTransmission	FALSE					
srsMaxUpPTS	N/A	Not applicable for FDD				
srsBandwidth	0	No hopping				
srsHoppingBandwidth	hbw0					
frequencyDomainPosition	0					
Duration	TRUE	Indefinite duration				
srs-ConfigIndex	0	SRS periodicity of 2ms				
transmissionComb	0					
cyclicShift	cs0	No cyclic shift				
srsAntennaPort	an1	Number of SRS antenna ports				
Note: For further information see clause 6.3.2 in TS 36.331.						

#### A.9.7.5.3 Test Requirements

The UE Rx-Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.4.

# A.9.7.6 E-UTRAN TDD UE Rx-Tx Time Difference under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

#### A.9.7.6.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD UE Rx–Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.4 when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

#### A.9.7.6.2 Test Parameters

In this test case, there are three synchronous cells, Cell 1, Cell 2 and Cell 3, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured. Cell 2 and Cell 3 are the interfering cells. A non-MBSFN ABS pattern is configured in each of the Cell 2 and Cell 3 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on PCell. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.6.2-1 and Table A.9.7.6.2-2, respectively, and the SRS configuration used is specified in Table A.9.7.6.2-3.

Table A.9.7.6.2-1: General test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Cell to be measured
Neighbour cell		Cell 2 and Cell 3	Cell 2 is the first interfering cell to Cell 1, whilst
			Cell 3 is the second interfering cell to Cell 1.
ABS transmission configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One TDD carrier frequency is used
Downlink Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	For all cells in the test
CP length		Normal	For all cells in the test
Special subframe configuration		6	For all cells in the test. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe		1	For all cells in the test. For uplink-downlink
configuration			subframe configurations see Table 4.2-2 in [16].
DRX			OFF
Time offset between cells	μs	Cell 2 offset with respect to Cell 1: 3 Cell 3 offset with respect to Cell 1: 2	Three synchronous cells
Physical cell ID PCI		(PCI <sub>cell1</sub> - PCI <sub>cell2</sub> )mod6 =0 (PCI <sub>cell1</sub> - PCI <sub>cell3</sub> )mod6 !=0	Cell PCIs are selected so that both conditions are met
ABS pattern		'000000001000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 2 and Cell 3 during the testing.
Time-domain measurement resource restriction pattern for serving cell measurements		'00000000010000000001'	Configured for measurements on Cell 1.
physCellId		see PCI conditions above	
CRS antennaPortsC ount		1	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig
information mbsfn- SubframeConfi gList		oneFrame = '000000'	element with subframe allocation one Frame='000000'.

Table A.9.7.6.2-2: Cell-specific test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2	Cell 3		
E-UTRAN RF Channel Number		1	1	1		
PDSCH Reference measurement channel		R.0 TDD	N/A	N/A		
defined in A.3.1.1.2		11.0 122	14// (	1471		
PDSCH allocation	$n_{PRB}$	13—36	N/A	N/A		
PDCCH/PCFICH/PHICH Reference		R.6 TDD	N/A	N/A		
measurement channel defined in A.3.1.2.2		11.0 100	IN/A	IN/A		
OCNG Patterns defined in A.3.2.2.1 (OP.1		OP.1 TDD	OP.2 TDD	OP.2 TDD		
TDD) and A.3.2.2.2 (OP.2 TDD)		01.1100	01.2 100	01.2100		
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB		Non-ABS and	ABS subframe		
PHICH_RB	dB	0	channel powers defined in Tab A.3.4.1.1-1.			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note1</sup>	dB					
OCNG_RB <sup>Note1</sup>	dB					
$N_{oc}^{ m Note2}$	dBm/15 kHz	-98	-98	-98		
${ m CRS}\hat{E}_s/N_{oc}$	dB	-3	3	1		
CRS $(\hat{E}_s/I_{ot})_{meas}$ Note 3	dB	-7.76	1.24	-0.76		
CRS $(\hat{E}_s/I_{ot})_{nonABS}$ Note 3	dB	-9.29	-1.41	-4.44		
RSRP Note 4	dBm/15 kHz	-101	-95	-97		
$(\mathrm{Io})_{meas}^{Note4}$	dBm/9 MHz	-67.11	-67.11	-67.11		
(Io) <sub>nonABS</sub> Note 4	dBm/9 MHz	-63.45	-63.45	-63.45		
Propagation Condition			AWGN			

Note 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3:  $(\hat{E}_s/I_{ot})_{meas}$  is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(\hat{E}_s/I_{ot})_{nonABS}$  is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  $(Io)_{meas}$  is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst  $(Io)_{nonABS}$  is calculated in CRS symbols

Table A.9.7.6.2-3: Sounding Reference Symbol Configuration to be used in TDD UE Rx–Tx time difference test

Field	Value	Comment
UL bandwidth	50 RBs	Same as the DL bandwidth
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc1	
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	TRUE	
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	10	SRS periodicity of 10ms for all Tests.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clau	ise 6.3.2 in TS 36.331.	

#### A.9.7.6.3 Test Requirements

The UE Rx-Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.4.

#### A.9.8 RSTD

### A.9.8.1 E-UTRAN FDD RSTD intra frequency case

#### A.9.8.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSTD intra-frequency measurement accuracy is within the specified limits in clause 9.1.10.1 in AWGN channels.

In the test, there are two synchronous cells, Cell 1 as the reference cell and Cell 2 as the neighbour cell on the same frequency.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

A time span of  $T_{RSTD\ IntraFreqFDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Tables A.9.8.1.1-1 and A.9.8.1.1-2 during this time.

The test parameters are given in Table A.9.8.1.1-1 and Table A.9.8.1.1-2.

Table A.9.8.1.1-1: General Test Parameters for intra frequency RSTD Tests for E-UTRAN FDD

Parameter	Unit		Va		Comment	
		Test1	Test2	Test3	Test4	
PCFICH/PDCCH/PHICH parameters		R.8	FDD	R.6	FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1		OP.7	FDD		FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Reference cell				II 1		
Neighbour cell				1 2		0 500
E-UTRA RF Channel Number				1		One FDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	1	.4	1	0	
PRS Bandwidth	RB	(	6	5	0	PRS bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
PRS configuration Index $I_{PRS}$		1	2	2	2	As defined in TS 36.211
Number of consecutive positioning downlink subframes $N_{\rm PRS}$		6 1				As defined in TS 36.211
prs-MutingInfo				1110000' 1110000'		See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 1	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 3	
expectedRSTD	us	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	
expectedRSTDUncertainty for all neighbour cells	us	5	5	5	5	
CP length		Normal				
DRX		OFF				
Radio frame receive time offset between the cells at the UE antenna connector	us	Cell 2 to Cell 1: -3	Cell 2 to Cell 1: 3	Cell 2 to Cell 2 to Cell 1: 3		PRS are transmitted from synchronous cells
Number of cells provided in OTDOA assistance data			1	The number of cells includes the reference cell		
T <sub>RSTD</sub> IntraFreqFDD, E-UTRAN	ms		25	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.1		

Table A.9.8.1.1-2: Cell Specific Test Parameters for intra frequency RSTD Tests for E-UTRAN FDD

Parameter	Parameter Unit Test1 Test2		Test3		Test4				
Farameter	Onit	Cell1	Cell2	Cell1	Cell2	Cell1	Cell2	Cell1	Cell2
E-UTRA RF Channel					1				
Number					ı				
PBCH_RA									
PBCH_RB									
PSS_RA									
SSS_RA									
PCFICH_RB									
PHICH_RA	dB	0	0	0	0	0	0	0	0
PHICH_RB									
PDCCH_RA									
PDCCH_RB									
OCNG_RA <sup>Note1</sup>									
OCNG_RB <sup>Note1</sup>									
PRS_RA	dB	0	0	-3	0	0	0	-3	0
$N_{oc}^{ m Note2}$	dBm/15 kHz	-98	-98	-98	-98	-98	-98	-98	-98
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	-2.37	-8.02	-6	-13	-2.37	-8.02	-6	-13
PRS $\hat{E}_{_{s}}/I_{_{ot}}$ Note3	dB	-3	-10	-6	-13	-3	-10	-6	-13
lo <sup>Note3</sup>	dBm/1.08 MHz	-78.92	-78.92	-79.21	-79.21	N/A	N/A	N/A	N/A
	dBm/9 MHz	N/A	N/A	N/A	N/A	-69.72	-69.72	-70	-70
PRP Note3	dBm/15kHz	-100.37	-106.02	-104	-111	-100.37	-106.02	-104	-111
${ m \hat{E}}_{ m s}/N_{\it oc}$ Note 3	dB	-2.37	-8.02	-3	-13	-2.37	-8.02	-3	-13
RSRP Note 3	dBm/15kHz	-100.37	-106.02	-101	-111	-100.37	-106.02	-101	-111
Propagation condition	AWGN								
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).									

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS

#### A.9.8.1.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.1.

## A.9.8.2 E-UTRAN TDD RSTD intra frequency case

#### A.9.8.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSTD intra-frequency measurement accuracy is within the specified limits in clause 9.1.10.1 in AWGN channels.

In the test, there are two synchronous cells, Cell 1 as the reference cell and Cell 2 as the neighbour cell on the same frequency.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data.

A time span of  $T_{RSTD\ IntraFreqTDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Tables A.9.8.2.1-1 and A.9.8.2.1-2 during this time.

The test parameters are given in Table A.9.8.2.1-1 and Table A.9.8.2.1-2.

Table A.9.8.2.1-1: General Test Parameters for intra frequency RSTD Tests for E-UTRAN TDD

Parameter	Parameter Unit Value					
	J.III	Test1	Test2	Test3	Test4	Comment
PCFICH/PDCCH/PHICH parameters		R.8	TDD	R.6	TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		OP.4 TDD		OP.2	TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Reference cell		Cell 1 Cell 2				
Neighbour cell E-UTRA RF Channel Number		Cell 2		1		One TDD carrier frequency is used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	1	.4	1	0	rrequericy is used.
PRS Bandwidth	RB	(	6	5	60	PRS bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Special subframe configuration		6		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		3		1		As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2. The same configuration in both cells.
PRS configuration Index $I_{\mathrm{PRS}}$		(	9	1	4	As defined in TS 36.211
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		(	6		1	As defined in TS 36.211
prs-MutingInfo		Cell 1: '11110		1110000'		See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 1	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 3	
expectedRSTD	us	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	
expectedRSTDUncertainty for all neighbour cells	us	5	5	5 5		
CP length		Normal				
DRX Radio frame receive time offset between the cells at the UE antenna connector	us	OFF Cell 2 to Cell 1: -3	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	PRS are transmitted from synchronous cells
Number of cells provided in OTDOA assistance data			1	6		The number of cells includes the reference cell

T <sub>RSTD IntraFreqTDD</sub> , E-UTRAN	ms	2560	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.2
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Table A.9.8.2.1-2: Cell Specific Test Parameters for intra frequency RSTD Tests for E-UTRAN TDD

Parameter	Unit	Test1		Test2		Test3		Test4	
	Offic	Cell1	Cell2	Cell1	Cell2	Cell1	Cell2	Cell1	Cell2
E-UTRA RF Channel					1				
Number									
PBCH_RA									
PBCH_RB									
PSS_RA									
SSS_RA									
PCFICH_RB									
PHICH_RA	dB	0	0	0	0	0	0	0	0
PHICH_RB									
PDCCH_RA									
PDCCH_RB									
OCNG_RA <sup>Note1</sup>									
OCNG_RB <sup>Note1</sup>									
PRS_RA	dB	0	0	-3	0	0	0	-3	0
$N_{_{oc}}^{ m Note2}$	dBm/15 kHz	-98	-98	-98	-98	-98	-98	-98	-98
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}$	dB	-2.37	-8.02	-6	-13	-2.37	-8.02	-6	-13
PRS $\hat{E}_{_{s}}/I_{_{ot}}^{}$ Note3	dB	-3	-10	-6	-13	-3	-10	-6	-13
lo Note3	dBm/1.08 MHz	-78.92	-78.92	-79.21	-79.21	N/A	N/A	N/A	N/A
	dBm/9 MHz	N/A	N/A	N/A	N/A	-69.72	-69.72	-70	-70
PRP Note3	dBm/15kHz	-100.37	-106.02	-104	-111	-100.37	-106.02	-104	-111
${ m \hat{E}}_{ m s}/N_{oc}^{ m Note~3}$	dB	-2.37	-8.02	-3	-13	-2.37	-8.02	-3	-13
RSRP Note 3	dBm/15kHz	-100.37	-106.02	-101	-111	-100.37	-106.02	-101	-111
Propagation condition		AWGN							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

#### A.9.8.2.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.1.

## A.9.8.3 E-UTRAN FDD-FDD RSTD inter frequency case

#### A.9.8.3.1 Test Purpose and Environment

The purpose of these tests is to verify that the RSTD inter-frequency measurement accuracy is within the specified limits in clause 9.1.10.2 in AWGN channels.

There are two synchronous cells on different carrier frequencies in the test. In all test cases, Cell 1 is the reference cell as well as the PCell and Cell 2 the neighbor cell. The inter frequency measurements on Cell 2 are supported by measurement gaps. PCIs of the two cells are selected randomly.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE before the measurements start.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of  $T_{RSTD\ InterFreqFDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Table A.9.8.3.1-1 and Table A.9.8.3.1-2 for each of the two cells during this time.

The test parameters are given in Table A.9.8.3.1-1 and Table A.9.8.3.1-2.

Table A.9.8.3.1-1: General Test Parameters for inter frequency RSTD Tests for E-UTRAN FDD

Parameter	Unit	Va	lue	Comment			
		Test1 Test2					
PCFICH/PDCCH/PHICH parameters		R.8 FDD	R.6 FDD	As specified in clause A.3.1.2.1			
OCNG Patterns defined in A.3.2.1		OP.7 OP.6 FDD		OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).			
Reference cell		Cell 1		Cell 1 on RF channel number 1			
Neighbour cell		Cell 2		Cell 2 on RF channel number 2			
E-UTRA RF Channel Number		1,2		Two FDD carrier frequencies are used.			
Channel Bandwidth (BW <sub>channel</sub> )	MHz	1.4	10	·			
PRS Bandwidth	RB	6	50	PRS bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].			
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		6	1	As defined in TS 36.211			
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000'		See clause 6.5.1.2 in TS 36.355 for more information			
expectedRSTD	μs	Cell 2:1 Other neighbour cells: randomly between -3 and 3		The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator			
expectedRSTDUncertainty for all neighbour cells	μs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index			
CP length		Normal					
DRX		OFF					
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	PRS are transmitted from synchronous cells			
Number of cells provided in OTDOA assistance data		16		The list includes the reference cell (received in OTDOA-ReferenceCellInfo [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in OTDOA-ProvideAssistanceData [24].			
T <sub>RSTD InterFreqFDD, E-UTRAN</sub>	ms	5120		Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.1			

Table A.9.8.3.1-2: Cell Specific Test Parameters for inter frequency RSTD Tests for E-UTRAN FDD

Darameter	1150	Te	st1	Test2			
Parameter	Unit	Cell1	Cell2	Cell1	Cell2		
E-UTRA RF Channel Number		1	2	1	2		
GapOffset		18	N/A	11	N/A		
Gap Pattern ID		0	N/A	0	N/A		
PRS configuration Index $I_{PRS}$		12	19	2	12		
PRS subframe offset		N/A	7	N/A	10		
PBCH_RA							
PBCH_RB	7						
PSS_RA	1						
SSS_RA	1						
PCFICH_RB	1						
PHICH_RA	dB	0	0	0	0		
PHICH_RB	7						
PDCCH_RA	1						
PDCCH_RB							
OCNG_RA <sup>Note1</sup>							
OCNG_RB <sup>Note1</sup>							
PRS_RA	dB	-3	0	-3	0		
$N_{oc}^{ m Note2}$	dBm/15 kHz		-98				
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$	dB	-6	-13	-6	-13		
PRS $\hat{E}_{_{s}}/I_{_{ot}}$ Note3	dB	-6	-13	-6	-13		
lo Note3	dBm/1.08 MHz	-79.25	-79.39	N/A	N/A		
	dBm/9 MHz	N/A	N/A	-70.04	-70.18		
PRP Note3	dBm/15kHz	-104	-111	-104	-111		
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 3}}$	dB	-3	-13	-3	-13		
RSRP Note 3	dBm/15kHz	-101	-111	-101	-111		
Propagation condition			AWGN				

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

#### A.9.8.3.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.2.

### A.9.8.4 E-UTRAN TDD-TDD RSTD inter frequency case

#### A.9.8.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSTD inter-frequency measurement accuracy is within the specified limits in clause 9.1.10.2 in AWGN channels.

There are two synchronous cells on different carrier frequencies in the test. In all test cases, Cell 1 is the reference cell as well as the PCell and Cell 2 is the neighbour cell. The inter frequency measurements on Cell 2 are supported by a measurement gap. PCIs of the two cells are selected randomly.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE before the measurements start.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of  $T_{RSTD\ InterFreqTDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Table A.9.8.4.1-1 and Table A.9.8.4.1-2 for each of the two cells during this time.

The test parameters are given in Table A.9.8.4.1-1 and Table A.9.8.4.1-2.

Table A.9.8.4.1-1: General Test Parameters for inter frequency RSTD Tests for E-UTRAN TDD

Parameter	Unit	Value Test1 Test2		Comment			
PCFICH/PDCCH/PHICH parameters		R.8 TDD	R.6 TDD	As specified in clause A.3.1.2.2			
OCNG Patterns defined in A.3.2.2		OP.4 OP.2 TDD		OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbol (other than those in the PRS subframes).			
Reference cell		Cell 1		Cell 1 on RF channel number 1			
Neighbour cell		Cell 2		Cell 2 on RF channel number 2			
E-UTRA RF Channel Number		1,2		Two TDD carrier frequencies are used.			
Channel Bandwidth (BW <sub>channel</sub> )	MHz	1.4 10					
PRS Bandwidth	RB	6	50	PRS bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].			
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.			
Uplink-downlink configuration		3	1	As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2.			
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		6	1	As defined in TS 36.211			
		Cell1:'11110000' Cell2:'11110000'		PRS muting is not used. See clause 6.5.1.2 in TS 36.355 for more information			
expectedRSTD				The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator			
expectedRSTDUncertainty for all neighbour cells	μs	5	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index			
CP length		Normal					
DRX							
Radio frame receive time offset between the cells at the UE antenna connector	μѕ	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	PRS are transmitted from synchronous cells			
Number of cells provided in OTDOA assistance data		16		The list includes the reference cell (received in OTDOA-ReferenceCellInfo [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in OTDOA-ProvideAssistanceData [24].			
$T_{ m RSTD\ InterFreqTDD,\ E-UTRAN}$ ms		5120		Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.3			

Table A.9.8.4.1-2: Cell Specific Test Parameters for inter frequency RSTD Tests for E-UTRAN TDD

Parameter	l lmit	Te	st1	Test2			
Parameter	Unit	Cell1	Cell2	Cell1	Cell2		
E-UTRA RF Channel Number		1	2	1	2		
Gap pattern ID		0	N/A	0	N/A		
Gapoffset		34	N/A	13	N/A		
PRS configuration Index $I_{PRS}$		15	35	4	14		
PRS subframe offset		N/A	20	N/A	10		
PBCH_RA							
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA	dB	0					
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA <sup>Note1</sup>							
OCNG_RB <sup>Note1</sup>							
PRS_RA	dB	-3	0	-3	0		
$N_{oc}^{ m Note2}$	dBm/15 kHz		-98				
PRS $\hat{\mathbf{E}}_{\mathrm{s}}/N_{oc}$	dB	-6	-13	-6	-13		
PRS $\hat{E}_{s}/I_{ot}^{Note3}$	dB	-6	-13	-6	-13		
lo Note3	dBm/1.08 MHz	-79.25	-79.39	N/A	N/A		
	dBm/9 MHz	N/A	N/A	-70.04	-70.18		
PRP Note3	dBm/15kHz	-104	-111	-104	-111		
$\hat{\mathrm{E}}_{\mathrm{s}}/N_{\mathit{oc}}^{\mathrm{Note 3}}$	dB	-3	-13	-3	-13		
RSRP Note 3	dBm/15kHz	-101	-111	-101	-111		
Propagation condition			AW	/GN	•		

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

#### A.9.8.4.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.2.

# A.9.8.5 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation

#### A.9.8.5.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN FDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are three synchronous cells on two different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is the SCell and reference cell on sceondary component carrier F2 (RF channel number 2), and Cell 3 is the neighbor cell on F2.

Cell2 and Cell3 are included in the OTDOA assistance data, whilst Cell1 is not included in the OTDOA assistance data. The RSTD measurements are performed between Cell 2 and Cell 3 to verify that when both the reference cell and

neighbouring cell belong to the secondary component carrier the RSTD measurement accuracy can meet the intrafrequency RSTD accuracy requirements defined in clause 9.1.10.1.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of  $T_{RSTD\ IntraFreqFDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Table A.9.8.5.1-1 and Table A.9.8.5.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.5.1-1 and Table A.9.8.5.1-2.

Table A.9.8.5.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH		R.6 FDD	As specified in clause A.3.1.2.1
parameters		K.0 FDD	
OCNG Patterns defined in A.3.2.1		OP.6 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Assistance data reference cell		Cell 2	Cell 2 is the SCell on RF channel number 2
PCell		Cell 1	Cell 1 on RF channel number 1
Neighbour cell		Cell 3	Cell 3 on RF channel number 2
E-UTRA RF Channel Number		1,2	Two FDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	·
PRS Bandwidth	RB	50	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes $N_{\rm PRS}$		1	As defined in TS 36.211
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 2 – Cell ID of cell 3) mod 6 = 3	PCI of cell 1 is selected randomly.
expectedRSTD	μs	Cell 3:-2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
DRX		OFF	
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 1 to Cell 2: -1 Cell 3 to Cell 2:1	PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data- reference cell (received in OTDOA- ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA- ProvideAssistanceData [24]. All cells provided in OTDOA assistance data are on RF channel 2.
$T_{ m RSTD~IntraFreqFDD,~E-UTRAN}$	ms	2560	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.1

Table A.9.8.5.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3
E-UTRA RF Channel Number		1	2	2
PRS configuration Index $I_{PRS}$		2	2	2
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA	dB	0	0	0
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA <sup>Note1</sup>				
OCNG_RB <sup>Note1</sup>				
PRS_RA	dB	-3	0	0
$N_{oc}^{ m Note2}$	dBm/15 kHz		-98	
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-13
PRS $\hat{E}_{_{s}}/I_{_{ot}}$	dB	-6	-6	-13
lo Note3	dBm/9 MHz	-70.04	-70.01	-70.01
PRP Note3	dBm/15kHz	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-13
Propagation condition			AWGN	•

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , RSRP, Io and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

#### A.9.8.5.2 Test Requirements

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.

## A.9.8.6 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation

#### A.9.8.6.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN TDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are three synchronous cells on two different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is the SCell and reference cell on sceondary component carrier F2 (RF channel number 2), and Cell 3 is the neighbor cell on F2.

Cell2 and Cell3 are included in the OTDOA assistance data, whilst Cell1 is not included in the OTDOA assistance data. The RSTD measurements are performed between Cell 2 and Cell 3 to verify that when both the reference cell and neighbouring cell belong to the secondary component carrier the RSTD measurement accuracy can meet the intrafrequency RSTD accuracy requirements defined in clause 9.1.10.1.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of  $T_{RSTD\ IntraFreqTDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Table A.9.8.6.1-1 and Table A.9.8.6.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.6.1-1 and Table A.9.8.6.1-2.

Table A.9.8.6.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH		R.6 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		OP.2 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Assistance data reference cell		Cell 2	Cell 2 is the SCell on RF channel number 2
PCell		Cell 1	Cell 1 on RF channel number 1
Neighbour cell		Cell 3	Cell 3 on RF channel number 2
E-UTRA RF Channel Number		1,2	Two TDD carrier frequencies are used.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
PRS Bandwidth	RB	50	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		1	As defined in TS 36.211
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2. The same configuration in both cells.
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 2 – Cell ID of cell 3) mod 6 = 3	PCI of cell 1 is selected randomly.
expectedRSTD	μѕ	Cell 3:-2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length DRX		Normal OFF	
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 1 to Cell 2: -1 Cell 3 to Cell 2:1	PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data- reference cell (received in OTDOA- ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA- ProvideAssistanceData [24]. All cells provided in OTDOA assistance data are on RF channel 2.
T <sub>RSTD</sub> IntraFreqTDD, E-UTRAN	ms	2560	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.2

Table A.9.8.6.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3
E-UTRA RF Channel Number		1	2	2
PRS configuration Index $I_{PRS}$		14	14	14
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA	dB	0	0	0
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA <sup>Note1</sup>				
OCNG_RB <sup>Note1</sup>				
PRS_RA	dB	-3	0	0
$N_{oc}^{$	dBm/15 kHz		-98	
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-13
PRS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	-6	-6	-13
Io Note3	dBm/9 MHz	-70.04	-70.01	-70.01
PRP Note3	dBm/15kHz	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-111
$\hat{E}_{\scriptscriptstyle S}/N_{\scriptscriptstyle oc}$ Note3	dB	-3	-6	-13
Propagation condition			AWGN	•

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , RSRP, lo and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

#### A.9.8.6.2 Test Requirements

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.

## A.9.8.7 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz bandwidth

#### A.9.8.7.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.5.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.7.1-1 and A.9.8.7.1-2 will replace the values of corresponding parameters in Tables A.9.8.5.1-1 and A.9.8.5.1-2.

Table A.9.8.7.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 20MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH		R.10 FDD	As specified in clause A.3.1.2.1
parameters		K. 10 FDD	
OCNG Patterns defined in A.3.2.1.14		OP.14 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	
PRS Bandwidth	RB	100	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Note 1: See Table A.9.8.5.1-1 Note 2: N/A	for othe	er general test parameters.	

Table A.9.8.7.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 20MHz bandwidth

Parameter		Unit	Cell1	Cell2	Cell3			
lo Note1		dBm/18 MHz	-67.03	-67.00	-67.00			
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS								
Note 2:	See Table A.9.8.5.	1-2 for other cell specific test par	See Table A.9.8.5.1-2 for other cell specific test parameters.					

#### A.9.8.7.2 Test Requirements

The test requirements defined in section A.9.8.5.2 shall apply to this test case.

## A.9.8.8 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz bandwidth

#### A.9.8.8.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.8.1-1 and A.9.8.8.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.8.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.10 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2.8		OP.8 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	20	
PRS Bandwidth	RB	100	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Note 1: See Table A.9.8.6.1-1 Note 2: N/A	for othe	er general test parameters.	

e Z: N/A

Table A.9.8.8.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz bandwidth

Parameter		Unit	Cell1	Cell2	Cell3	
lo Note1		dBm/18 MHz	-67.03	-67.00	-67.00	
Note 1:	values are derived	I has been derived from other parameters for information purposes. It is not settable parameter itself. Io are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS				
Note 2:	See Table A.9.8.6.	1-2 for other cell specific test para	ameters.			

#### A.9.8.8.2 Test Requirements

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

## A.9.8.9 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation for 10MHz+5MHz

#### A.9.8.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.5.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.9.1-1 and A.9.8.9.1-2 will replace the values of corresponding parameters in Tables A.9.8.5.1-1 and A.9.8.5.1-2.

Table A.9.8.9.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Value	Comment	
PCFICH/PDCCH/PHICH parameters		Cell1: R.6 FDD Cell2: R.11 FDD Cell3: R.11 FDD	As specified in clause A.3.1.2.1	
OCNG Patterns defined in A.3.2.1		Cell1: OP.6 FDD Cell2: OP.19 FDD Cell3: OP.19 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	Cell1: 10 Cell2: 5 Cell3: 5		
PRS Bandwidth	RB	Cell1: 50 Cell2: 25 Cell3: 25	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].	
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		2	As defined in TS 36.211	
Note 1: See Table A.9.8.5.1-1 for other general test parameters.  Note 2: N/A				

Table A.9.8.9.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Cell1	Cell2	Cell3		
lo Note1	dBm/9 MHz	-70.04	N/A	N/A		
10	dBm/4.5 MHz	N/A	-73.02	-73.02		
Note 1: lo level has been derived from other parameters for information purposes. It						
is not settable parameter itself. Io values are derived in the case that there is						
no PBCH, PSS or SSS in the OFDM symbols carrying PRS						
Note 2:	See Table A.9.8.5.1-2 for other	er cell specific te	st parameters.			

#### A.9.8.9.2 Test Requirements

The test requirements defined in section A.9.8.5.2 shall apply to this test case.

## A.9.8.10 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 10MHz+5MHz

#### A.9.8.10.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.10.1-1 and A.9.8.10.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.10.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Value	Comment		
PCFICH/PDCCH/PHICH parameters		Cell1: R.6 TDD Cell2: R.11 TDD Cell3: R.11 TDD	As specified in clause A.3.1.2.2		
OCNG Patterns defined in A.3.2.2		Cell1: OP.2 TDD Cell2: OP.10 TDD Cell3: OP.10 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.		
Channel Bandwidth (BW <sub>channel</sub> )	MHz	Cell1: 10 Cell2: 5 Cell3: 5			
PRS Bandwidth	RB	Cell1: 50 Cell2: 25 Cell3: 25	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].		
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		2	As defined in TS 36.211		
Note 1: See Table A.9.8.6	Note 1: See Table A.9.8.6.1-1 for other general test parameters.				

Note 2:

Table A.9.8.10.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Cell1	Cell2	Cell3		
lo Note1	dBm/9 MHz	-70.04	N/A	N/A		
10	dBm/4.5 MHz	N/A	-73.02	-73.02		
Note 1: lo level has been derived from other parameters for information purposes. It is not settable parameter itself. lo values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS						
Note 2: See Table A.9.8.6.1-2 for other cell specific test parameters.						

#### A.9.8.10.2 **Test Requirements**

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

### A.9.8.11 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation for 5 + 5MHz bandwidth

#### A.9.8.11.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.5.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.11.1-1 and A.9.8.11.1-2 will replace the values of corresponding parameters in Tables A.9.8.5.1-1 and A.9.8.5.1-2.

Table A.9.8.11.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.11 FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1.19		OP.19 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
PRS Bandwidth	RB	25	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		2	As defined in TS 36.211
Note 1: See Table A.9.8.5.1-1 for other Note 2: N/A	general t	est parameters.	•

Table A.9.8.11.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter		Unit	Cell1	Cell2	Cell3
lo Note1	o <sup>Note1</sup> dBm/4.5 MHz		-73.05	-73.02	-73.02
Note 1: lo level has been derived from other parameters for information purposes. It is not settable					
parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the					
OFDM symbols carrying PRS					
Note 2:	See Table A.9	.8.5.1-2 for other cell specific	test parameters.		

#### A.9.8.11.2 Test Requirements

The test requirements defined in section A.9.8.5.2 shall apply to this test case.

## A.9.8.12 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 5+5MHz bandwidth

#### A.9.8.12.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.12.1-1 and A.9.8.12.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.12.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.11 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2.10		OP.10 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5	
PRS Bandwidth	RB	25	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes $N_{\mathrm{PRS}}$		2	As defined in TS 36.211
Note 1: See Table A.9.8.6.1-1 for other gen	eral test	parameters.	

Table A.9.8.12.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter Unit		Cell1	Cell2	Cell3
lo <sup>Note1</sup>	dBm/4.5 MHz	-73.05	-73.02	-73.02

lo level has been derived from other parameters for information purposes. It is not settable parameter itself. lo Note 1: values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS See Table A.9.8.6.1-2 for other cell specific test parameters. Note 2:

#### A.9.8.12.2 **Test Requirements**

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

#### A.9.8.13 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz+10MHz

#### A.9.8.13.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.13.1-1 and A.9.8.13.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.13.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz+10MHz

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		Cell1: R.10 TDD Cell2: R.6 TDD Cell3: R.6 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		Cell1: OP.8 TDD Cell2: OP.2 TDD Cell3: OP.2 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth (BW <sub>channel</sub> )	MHz	Cell1: 20 Cell2: 10 Cell3: 10	
PRS Bandwidth	RB	Cell1: 100 Cell2: 50 Cell3: 50	PRS Bandwidth bandwidth is as indicated in <i>prs-Bandwidth</i> in the OTDOA assistance data defined in [24].
Note 1: See Table A.9.8.6 Note 2: N/A	6.1-1 for	other general test par	ameters.

Table A.9.8.13.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz+10MHz

Paramete	Parameter Unit		ter Unit Cell1		Cell1	Cell2	Cell3
lo <sup>Note1</sup>		dBm/ 18MHz	-67.03	N/A	N/A		
10		dBm/ 9MHz	N/A	-70.01	-70.01		
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS							
		Table A.9.8.6.1-2 for oth					

#### A.9.8.13.2 Test Requirements

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

## A.9.8.14 E-UTRAN FDD RSTD Measurement Accuracy in 3DL Carrier Aggregation

#### A.9.8.14.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN FDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are four synchronous cells on three different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is an SCell on secondary component carrier F2 (RF channel number 2), Cell 3 is an SCell and reference cell on secondary component carrier F3 (RF channel number 3), and Cell 4 is the neighbor cell on F3.

Cell 1, Cell2, Cell3, and Cell 4 are included in the OTDOA assistance data. The RSTD measurements are performed

- between Cell 4 and Cell 3 to verify the accuracy of RSTD measurement when the reference cell and neighbouring cell belong to the same secondary component carrier can meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.
- between Cell 1 and Cell 3 to verify the accuracy of RSTD measurement between the PCell and an SCell can meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.

- between Cell 2 and Cell 3 to verify the accuracy of RSTD measurement between two SCells can meet the interfrequency RSTD accuracy requirements defined in clause 9.1.10.2.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of  $T_{RSTD\ InterFreqFDD,E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Table A.9.8.14.1-1 and Table A.9.8.14.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.14.1-1 and Table A.9.8.14.1-2.

Table A.9.8.14.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for 3DL Carrier Aggregation

Parameter	Unit	Value	Comment
PCell		Cell 1	Cell 1 on RF channel number 1
SCell 1		Cell 2	Cell 2 is an SCell on RF channel number 2
SCell 2 (Assistance data reference cell)		Cell 3	Cell 3 is an SCell on RF channel number 3
Neighbour cell		Cell 4	Cell 4 on RF channel number 3
PRS configuration index $I_{\mathrm{PRS}}$		171 for all cells on PCC 181 for all cells on SCC1 191 for all cells on SCC2	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000' Cell4:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
prs-SubframeOffset		Cells on PCC: 300 Cells on SCC1: 310 Cells on SCC2, except reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
Cell ID		(Cell ID of cell 4 – Cell ID of cell 3) mod 6 = 3	PCIs of cell 1 and cell 2 are selected randomly.
expectedRSTD	μs	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
Radio frame receive time offset between the cells at the UE antenna connector	μs	OFF Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1 Cell 4 to Cell 2: 3	PRS are transmitted from synchronous cells
Time alignment errors between Cell 1, Cell 2, and Cell 3	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.

Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data-reference cell (received in OTDOA-ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA-ProvideAssistanceData [24]. Cell 1 and Cell 2 appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
T <sub>RSTD</sub> InterFreqFDD, E-UTRAN	ms	4960	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.1

Table A.9.8.14.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3	Cell 4
E-UTRA RF Channel Number		1	2	3	3
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5,10,20	5,10,20	5,10,20	5,10,20
PCFICH/PDCCH/PHICH parameters as		5MHz:	5MHz: R.11	5MHz: R.11	5MHz: R.11
specified in clause A.3.1.2.1		R.11 FDD	FDD	FDD	FDD
		10MHz:	10MHz: R.6	10MHz: R.6	10MHz: R.6
		R.6 FDD	FDD	FDD	FDD
		20MHz:	20MHz:	20MHz:	20MHz:
		R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD
		5MHz:	5MHz: OP.18 FDD	5MHz:	5MHz:
		OP.18 FDD 10MHz:	10MHz:	OP.18 FDD 10MHz:	OP.18 FDD 10MHz:
OCNG Patterns defined in A.3.2.1		OP.5 FDD	OP.5 FDD	OP.5 FDD	OP.5 FDD
		20MHz:	20MHz:	20MHz:	20MHz:
		OP.13 FDD	OP.13 FDD	OP.13 FDD	OP.13 FDD
PRS Transmission Bandwidth (PRS					
transmission bandwidth depends on selected	D.5	5MHz: 25	5MHz: 25	5MHz: 25	5MHz: 25
channel bandwidth. PRS are transmitted over	RB	10MHz: 50	10MHz: 50	10MHz: 50	10MHz: 50
the system bandwidth)		20MHz:100	20MHz:100	20MHz:100	20MHz:100
Number of consecutive downlink positioning					
subframes $N_{\rm PRS}$ . $N_{\rm PRS}$ also depends on		5MHz: 2	5MHz: 2	5MHz: 2	5MHz: 2
selected channel bandwidth. As defined in TS		10MHz: 1	10MHz: 1	10MHz: 1	10MHz: 1
36.211 [16]. The number of subframes in a		20MHz:1	20MHz:1	20MHz:1	20MHz:1
positioning occasion					
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA	dB	0	0	0	0
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA <sup>Note1</sup>					
OCNG_RB <sup>Note1</sup>					
PRS_RA	dB	-3	0	0	0
$N_{oc}^{ m Note2}$	dBm/15 kHz		-6	98	
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-6	-13
	-				
PRS $\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	-6	-6	-6	-13
Notes	dBm/9	-70.04	-70.01	-70.01	-70.01
Io Note3	MHz	+10log	+10log	+10log	+10log
Note?		(N <sub>RB,c</sub> /50)	$(N_{RB,c}/50)$	$(N_{RB,c}/50)$	$(N_{RB,c}/50)$
PRP Note3	dBm/15kHz	-104	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-6	-13
Propagation condition			AW	/GN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , RSRP, lo and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. lo values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

#### A.9.8.14.2 Test Requirements

The measurement accuracy of RSTD between Cell1 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell4 and Cell3 shall fulfill the requirements in clause 9.1.12.1.

## A.9.8.15 E-UTRAN TDD RSTD Measurement Accuracy in 3DL Carrier Aggregation

#### A.9.8.15.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN TDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are four synchronous cells on three different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is an SCell on secondary component carrier F2 (RF channel number 2), Cell 3 is an SCell and reference cell on secondary component carrier F3 (RF channel number 3), and Cell 4 is the neighbor cell on F3.

Cell 1, Cell2, Cell3, and Cell 4 are included in the OTDOA assistance data. The RSTD measurements are performed

- between Cell 4 and Cell 3 to verify the accuracy of RSTD measurement when the reference cell and neighbouring cell belong to the same secondary component carrier can meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.
- between Cell 1 and Cell 3 to verify the accuracy of RSTD measurement between the PCell and an SCell can meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.
- between Cell 2 and Cell 3 to verify the accuracy of RSTD measurement between two SCells can meet the interfrequency RSTD accuracy requirements defined in clause 9.1.10.2.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE  $\Delta T$  ms before the start of measurement period, where  $\Delta T = 150$  ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of  $T_{RSTD\ InterFreqTDD,\ E-UTRAN}$  is provided for the measurement period, and PRS are configured according to  $I_{PRS}$  in Table A.9.8.15.1-1 and Table A.9.8.15.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.15.1-1 and Table A.9.8.15.1-2.

Table A.9.8.15.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for 3DL Carrier Aggregation

Parameter	Unit	Value	Comment
PCell		Cell 1	Cell 1 on RF channel number 1
SCell 1		Cell 2	Cell 2 is an SCell on RF channel number 2
SCell 2 (Assistance data reference cell)		Cell 3	Cell 3 is an SCell on RF channel number 3
Neighbour cell		Cell 4	Cell 4 on RF channel number 3
E-UTRA RF Channel Number		1,2,3	Three TDD carrier frequencies are used.
PRS configuration index $I_{\mathrm{PRS}}$		171 for all cells on PCC 181 for all cells on SCC1 191 for all cells on SCC2	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\rm PRS}-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000' Cell4:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
prs-SubframeOffset		Cells on PCC: 300 Cells on SCC1: 310 Cells on SCC2, except reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2. The same configuration in both cells.
Cell ID		(Cell ID of cell 4 – Cell ID of cell 3) mod 6 = 3	PCIs of cell 1 and cell 2 are selected randomly.
expectedRSTD	μs	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
Radio frame receive time offset between the cells at the UE antenna connector	μs	OFF Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1 Cell 4 to Cell 2: 3	PRS are transmitted from synchronous cells
Time alignment errors between Cell 1, Cell 2, and Cell 3	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.

Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data-reference cell (received in OTDOA-ReferenceCellInfo [24]) and 15 other cells, all received in OTDOA-ProvideAssistanceData [24]. Cell 1 and Cell 2 appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
$T_{RSTD\ InterFreqTDD,\ E-UTRAN}$	ms	4960	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.3

Table A.9.8.15.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3	Cell 4
E-UTRA RF Channel Number		1	2	3	3
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5,10,20	5,10,20	5,10,20	5,10,20
PCFICH/PDCCH/PHICH parameters as		5MHz: R11	5MHz: R11	5MHz: R11	5MHz: R11
specified in clause A.3.1.2.2		TDD	TDD	TDD	TDD
		10MHz: R6	10MHz: R6	10MHz: R6	10MHz: R6
		TDD	TDD	TDD	TDD
		20MHz:	20MHz:	20MHz:	20MHz:
		R10 TDD	R10 TDD	R10 TDD	R10 TDD
		5MHz: OP.10 TDD	5MHz: OP.10 TDD	5MHz: OP.10 TDD	5MHz: OP.10 TDD
OCNG Patterns defined in A.3.2.2 (		10MHz:	10MHz:	10MHz:	10MHz:
There is no PDSCH allocated in the subframe		OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
transmitting PRS)		20MHz:	20MHz:	20MHz:	20MHz:
		OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.8 TDD
PRS Transmission Bandwidth (PRS					
transmission bandwidth depends on selected	RB	5MHz: 25	5MHz: 25	5MHz: 25	5MHz: 25 10MHz: 50
channel bandwidth. PRS are transmitted over	KB	10MHz: 50 20MHz:100	10MHz: 50 20MHz:100	10MHz: 50 20MHz:100	20MHz:100
the system bandwidth)		201VITZ. 100	201VITZ. 100	201VITZ. 100	201VIT2.100
Number of consecutive downlink positioning					
subframes $N_{ m PRS}$ . $N_{ m PRS}$ also depends on		5MHz: 2	5MHz: 2	5MHz: 2	5MHz: 2
selected channel bandwidth. As defined in TS		10MHz: 1	10MHz: 1	10MHz: 1	10MHz: 1
36.211 [16]. The number of subframes in a		20MHz:1	20MHz:1	20MHz:1	20MHz:1
positioning occasion					
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB	_				
PHICH_RA	dB	0	0	0	0
PHICH_RB	4				
PDCCH_RA	4				
PDCCH_RB	4				
OCNG_RA <sup>Note1</sup>	4				
OCNG_RB <sup>Note1</sup>	ID.	•			
PRS_RA	dB	-3	0	0	0
$N_{oc}^{ m Note2}$	dBm/15 kHz		-6	98	
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-6	-13
PRS $\hat{E}_{s}/I_{ot}$	dB	-6	-6	-6	-13
	-ID /C	-70.04	-70.01	-70.01	-70.01
lo Note3	dBm/9	+10log	+10log	+10log	+10log
	MHz	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)	(N <sub>RB,c</sub> /50)
PRP Note3	dBm/15kHz	-104	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-6	-13
Propagation condition			AW	'GN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 3:  $\hat{E}_s/N_{oc}$ , PRS  $\hat{E}_s/I_{ot}$ , RSRP, lo and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. lo values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.

#### A.9.8.15.2 Test Requirements

The measurement accuracy of RSTD between Cell1 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell4 and Cell3 shall fulfill the requirements in clause 9.1.12.1.

### A.9.9 RSRP and RSRQ on the serving cell

#### A.9.9.1 FDD Intra frequency serving cell case

#### A.9.9.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP/RSRQ absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.2.1 and 9.1.5.1 for FDD intra frequency measurements.

#### A.9.9.1.2 Test parameters

In this set of test case there is only the serving cell. Absolute accuracy of RSRP/RSRQ intra frequency measurements for the serving cell is tested by using the parameters in Table A.9.9.1.2-1. In the test case, Cell 1 is the serving cell.

Table A.9.9.1.2-1: RSRP FDD Intra frequency test parameters

Pa	ırameter	Unit	Test
E-UTRA RF Ch			Cell 1
BW <sub>channel</sub>	iailiei Nullibei	MHz	10
Measurement b	pandwidth	$n_{PRB}$	22—27
	nce measurement	PRB	R.0 FDD
channel defined		10	13—36
	H/PHICH Reference	$n_{PRB}$	13—30
measurement of A.3.1.2.1	channel defined in		R.6 FDD
OCNG Patterns (OP.1 FDD)	s defined in A.3.2.1.1		OP.1 FDD
PBCH_RA			
PBCH_RB			
PSS_RA SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB		dB	0
PDCCH_RA			
PDCCH_RB			
PDSCH_RA			
PDSCH_RB OCNG_RA <sup>Note1</sup>			
OCNG_RB <sup>Note1</sup>			
OCNO_ND	Bands FDD A		-122
	Bands FDD_C		-121
Note2	Bands FDD_D	†	-120.5
$N_{oc}^{ m Note2}$	Bands FDD_E, FDD_F Note 5	dBm/15 kHz	-120
	Bands FDD_G Note 7	_	-119
	Bands FDD H		-118.5
$\hat{E}_{s}/I_{ot}$		dB	-4
	Bands FDD_A		-126
	Bands FDD_C		-125
	Bands FDD_D		-124.5
Note3	Bands FDD_E,		-124
RSRP <sup>Note3</sup>	FDD_F Note 5	dBm/15 kHz	.2.
	Bands FDD_G Note 7		-123
	Bands FDD_H		-122.5
	Bands FDD_A		
	Bands FDD_C		
	Bands FDD_D		
RSRQ <sup>Note3</sup>	Bands FDD_E, FDD_F Note 5	dB	-16.25
	Bands FDD_G Note 7		
	Bands FDD_H		
	Bands FDD_A		-92.76
	Bands FDD_C		-91.76
Io <sup>Note3</sup>	Bands FDD_D		-91.26
10'''	Bands FDD_E, FDD_F Note 5	dBm/9 MHz	-90.76
	Bands FDD_G Note 7		-89.76
	Bands FDD_H		-89.26
$\hat{E}_s/N_{oc}$		dB	-4

Propagation condition - AWGN				
Note 1:	OCNG shall be used such t			
	and a constant total transmitted power spectral density is			
	achieved for all OFDM sym			
Note 2:	Interference from other cell		•	
	the test is assumed to be co			
	and shall be modelled as A	WGN of appropi	riate power for	
	$N_{oc}$ to be fulfilled.			
Note 3:	RSRP, RSRQ and lo levels	have been deri	ved from other	
	parameters for information	purposes. They	are not settable	
	parameters themselves.			
Note 4:	RSRP minimum requirement	•	· ·	
	independent interference and noise at each receiver antenna port.			
Note 5:	For Band 26, the tests shall	l be performed w	vith the carrier	
	frequency of the assigned E	E-UTRA channel	bandwidth within	
	865-894 MHz.			
Note 6:	E-UTRA operating band gro	•	ned in Section 3.5.	
Note 7:	Except Band 29 and Band	32.		

#### A.9.9.1.3 Test Requirements

The absolute RSRP and RSRQ measurement accuracy shall fulfil the requirements in clause 9.1.2.1 and 9.1.5.1 respectively.

#### A.9.9.2 TDD Intra frequency serving cell case

#### A.9.9.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP/RSRQ absolute measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.2.1 and 9.1.5.1 for TDD intra frequency measurements.

#### A.9.9.2.2 Test parameters

In this set of test case there is only the serving cell. Absolute accuracy of RSRP/RSRQ intra frequency measurements for the serving cell is tested by using the parameters in Table A.9.9.2.2-1. In the test case, Cell 1 is the serving cell.

Table A.9.9.2.2-1: RSRP TDD Intra frequency test parameters

F	Parameter	Unit	Test Cell 1	
E-UTRA RF C	Channel Number		1	
BW <sub>channel</sub>		MHz	10	
Special subfra	ame configuration <sup>Note1</sup>		6	
Uplink/downlir	nk configuration Note1		1	
Measurement bandwidth		$n_{PRB}$	22—27	
	rence measurement ed in A.3.1.1.2		R.0 TDD	
PDSCH alloca	ation	$n_{PRB}$	13—36	
PDCCH/PCFI	CH/PHICH Reference			
measurement	channel defined in		R.6 TDD	
A.3.1.2.2				
	ns defined in A.3.2.2.1		OP.1 TDD	
(OP.1 TDD) PBCH_RA				
PBCH RB		1		
PSS RA				
SSS RA				
PCFICH_RB				
PHICH RA				
PHICH_RB		dB	0	
PDCCH RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note</sup>	92			
OCNG_RB <sup>Note</sup>	92			
$N_{oc}^{ m \ Note3}$	Bands TDD_A	<u> </u>	-122	
¹V oc	Bands TDD_C	dBm/15 kHz	-121	
	Bands TDD_E		-120	
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB	-4	
	Bands TDD_A		-126	
RSRP <sup>Note4</sup>	Bands TDD_C	dBm/15 kHz	-125	
	Bands TDD_E		-124	
	Bands TDD_A			
RSRQ <sup>Note4</sup>	Bands TDD_C	dB	-16.25	
	Bands TDD_E			
Note4	Bands TDD_A		-92.76	
Io <sup>Note4</sup>	Bands TDD_C	dBm/9 MHz	-91.76	
	Bands TDD_E		-90.76	
$\hat{E}_s/N_{oc}$	•	dB	-4	
Propagation condition - AWGN				
Note 1: For	r special subframe and t		onfigurations see	
Note 2: OC	oles 4.2-1 and 4.2-2 in T NG shall be used such d a constant total transm	that both cells are		

Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for

 $N_{\it oc}$  to be fulfilled.

Note 4: RSRP, RSRQ and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 6: E-UTRA operating band groups are as defined in Section 3.5.

#### A.9.9.2.3 Test Requirements

The absolute RSRP and RSRQ measurement accuracy shall fulfil the requirements in section 9.1.2.1 and 9.1.5.1 respectively.

#### A.10 Proximity-based Services in Any Cell Selection State

## A.10.1 E-UTRAN FDD – UE ProSe Direct Communication Transmission Timing Accuracy Test

#### A.10.1.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Communication transmissions in Any Cell Selection state defined in clause 11.2.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A.10.1.1-1 below. There is no serving cell and one active SyncRef UE in this test. The test system shall emulate the SyncRef UE to transmit SLSS and MIB-SL every synchronization period.

The test system will configure the ProSe UE to transmit SLSS in each period (40ms) by configuring *syncTxThreshOoC* as +infinity in the pre-configured parameters. The ProSe UE is expected to synchronize to the SyncRef UE and transmit its own SLSS and SL-MIB in accordance to the procedure specified in clause 5.10.7.3 of TS 36.331.

The transmit timing is verified using the transmission timing of SLSS transmissions.

Table A.10.1.1-1: Test parameters for ProSe Transmission Timig Accuracy test for E-UTRAN FDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1	
Channel Bandwi	dth (BW <sub>channel</sub> )	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell			None	
Active SyncRef I	JE		SyncRef UE 1	Transmitting SLSS+MIB- SL on uplink of RF channel number 1
ProSe Direct Co	mmunication preconfiguration		As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshO	oC		11 (+infinity)	
$N_{oc}$		dBm/15 kHz	-98	
	syncCP-Len		Normal	
	syncOffsetIndicator		Set same as syncOffsetIndicator1 in ProSe Direct Communication preconfiguration	
	slssid		30	
	inCoverage		TRUE	In MIB-SL
SyncRef UE 1	networkControlledSyncTx		ON	
	ProSe Direct Communication resource pool configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test; Note resource pool is same as Configuration #2 used by ProSe UE.
	$\hat{E}_{s}/N_{oc}$		3	
	S-RSRP Note 1, Note 2		-95	
Propagation con	dition		AWGN	

Note 1: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: SSSS Es/lot is set the same as PSSS/PSBCH Es/lot.

#### A.10.1.2 Test Requirements

For parameters specified in Tables A.10.1.1-1, the timing accuracy for ProSe Direct Communication transmissions shall be within the limits defined in clause 11.2.2. The timing accuracy is verified using SLSS transmissions.

Prior to start of test, test system is required to ensure that the ProSe UE is synchronized to the SyncRef UE 1 and is transmitting SLSS + MIB-SL as derived from the SLSS + MIB-SL of SyncRef UE 1 as per clause 5.10.7.3 of TS 36.331. For the test configuration, the SLSSID used by the ProSe UE shall be 30 with *inCoverage* IE in MIB-SL set as FALSE.

The following sequence of events shall be used to verify that the requirements are met.

For 5MHz or 10MHz channel bandwith, the test sequence shall be carried out in Any Cell Selection state.

- a) After the ProSe UE is synchronized to SyncRef UE 1, the test system shall verify that the ProSe UE SLSS transmission timing offset is within  $\pm$  24×T<sub>S</sub> with respect to the first detected path (in time) of the corresponding frame of SyncRef UE 1.
- b) The test system adjusts the transmit timing of SyncRef UE 1 by  $+24 \times T_S$  compared to that in (a). The test system shall wait for at least one SLSS period (40ms) before verifying the requirement again in (c).
- c) The test system shall verify that the UE SLSS transmissiontiming offset stays within  $\pm$  24×T<sub>S</sub> with respect to the first detected path (in time) of the corresponding frame of SyncRef UE 1.

## A.10.2 E-UTRAN FDD – Initiation/Cease of SLSS Transmission with ProSe Direct Communication

#### A.10.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to the evaluation time allowed to initiate and cease SLSS transmissions in Any Cell Selection state defined in clause 11.3.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A. X.2.1-1 and Table A.10.2.1-2 below. There are no active cells in this test. There is one active SyncRef UE (SyncRef UE 1) in this test. The test system shall emulate SyncRef UE 1 to transmit SLSS and MIB-SL every synchronization period.

Prior to start of test, test system is required to ensure that the ProSe UE is synchronized to the SyncRef UE 1 and is transmitting SLSS + MIB-SL as derived from the SLSS + MIB-SL of SyncRef UE 1 as per clause 5.10.7.3 of TS 36.331. For the test configuration, the SLSSID used by the ProSe UE shall be 30 with *inCoverage* IE in MIB-SL set as FALSE.

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the S-RSRP of SyncRef UE 1 is above *syncTxThreshOOC* and the UE is not expected to be transmitting SLSS. During T2, the S-RSRP of SyncRef UE 1 is lowered below *syncTxThreshOOC* and the UE is expected to initiate SLSS transmissions. During T3, the S-RSRP of SyncRef UE 1 is increased back to be above *syncTxThreshOOC* and the UE is expected to cease SLSS transmissions.

Table A.10.2.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth (BW <sub>channel</sub> )	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell		None	
Active SyncRef UE		SyncRef UE 1	Transmitting SLSS+MIB- SL on uplink of RF channel number 1
ProSe Direct Communication preconfiguration		As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC	dBm/15 kHz	-95	
T1	S	3	
T2	S	5.24	
T3	S	5.24	_

Table A.10.2.1-2: SyncRef UE specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit		SyncRef UE 1		
Parameter	Offic	T1	T2	T3	
E-UTRA RF Channel Number			1		
BW <sub>channel</sub> Note 4	MHz		5 or 10		
ProSe Direct Communication resource pool configuration		Note resourc	As specified in Table A.3.12.5-1 (Configuration #1) Note resource pool is same as Configuration #2 used by ProSe UE.		
syncOffsetIndicator		Set same as syncOffsetIndicator1 in ProSe Direct Communication preconfiguration			
slssid		30			
inCoverage			TRUE		

networkControlledSyncTx			ON	
$N_{oc}^{}$ Note1	dBm/15 kHz		-96	
$\hat{E}_s/N_{oc}$	dB	5.5	-3.5	5.5
S-RSRP Note2, Note3	dBm/15 kHz	-90.5	-99.5	-90.5
Propagation Condition			AWGN	

Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 2: RSRP levels have been derived from other parameters for information purposes. They are not settable

parameters themselves.

Note 3: SSSS Es/lot is set the same as PSSS/PSBCH Es/lot.

Note 4: This test is according to the principle defined in section A.3.12.3.

#### A.10.2.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 0.84 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 0.84 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: Tevaluate.SLSS + SLSS period,

#### Where:

 $T_{evaluate,SLSS}$  is the evaluation time for initiate/cease of SLSS, and is 0.8 sec (clause 11.3.2) for the parameters in this test;

SLSS period is set as 40ms in this test.

#### A.10.3 E-UTRAN FDD - SyncRef UE Selection / Reselection Test

#### A.10.3.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to SyncRef UE selection / reselection in Any Cell Selection state defined in clause 11.5.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A. X.3.1-1 and Table A.10.3.1-2 below. There are no active cells in this test. There are two active SyncRef UEs (SyncRef UE 1 and SyncRef UE 2) in this test. The test system shall emulate SyncRef UE 1 and SyncRef UE 2 to transmit SLSS and MIB-SL every SLSS period (40ms).

The test system can verify the selection / reselection of SyncRef UE by monitoring the SLSS ID used by the ProSe UE for its SLSS+MIB-SL transmissions. When the ProSe UE is not synchronized to any SyncRef UE, then the ProSe UE shall use the SLSS ID pre-configured in the ProSe UE. When the ProSe UE is synchronized to a SyncRef UE, the ProSe UE shall derive its SLSS ID from the SLSS ID of the SyncRef UE as per clause 5.10.7.3 of TS 36.331

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, both SyncRef UE 1 and SyncRef UE 2 are powered off and the ProSe UE is expected to transmit SLSS as an independent synchronization source. During T1, SyncRef UE 1 is powered ON and the ProSe UE will select SyncRef UE 1 as the

synchronization source. During T2, a higher priority SyncRef UE 2 is additionally powered ON and the ProSe UE will reselect to the higher priority SyncRef UE 2 as the synchronization source.

Table A.10.3.1-1: Test parameters for SyncRef UE selection/reselection test for E-UTRAN FDD

	Parameter	Unit	Value	Comment
Initial condition	Active synchronization source		Independent synchronization source	UE transmits for ProSe Direct Communication and SLSS+MIB-SL with some random SLSS ID and in-coverage set as FALSE in MIB-SL.
T2 end condition	Active synchronization source		SyncRef UE 1	UE transmits for ProSe Direct Communication and SLSS+MIB-SL with SLSS ID = 168+59 and in- coverage set as FALSE in MIB-SL.
Final condition	Active synchronization source		Sync Ref UE 2	UE transmits for ProSe Direct Communication and SLSS+MIB-SL with SLSS ID = 30 and in- coverage set as FALSE in MIB-SL.
E-UTRA RF Channe	l Number		1	
Channel Bandwidth	(BW <sub>channel</sub> )	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell			None	
Active SyncRef UEs			SyncRef UE 1 SyncRef UE 2	Transmitting SLSS+MIB- SL on uplink of RF channel number 1
Timing offset between UE 2	en SyncRef UE 1 and SyncRef	ms	3	Asynchronous
Frequency offset of SyncRef UE 1		ppm	0	
Frequency offset of SyncRef UE 2		ppm	5	
ProSe Direct Communication preconfiguration			As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC	-		11 (+infinity)	
T1		S	24	
T2		S	24	
T3		S	24	

Table A.10.3.1-2: SyncRef UE specific test parameters for SyncRef UE selection/reselection test for E-UTRAN FDD

Donomoton	1110:11	SyncRef UE 1		SyncRef UE 2		2	
Parameter	Unit	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1					
BW <sub>channel</sub> Note 4	MHz			5 o	r 10		
ProSe Direct Communication		As specifi	ed in Table	A.3.12.5-2	As specifi	ed in Table A	4.3.12.5-1
resource pool configuration		(Co	onfiguration	#2)	(C	onfiguration :	#1)
networkControlledSyncTx			N/A			ON	
syncTxThreshOoC	dBm/15 kHz	+infinity				N/A	
slssid			59			30	
inCoverage (in MIB-SL)			FALSE			TRUE	
syncOffsetIndicator		synd	OffsetIndica	ator2	synd	cOffsetIndica	ıtor1
$N_{oc}^{$	dBm/15 kHz			-(	98		
$\hat{E}_s/N_{oc}$	dB	-infinity	16	16	-infinity	-infinity	13
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	-infinity 16 2.79		-infinity	-infinity	-3.11	
S-RSRP Note2, Note 3	dBm/15 kHz	-infinity -82 -82 -infinity -infinity -85				-85	
Propagation Condition				AW	/GN		

Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.

Note 2: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 3: SSSS Es/lot is set the same as PSSS/PSBCH Es/lot.

Note 4: This test is according to the principle defined in section A.3.12.3.

#### A.10.3.2 Test Requirements

SyncRef UE selection delay is defined as the time from the beginning of T2 to the time UE is synchronized to SyncRef UE 1 and changes its SLSS transmissions timing and SLSS ID to follow SyncRef UE 1 as the synchronization source. For the test configuration, the SLSS ID will be changed to 168+59 (with in-coverage IE in MIB-SL set to FALSE) after SyncRef UE selection delay from start of T2.

The SyncRef UE selection delay shall be less than 20.84sec.

SyncRef UE reselection delay is defined as the time from the beginning of T3 to the time UE changes its synchronization source from SyncRef UE 1 to SyncRef UE 2, and changes its SLSS transmissions timing and SLSS ID to follow SyncRef UE 2 as the synchronization source. For the test configuration, the SLSS ID will be changed o 30 (with in-coverage IE in MIB-SL set to FALSE) after SyncRef UE selection delay from start of T3.

The SyncRef UE reselection delay shall be less than 20.84sec.

The rate of correct SyncRef UE selection / reselection observed during repeated tests shall be at least 90%.

The test system will verify that the ProSe UE does not drop or delay more than 2% of its SLSS transmissions during the duration of T1, T2, and T3.

The SyncRef UE selection/reselection delay can be expressed as:

 $SyncRef\ UE\ selection/reselection\ delay = T_{detect,SyncRef\ UE} + T_{evaluate,SLSS} + SLSS\ period$ 

#### Where

- $T_{\text{detect.SyncRef UE}} = 20 \text{sec}$  (as specified in sub-clause 11.5.2.2)
- $T_{\text{evaluate,SLSS}} = 0.8$  (as specified in sub-clause 11.3.2)
- SLSS period = 40ms

This gives a total of 20.84 seconds.

# A.10.4 E-UTRAN FDD – Cell Identification on downlink frequency associated with ProSe frequency (when UE is transmitting for ProSe)

#### A.10.4.1 Test Purpose and Environment

The purpose of this test is to verify cell identification delay requirement for a newly detectable cell on the downink frequency associated with the pre-configured ProSe carrier frequency in Any Cell Selection state. This test will verify the requirements in clause 11.4 when the UE is transmitting for ProSe.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A. X.4.1-1, Table A. X.4.1-2, and Table A.10.4.1-2 below. There is one active cell (Cell 1) and active SyncRef UE (SyncRef UE 1) in this test. The test system shall emulate SyncRef UE 1 to transmit SLSS and MIB-SL every SLSS period (40ms).

The test consists of two successive time periods, with time duration of T1 and T2 respectively. During T1, the cell is powered OFF and the ProSe UE is synchronized to SyncRef UE 1. During T2, the cell is powered ON and the ProSe UE will detect the cell and attempt to camp on the cell.

Prior to start of test, test system is required to ensure that the ProSe UE is synchronized to the SyncRef UE 1 and is transmitting SLSS + MIB-SL as derived from the SLSS + MIB-SL of SyncRef UE 1 as per clause 5.10.7.3 of TS 36.331. For the test configuration, the SLSSID used by the ProSe UE shall be 30 with *inCoverage* IE in MIB-SL set as FALSE.

Table A.10.4.1-1: Test parameters for cell identification test on on downlink frequency associated with ProSe frequency for E-UTRAN FDD (when UE is transmitting for ProSe)

Parameter		Unit	Value	Comment
Initial condition	Active synchronization source		SyncRef UE 1	
Final condition	Active synchronization source		Cell 1	
E-UTRA RF C	Channel Number		1	
Channel Band	Channel Bandwidth (BW <sub>channel</sub> )		5 or 10	According to principle defined in clause A.3.12.3
Active cell			Cell 1	
Active SyncRo	ef UEs		SyncRef UE 1	Transmitting SLSS+MIB- SL on uplink of RF channel number 1
ProSe Direct Communication preconfiguration			As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC			11 (+infinity)	
T1		S	2	_
T2		S	30	

Table A.10.4.1-2: Cell specific test parameters for cell identification test on on downlink frequency associated with ProSe frequency for E-UTRAN FDD (when UE is transmitting for ProSe)

Doromotor	l lmi4	Cell 1			
Parameter	Unit	T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub> Note 4	MHz	5 or	10		
OCNG Patterns defined in A.3.2.1.2 Note 4		5 MHz: OP.16 FDD 10 MHz: OP.2 FDD			
PBCH_RA					
PBCH_RB	<b>T</b>				
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA	<b>T</b>	0			
PHICH_RB	dB				
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note 1</sup>					
OCNG_RB <sup>Note 1</sup>					
$N_{oc}^{$	dBm/15 kHz	-98	3		
$\hat{E}_s/N_{oc}$	dB	-infinity	-3		
RSRP Note3	dBm/15 kHz	-infinity	-101		
SCH_RP Note3	dBm/15 kHz	-infinity -101			
Propagation Condition		AWGN			

- Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{oc}$  to be fulfilled.
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: This test is according to the principle defined in section A.3.12.3.

Table A.10.4.1-3: SyncRef UE specific test parameters for cell identification test on on downlink frequency associated with ProSe frequency for E-UTRAN FDD

Parameter	Unit SyncRef UE 1		f UE 1
Parameter		T1	T2
E-UTRA RF Channel Number		1 (Upl	ink)
BW <sub>channel</sub> Note 4	MHz	5 or	10
ProSe Direct Communication resource pool configuration		As specified in Ta (Configura	
networkControlledSyncTx		ON	I
slssid		30	
inCoverage (in MIB-SL)		TRU	IE .
syncOffsetIndicator		syncOffsetI	ndicator1
$N_{oc}^{$	dBm/15 kHz	-98	3
$\hat{E}_s/N_{oc}$	dB	13	
S-RSRP Note2, Note3	dBm/15 kHz	-85	
Propagation Condition		AWO	SN

- Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  $N_{ac}$  to be fulfilled.
- Note 2: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 3: SSSS Es/lot is set the same as PSSS/PSBCH Es/lot.
- Note 4: This test is according to the principle defined in section A.3.12.3.

#### A.10.4.2 Test Requirements

The cell selection delay to a newly detectable cell on the downlink associated with the preconfigured ProSe carrier is defined as the time from the beginning of T2 to the time UE camps on the cell and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST.

The cell selection delay to a newly detectable cell on the downlink associated with the preconfigured ProSe carrier shall be less than 7.68 s.

The cell selection delay can be expressed as  $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON} + T_{SI}$ , where

- $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON} = 6.4sec$  as specified in sub-clause 11.4.2.2
- $T_{SI}$  = Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case

This gives a total of 7.68 sec.

## Annex B (normative):

# Conditions for RRM requirements applicability for operating bands

### B.1 Conditions for E-UTRAN RRC\_IDLE state mobility

## B.1.1 Conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection

This clause defines the E-UTRAN intra-frequency RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection are defined in Table B.1.1-1.

Table B.1.1-1: Conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection

Parameter	E-UTRA operating band groups <sup>Note 3</sup>	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/lot	SCH Ês/lot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FDD_A, TDD_A	-124	-124	≥ -4	≥ -4
	FDD_C, TDD_C	-123	-123		
	FDD_D	-122.5	-122.5		
	FDD_E, TDD_E	-122	-122		
	FDD_F	-121.5 Note 2	-121.5 Note 2		
	FDD_G	-121	-121		
	FDD_H	-120.5	-120.5		
	FDD_N	-117.5	-117.5		

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Section B.4.2.

NOTE 2: The condition is -122 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

## B.1.2 Conditions for measurements of inter-frequency E-UTRAN cells for cell re-selection

This clause defines the E-UTRAN inter-frequency RSRP, RSRP  $\hat{E}s/Iot$ , SCH\_RP and SCH  $\hat{E}s/Iot$  applicable for a corresponding operating band.

The conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection defined in Table B.1.1-1 also apply for inter-frequency E-UTRAN cells in this section.

# B.2 Conditions for UE Measurements Procedures in RRC\_CONNECTED State

#### B.2.1 Conditions for E-UTRAN intra-frequency measurements

This clause defines the E-UTRAN intra-frequency SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements are defined in Table B.2.1-1.

Table B.2.1-1: E-UTRAN intra-frequency measurements

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/lot
		dBm/15kHz	dB
	FDD_A, TDD_A	-127	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
Conditions	FDD_E, TDD_E	-125	\ <u></u>
Conditions	FDD_F	-124.5 Note 2	≥ -6
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

# B.2.2 Conditions for E-UTRAN intra-frequency measurements with autonomous gaps

This clause defines the E-UTRAN intra-frequency SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements with autonomous gap are as in Table B.2.1-1.

Table B.2.2-1: Void

#### B.2.3 Conditions for E-UTRAN inter-frequency measurements

This clause defines the E-UTRAN inter-frequency SCH\_RP, SCH Ês/Iot, RSRP and RSRP Ês/Iot applicable for a corresponding operating band.

The conditions for inter-frequency E-UTRAN measurements with autonomous gap are defined in Table B.2.3-1.

Table B.2.3-1: E-UTRAN inter-frequency measurements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/lot	SCH Ês/lot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FDD_A, TDD_A	-125	-125	 ≥ -4	≥ -4
	FDD_C, TDD_C	-124	-124		
	FDD_D	-123.5	-123.5		
	FDD_E, TDD_E	-123	-123		
	FDD_F	-122.5 Note 2	-122.5 Note 2		
	FDD_G	-122	-122		
	FDD_H	-121.5	-121.5		
	FDD_N	-118.5	-118.5		

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

# B.2.4 Conditions for E-UTRAN inter-frequency measurements with autonomous gaps

This clause defines the E-UTRAN inter-frequency SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for inter-frequency E-UTRAN measurements with autonomous gap are defined in Table B.2.4-1.

Table B.2.4-1: E-UTRAN inter-frequency measurements with autonomous gaps

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/lot
		dBm/15kHz	dB
	FDD_A, TDD_A	-125	
	FDD_C, TDD_C	-124	
	FDD_D	-123.5	
Conditions	FDD_E, TDD_E	-123	
Conditions	FDD_F	-122.5 Note 2	≥ -4
	FDD_G	-122	
	FDD_H	-121.5	7
	FDD_N	-118.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

### B.2.5 Conditions for E-UTRAN OTDOA intra-frequency RSTD Measurements

This clause defines the E-UTRAN intra-frequency PRP1,2 applicable for a corresponding operating band

The conditions for E-UTRAN OTDOA intra-frequency RSTD measurements are defined in Table B.2.5-1

Table B.2.5-1: E-UTRAN OTDOA intra-frequency RSTD measurements

Parameter	E-UTRA operating band groups Note 3	Minimum PRP1,2
		dBm/15kHz
	FDD_A, TDD_A	-127
	FDD_C, TDD_C	-126
	FDD_D	-125.5
Conditions	FDD_E, TDD_E	-125
Conditions	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5

NOTE 1: This condition level is increased by  $\Delta > 0$ , when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

## B.2.6 Conditions for E-UTRAN OTDOA inter-frequency RSTD Measurements

This clause defines the E-UTRAN inter-frequency PRP1,2 applicable for a corresponding operating band.

The conditions for E-UTRAN OTDOA inter-frequency RSTD measurements are defined in Table B.2.5-1.

## B.2.7 Conditions for Measurements of the secondary component carrier with deactivated SCell

This clause defines the SCH\_RP and SCH  $\hat{E}s/Iot$  for measurements in the secondary component carrier applicable for a corresponding operating band.

The conditions for measurements of the secondary component carrier with deactivated SCell are defined in Table B.2.7-1

Table B.2.7-1: Measurements of the secondary component carrier with deactivated SCell

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/lot
		dBm/15kHz	dB
	FDD_A, TDD_A	-127	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
Conditions	FDD_E, TDD_E	-125	\ <u>`</u>
Conditions	FDD_F	-124.5 Note 2	≥ -6
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by  $\Delta>0$ , when applicable, as described in Sections B.4.2 and B.4.3.

# B.2.8 Conditions for E-UTRAN Intra-Frequency Measurements under Time Domain Measurement Resource Restriction

This clause defines the E-UTRAN intra-frequency SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements under time domain measurement resource restriction are defined in Table B.2.8-1.

Table B.2.8-1: E-UTRAN intra-frequency measurements under time domain measurement resource restriction

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/lot
		dBm/15kHz	dB
	FDD_A, TDD_A	-127	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
Conditions	FDD_E, TDD_E	-125	\ \ 7.F
Conditions	FDD_F	-124.5 Note 2	≥ -7.5
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

# B.2.9 Conditions for E-UTRAN Intra-Frequency Measurements under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN intra-frequency SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements under time domain measurement resource restriction with CRS assistance information are defined in Table B.2.9-1.

Table B.2.9-1: E-UTRAN intra-frequency measurements under time domain measurement resource restriction with CRS assistance information

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/lot
		dBm/15kHz	dB
	FDD_A, TDD_A	-127	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
O a malifica ma	FDD_E, TDD_E	-125	. 44.07
Conditions	FDD_F	-124.5 Note 2	≥ -11.07
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

## B.2.10 Conditions for E-UTRAN intra-frequency discovery signal measurements

This clause defines the E-UTRAN intra-frequency SCH\_RP, SCH Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for discovery signal measurements

The conditions for E-UTRAN intra-frequency discovery signal measurements are as in Table B.2.1-1.

## B.2.11 Conditions for E-UTRAN inter-frequency discovery signal measurements

#### B.2.11.1 Conditions for E-UTRAN inter-frequency CRS-based measurements

This clause defines the E-UTRAN inter-frequency SCH\_RP, SCH £s/Iot, RSRP, and £s/Iot in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for E-UTRAN inter-frequency CRS-based discovery signal measurements in discovery signal occasions are specified in Table B.2.11.1-1.

Table B.2.11.1-1: E-UTRAN inter-frequency discovery signal measurements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/lot	SCH Ês/lot
	groups	dBm/15kHz	dBm/15kHz	dB	dB
	FDD_A, TDD_A	-125	-125		
	FDD_C, TDD_C	-124	-124		
	FDD_D	-123.5	-123.5		
Conditions	FDD_E, TDD_E	-123	-123	≥ -6	≥ -6
Conditions	FDD_F	-122.5 Note 2	-122.5 Note 2	≥ -0	≥ -0
	FDD_G	-122	-122		
	FDD_H	-121.5	-121.5		
	FDD_N	-118.5	-118.5		

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

## B.2.11.2 Conditions for E-UTRAN inter-frequency CSI-RS based measurements

This clause defines the E-UTRAN inter-frequency SCH\_RP, SCH Ês/Iot, CSI-RSRP, and CSI-RS Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for E-UTRAN inter-frequency CRS-based discovery signal measurements in discovery signal occasions are specified in Table B.2.11.2-1.

Table B.2.11.2-1: E-UTRAN inter-frequency discovery signal measurements

Parameter	E-UTRA operating band groups Note 3	Minimum CSI- RSRP Note 1	Minimum SCH_RP Note 1	CSI-RS Ês/lot	SCH Ês/lot
	groups	dBm/15kHz	dBm/15kHz	dB	dB
	FDD_A, TDD_A	-125	-125		
	FDD_C, TDD_C	-124	-124	≥0	≥ -6
	FDD_D	-123.5	-123.5		
Conditions	FDD_E, TDD_E	-123	-123		
Conditions	FDD_F	-122.5 Note 2	-122.5 Note 2		
	FDD_G	-122	-122		
	FDD_H	-121.5	-121.5		
	FDD_N	-118.5	-118.5		

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.

# B.3 Conditions for measurements performance requirements for UE

# B.3.1 Conditions for intra-frequency RSRP and RSRQ Accuracy Requirements

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements are defined in Table B.3.1-1.

NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

Table B.3.1-1: Intra-frequency absolute RSRP and RSRQ Accuracy Requirements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP <sup>Note 1</sup>
		dBm/15kHz
	FDD_A, TDD_A	-127
	FDD_C, TDD_C	-126
	FDD_D	-125.5
Conditions	FDD_E, TDD_E	-125
Conditions	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

#### B.3.2 Void

## B.3.3 Conditions for inter-frequency RSRP and RSRQ Accuracy Requirements

This clause defines the E-UTRAN inter-frequency RSRP applicable for a corresponding operating band.

The conditions for inter-frequency absolute RSRP and RSRQ accuracy requirements are defined in Table B.3.1-1.

# B.3.4 Conditions for inter-frequency relative RSRP and RSRQ Accuracy Requirements

This clause defines the E-UTRAN inter-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for inter-frequency relative RSRP and RSRQ accuracy requirements are defined in Table B.3.8-1.

#### B.3.5 Conditions for UE Rx – Tx time difference

This clause defines the E-UTRAN RSRP applicable for a corresponding operating band.

The conditions for UE Rx-Tx time difference are defined in Table B.3.1-1.

# B.3.6 Conditions for intra-frequency Reference Signal Time Difference (RSTD) measurements

This sections defines the E-UTRAN intra-frequency PRP applicable for a corresponding operating band.

The conditions for intra-frequency RSTD measurements are defined in Table B.2.5-1.

## B.3.7 Conditions for inter-frequency RSTD measurements

This sections defines the E-UTRAN inter-frequency PRP applicable for a corresponding operating band.

The conditions for inter-frequency RSTD measurements are defined in Table B.2.5-1.

## B.3.8 Conditions for Intra-Frequency Relative RSRP Accuracy Requirements

This clause defines the E-UTRAN intra-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements are specified in Table B.3.8-1.

Table B.3.8-1: Intra-frequency relative RSRP accuracy requirements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP1,2 <sup>Note 1</sup>
		dBm/15kHz
	FDD_A, TDD_A	-127
	FDD_C, TDD_C	-126
	FDD_D	-125.5
Conditions	FDD_E, TDD_E	-125
Conditions	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel

bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

# B.3.9 Conditions for Intra-Frequency Absolute RSRP and RSRQ Accuracy Requirements under Time Domain Measurement Resource Restriction

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements under time domain measurement resource restriction are as specified in Table B.3.1-1.

## B.3.10 Conditions for Intra-Frequency Relative RSRP Accuracy Requirements under Time Domain Measurement Resource Restriction

This clause defines the E-UTRAN intra-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements under time domain measurement resource restriction are defined in Table B.3.8-1.

# B.3.11 Conditions for Intra-Frequency Absolute RSRP and RSRQ Accuracy Requirements under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements under time domain measurement resource restriction with CRS assistance information are as specified in Table B.3.1-1.

## B.3.12 Conditions for Intra-Frequency Relative RSRP Accuracy Requirements under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN intra-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements under time domain measurement resource restriction with CRS assistance information are as specified in Table B.3.8-1.

# B.3.13 Conditions for UE Rx–Tx Time Difference Measurement under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN RSRP applicable for a corresponding operating band.

The conditions for UE Rx-Tx time difference measurements, when time domain measurement resource restriction pattern and CRS assistance information are provided, are as defined in Table B.3.1-1.

# B.3.14 Conditions for Intra-Frequency Absolute Discovery Signal Measurement Accuracy Requirements

#### B.3.14.1 Conditions for Intra-frequency CRS-based measurements

This clause defines the intra-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.1-1

## B.3.14.2 Conditions for Intra-frequency CSI-RS-based measurements

This clause defines the intra-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for intra-frequency absolute CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are specified in Table B.3.14.2-1

Table B.3.14.2-1: Intra-frequency Absolute CSI-RSRP Accuracy Requirements

Parameter	E-UTRA operating band groups Note 3	Minimum CSI-RSRP Note 1
		dBm/15kHz
	FDD_A, TDD_A	-127
	FDD_C, TDD_C	-126
	FDD_D	-125.5
Conditions	FDD_E, TDD_E	-125
Conditions	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

# B.3.15 Conditions for Intra-Frequency Relative Discovery Signal Measurement Accuracy Requirements

#### B.3.15.1 Conditions for Intra-frequency CRS-based measurements

This clause defines the intra-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for intra-frequency relative RSRP accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.8-1

#### B.3.15.2 Conditions for Intra-frequency CSI-RS-based measurements

This clause defines the intra-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for intra-frequency relative CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are specified in Table B.3.15.2-1

Table B.3.15.2-1: Intra-frequency Relative CSI-RSRP Accuracy Requirements

Parameter	E-UTRA operating band groups Note 3	Minimum CSI-RSRP1,2 Note 1
		dBm/15kHz
	FDD_A, TDD_A	-127
	FDD_C, TDD_C	-126
	FDD_D	-125.5
Conditions	FDD_E, TDD_E	-125
Conditions	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

# B.3.16 Conditions for Inter-Frequency Absolute Discovery Signal Measurement Accuracy Requirements

#### B.3.16.1 Conditions for Inter-frequency CRS-based measurements

This clause defines the inter-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for inter-frequency absolute RSRP and RSRQ accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.1-1

## B.3.16.2 Conditions for Inter-frequency CSI-RS-based measurements

This clause defines the inter-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for inter-frequency absolute CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are as in Table B.3.14.2-1.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

# B.3.17 Conditions for Inter-Frequency Relative Discovery Signal Measurement Accuracy Requirements

#### B.3.17.1 Conditions for Inter-frequency CRS-based measurements

This clause defines the inter-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for inter-frequency relative RSRP and RSRQ accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.8-1

#### B.3.17.2 Conditions for Inter-frequency CSI-RS-based measurements

This clause defines the inter-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for inter-frequency relative CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are as in Table B.3.15.2-1.

## B.4 RRM Requirements Exceptions

#### B.4.1 General

### B.4.2 Receiver sensitivity relaxation for UE supporting CA

For a UE supporting inter-band carrier aggregation configuration with uplink in one E-UTRA band, if there is a relaxation of receiver sensitivity  $\Delta R_{IB,c}>0$  dB as defined in TS 36.101 [5], Table 7.3.1-1A, the relevant side conditions specifying received power levels (E-UTRA RSRP, SCH\_RP, PRP, CSI-RSRP, and Io) shall be increased by the amount  $\Delta=\Delta R_{IB,c}$  defined for each of the downlink E-UTRA bands.

NOTE: This side condition adjustment applies only for a UE supporting a single inter-band LTE CA band combination. For a UE supporting additional inter-band LTE CA band combinations, the  $\Delta R_{IB,c}$  for all bands supported by the UE, need to be studied [5].

### B.4.3 Receiver sensitivity relaxation for UE configured with CA

### B.4.3.1 Inter-band carrier aggregation

In this section, requirements exceptions are described for the UE configured with inter-band carrier aggregation with one uplink active in low operating band.

A relevant side condition (e.g., E-UTRA RSRP, SCH\_RP, PRP, CSI-RSRP, and Io) in a requirement shall be increased by the amount  $\Delta$ =L2-L1, where L1 is the reference sensitivity level specified in 36.101, Table 7.3.1-1, and L2 is the reference sensitivity level specified in 36.101, Table 7.3.1A-0a, when the following conditions are fulfilled,

- both downlink component carriers on different bands are configured with CA and active,
- the single uplink is active in the low operating band,
- the exception requirements specified in TS36.101, Table 7.3.1A-0a, apply.

If the relaxation  $\Delta$  specified in this section applies, then the relaxation specified in Section B.4.2 should not be applied.

#### B.4.3.2 Intra-band non-contiguous carrier aggregation

For a UE configured with intra-band non-contiguous carrier aggregation configuration with uplink in one E-UTRA band, if there is a relaxation of receiver sensitivity  $\Delta R_{IBNC}>0$  as defined in TS 36.101 [5], Table 7.3.1A-3, the relevant side conditions specifying received power levels (E-UTRA RSRP, SCH\_RP, PRP, CSI-RSRP, and Io) shall be increased by the amount  $\Delta=\Delta R_{IBNC}$  defined for the downlink SCC, when the following conditions are fulfilled,

- both downlink component carriers are configured with CA and active,
- one uplink carrier is active,
- the exception requirements specified in TS36.101, Table 7.3.1A-3, apply.

If the relaxation  $\Delta$  specified in this section applies, then the relaxation specified in Section B.4.2 should not be applied.

## B.4.3.3 Inter-band carrier aggregation with operating bands without uplink band

In this section, requirements are described for the UE configured with inter-band carrier aggregation involving one operating band without uplink band.

There is no relaxation in relevant side condition (e.g., E-UTRA RSRP, SCH\_RP, PRP, CSI-RSRP, and Io) in a requirement, i.e.,  $\Delta$ =0, when the following conditions are fulfilled,

- both downlink component carriers on different bands are configured with CA and active,
- the single uplink is active in the high operating band,
- conditions specified in TS36.101, Table 7.3.1A-0d, apply.

If  $\Delta$  specified in this section applies, then no other additional relaxation to REFSENS shall be applied.

## B.5 Conditions for Measurement Performance Requirements for ProSe UE in Any Cell Selection State State

## B.5.1 Conditions for S-RSRP Accuracy Requirements

This clause defines the S-RSRP applicable for a corresponding operating band.

The conditions for absolute S-RSRP accuracy requirements are defined in Table B.5.1-1.

Table B.5.1-1: Absolute S-RSRP Requirements

	E-UTRA ProSe operating band groups Note 3	Minimum S-RSRP Note 1
		dBm/15kHz
Daramatar	FDD_D	-125.5
Parameter	FDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_N	-120.5

NOTE 1: This condition level is increased by  $\Delta$ >0, when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.

#### Conditions for Relative S-RSRP Accuracy Requirements B.5.2

This clause defines the S-RSRP1,2 applicable for a corresponding operating band.

The conditions for relative S-RSRP accuracy requirements are specified in Table B.5.2-1.

Table B.5.2-1: Relative S-RSRP accuracy requirements

	E-UTRA ProSe operating band groups Note 3	Minimum S-RSRP1,2 Note 1
		dBm/15kHz
Doromotor	FDD_D	-125.5
Parameter	FDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_N	-120.5
NOTE 1: Th	is condition level is increased by $\Delta > 0$ , when applicable, as described in Sections	B 4 2 and B 4 3

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel

bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA

operating bands

#### Conditions for Selection/Seselection to Intra-frequency B.5.3 SyncRef UE

This clause defines the ProSe SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for selection/reselection to intra-frequency SyncRef UE are defined in Table B.5.3-1.

Table B.5.3-1: ProSe synchronization measurements

	E-UTRA ProSe operating band groups Note 3	Minimum ProSe SCH_RP	ProSe SCH Ês/lot Note 4
		dBm/15kHz	dB
Parameter	FDD_D	-125.5	
	FDD_E	-125	
	FDD_F	-124.5 Note 2	≥ -4
	FDD_G	-124	
	FDD N	-120.5	

NOTE 1: This condition level is increased by  $\Delta > 0$ , when applicable, as described in Sections B.4.2 and B.4.3.

NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating

NOTE 4: ProSe SCH Ês/lot for a SyncRef UE is the minimum of the Ês/lot of PSSS/PSBCH and the Ês/lot of SSSS

# Annex C (informative): Change history:

Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2007-12	RP#38	RP- 071037				Approved version in TSG RAN#38	8.0.0
2008-03	RP#39	RP- 080123	2			Updates of TS36.133	8.1.0
2008-05	RP#40	RP- 080325	3			Updates of TS36.133	8.2.0
2008-09	RP#41	RP- 080644	006	1		E-UTRAN TDD intra frequency measurements when DRX is used	8.3.0
2008-09	RP#41	RP- 080644	008	1		E-UTRAN TDD - UTRAN TDD measurements	8.3.0
2008-09	RP#41	RP- 080644	012			RSRQ reporting Range	8.3.0
2008-09	RP#41	RP- 080644	018	1		Interfrequency and UTRA interRAT DRX peformance requirements	8.3.0
2008-09	RP#41	RP- 080644	020	1		Additions to UE transmit timing requirements	8.3.0
2008-09	RP#41	RP- 080644	043			Received interference power measurement performance requirement	8.3.0
2008-09	RP#41	RP- 080644	044			Cell Synchronization requirement for E-UTRA TDD	8.3.0
2008-09	RP#41	RP- 080644	047			Power Headroom Requirements	8.3.0
2008-09	RP#41	RP- 080644	048			Event Triggering and Reporting Criteria Capability Requirements	8.3.0
2008-09	RP#41	RP- 080642	004			Correction of E-UTRAN to UTRAN TDD handover	8.3.0
2008-09	RP#41	RP- 080642	016	1		Definition of Symbols	8.3.0
2008-09	RP#41	RP- 080642	019	1		Idle mode requirements updates	8.3.0
2008-09	RP#41	RP- 080642	021	1		General updates to 36.133	8.3.0
2008-09	RP#41	RP- 080642	023	1		Handover requirements for E-UTRAN to cdma200 HRPD/1x	8.3.0
2008-09	RP#41	RP- 080642	024			Inter-frequency and inter-RAT measurement requirements for multiple layer monitoring	8.3.0
2008-09	RP#41	RP- 080642	025			Side conditions for UE measurement procedures and measurement performance requirements	8.3.0
2008-09	RP#41	RP- 080642	026			Correction to cell reselection Requirement from E-UTRAN to HRPD/cdma200 1x	8.3.0
2008-09	RP#41	RP- 080642	027			IRAT Measurement requirements in TS 36.133	8.3.0
2008-09	RP#41	RP- 080713	022	1		Corrections to Handover requirements	8.3.0
2008-09	RP#41	RP- 080713	028			Measurement reporting requirements	8.3.0
2008-09	RP#41	RP- 080713	029	2		RRC re-establishment requirements	8.3.0
2008-09	RP#41	RP- 080713	032			Correction to UE measurement requirements	8.3.0
2008-09	RP#41	RP- 080713	033			Correction for the definition of interruption time	8.3.0
2008-09	RP#41	RP- 080713	040	1		Correction to idle mode higher priority search requirements	8.3.0
2008-09	RP#41	RP- 080713	045			E-UTRAN TDD inter frequency measurement requirements	8.3.0
2008-09	RP#41	RP- 080713	046			Updates of the Measurement procedures in RRC_Connected state from RAN 4#47bis and RAN 4#48	8.3.0
2008-12	RP#42	RP- 080919	53			Introduction of 700MHz Bands 12, 14 and 17	8.4.0
2008-12	RP#42	RP- 080928	88	1		CR to 36.133 on Radio Link Failure Monitoring	8.4.0
2008-12	RP#42	RP- 080929	51			Correction to idle mode requirements	8.4.0
2008-12	RP#42	RP-	52			Definition of out of service area	8.4.0

2008-12	RP#42	080929 RP-	54	+ +	Measurement requirements for UTRAN TDD cells in idle	8.4.0
		080929			state	
2008-12	RP#42	RP- 080929	69	2	Correction of Inter-RAT UTRA cell reselection requirement	8.4.0
2008-12	RP#42	RP- 080929	55		Correction of E_UTRAN cell measurement requirements in idle state	8.4.0
2008-12	RP#42	RP- 080930	76		Correction to HO Requirements	8.4.0
2008-12	RP#42	RP- 080931	71		Random access requirements	8.4.0
2008-12	RP#42	RP- 080932	85		Cell phase synchronization error for large cell	8.4.0
2008-12	RP#42	RP- 080932	63	4	Synchronization Requirements for E-UTRAN to 1xRTT and HRPD Handovers	8.4.0
2008-12	RP#42	RP-	49		E-UTRAN TDD-TDD intra/inter frequency measurement	8.4.0
2008-12	RP#42	080933 RP-	50		reporting requirements  E-UTRAN FDD – UTRAN FDD Measurement reporting	8.4.0
2008-12	RP#42	080933 RP-	58		requirements  Measurement requirement for E-UTRAN TDD to UTRAN	8.4.0
2008-12	RP#42	080933 RP-	60		TDD/FDD when DRX is used Interfrequency and GSM measurement performance	8.4.0
2008-12	RP#42	080933 RP-	62		requirements in large DRX  Correction of implementation margin for transmission gap.	8.4.0
2008-12	RP#42	080933 RP-	72		Alignement of DRX cycle dependent requirements	8.4.0
		080933		4		
2008-12	RP#42	RP- 080933	73	1	Alignement of side conditions for mobility measurements	8.4.0
2008-12	RP#42	RP- 080933	66	1	Measurement models in RRC_CONNECTED	8.4.0
2008-12	RP#42	RP- 080933	78	1	Limitation of maximum number of layers for multiple monitoring	8.4.0
2008-12	RP#42	RP- 080933	83	1	GSM Cell identification requirements for parallel monitoring	8.4.0
2008-12	RP#42	RP- 080933	87		UE transmit timing requirement	8.4.0
2008-12	RP#42	RP- 080933	56		Correction of TS 36.133 clause 8.1.2.1.1.	8.4.0
2008-12	RP#42	RP- 080934	77		Correction to RSRQ Report Mapping	8.4.0
2008-12	RP#42		86		Missing side conditions for RSRP and RSRQ	8.4.0
2008-12	RP#42	RP- 080935	81	1	Phase I RRM Test Cases	8.4.0
2008-12	RP#42		80	1	Test Configuration for RRM Tests: Measurement Reference Channels and OCNG	8.4.0
2008-12	RP#42	RP- 080936	75		Cdma200 1xRTT Measurement Requirements	8.4.0
2008-12	RP#42	RP- 080937	74	1	E-UTRA to UTRA cell search requirements for SON	8.4.0
2009-03	RP#43	RP- 090182	101	1	Correction of A3-offset parameter in RRM test case	8.5.0
2009-03	RP#43	RP- 090182	105		Some Editorial Corrections	8.5.0
2009-03	RP#43	RP- 090182	145		Clarifications for the DRX state	8.5.0
2009-03	RP#43	RP-	89		Modification on measurements of UTRAN TDD cells	8.5.0
2009-03	RP#43	090183 RP-	91		Clarification of the correct behavior when Treselection is not	8.5.0
2009-03	RP#43	090183 RP-	98		a multiple of idle mode reselection evaluation period  Clarification of 'Out of Service Area' Concept and Definition	8.5.0
2009-03	RP#43	090183 RP-	118		Radio link monitoring	8.5.0
2009-03	RP#43	090183 RP-	142	1	Update of RRC_IDLE state mobility side conditions	8.5.0
2009-03	RP#43	090183 RP-	150	+ +	UE measurement capability in Idle mode	8.5.0
2009-03	RP#43	090183 RP-	133		Removal of RRC re-establishment procedure delay	8.5.0
		090184 RP-		1	,	
2009-03	RP#43	090184	138	1	Correction for the UE Re-establishment delay requirement	8.5.0
2009-03	RP#43	RP-	92	2	Cell phase synchronization accuracy	8.5.0

		090185				
2009-03	RP#43	RP- 090185	97		Radio link monitoring in DRX	8.5.0
2009-03	RP#43	RP- 090185	120		UE Transmit Timing	8.5.0
2009-03	RP#43	RP- 090185	137	1	Clarification of the reference point for the UE initial transmission timing control requirement	8.5.0
2009-03	RP#43	RP- 090186	90		Correction of clause 8.1.2.2.2.2 in TS36.133	8.5.0
2009-03	RP#43	RP- 090186	93	1	cdma2000 1xRTT and HRPD Measurement Requirements	8.5.0
2009-03	RP#43	RP- 090186	94		Event Triggered Periodic Reporting Requirements for IRAT Measurements	8.5.0
2009-03	RP#43	RP- 090186	95		Measurement Reporting Requirements for E-UTRAN TDD – UTRAN TDD Measurements	8.5.0
2009-03	RP#43	RP- 090186	99	1	Clarification of UE behavior when measurement gap is used	8.5.0
2009-03	RP#43	RP- 090186	100		E-UTRA to UTRA cell search requirements in DRX for SON	8.5.0
2009-03	RP#43	RP- 090186	110	1	Correction to GSM BSIC Requirements for Parallel Monitoring	8.5.0
2009-03	RP#43	RP- 090186	117		Alignment of terminology for GAP	8.5.0
2009-03	RP#43	RP- 090186	134		Inter frequency and Inter RAT cell search requirement when DRX is used	8.5.0
2009-03	RP#43	RP- 090186	139		Correction of E-UTRAN FDD – UTRAN FDD measurements when no DRX	8.5.0
2009-03	RP#43	RP- 090186	146		Addition of the definition of "when DRX is used"	8.5.0
2009-03	RP#43	RP- 090186	147	1	Corrections to E-UTRAN inter-frequency side conditions	8.5.0
2009-03	RP#43	RP- 090187	96		Correction to Intra-frequency RSRP Accuracy Requirements	8.5.0
2009-03	RP#43	RP- 090187	136	1	Power Headroom reporting delay	8.5.0
2009-03	RP#43	RP- 090370	103	1	E-UTRAN -GSM Handover Test Case	8.5.0
2009-03	RP#43	RP- 090370	104	1	E-UTRAN FDD - UTRAN TDD Cell Search Test Cases in Fading	8.5.0
2009-03	RP#43	RP- 090370	106	1	E-UTRA FDD to UTRA FDD Handover Test Case	8.5.0
2009-03	RP#43	RP- 090370	107	1	Correction of E-UTRA FDD-FDD Intra-frequency cell reselection test case	8.5.0
2009-03	RP#43	RP- 090370	108	1	Correction of E-UTRA FDD-FDD priority based Inter- frequency cell reselection test case	8.5.0
2009-03	RP#43	RP- 090370	111		E-UTRAN TDD - UTRAN FDD Handover Test Case	8.5.0
2009-03	RP#43	RP- 090370	112	1	E-UTRAN FDD - GSM Cell Search Test Case in AWGN	8.5.0
2009-03	RP#43	RP- 090370	113		E-UTRAN - UTRAN FDD Cell Search Test Cases in Fading	8.5.0
2009-03	RP#43	RP- 090370	114	1	E-UTRAN UE Timing Accuracy Related Test Cases	8.5.0
2009-03	RP#43	RP- 090370	115	1	Inclusion of MBSFN Configurations for RRM Test Cases	8.5.0
2009-03	RP#43	RP- 090370	116		E-UTRAN FDD HRPD Cell Reselection Test Case; HRPD of Low Priority	8.5.0
2009-03	RP#43	RP- 090370	122	1	Clarification on Annex A.9: Measurement performance requirements	8.5.0
2009-03	RP#43	RP- 090370	125		E-UTRA TDD – UTRA TDD cell reselection: UTRA is of higher priority	8.5.0
2009-03	RP#43	RP- 090370	126		E-UTRA TDD – UTRA TDD cell reselection: UTRA is of lower priority	8.5.0
2009-03	RP#43	RP- 090370	127		E-UTRA FDD – UTRA TDD cell reselection	8.5.0
2009-03	RP#43	RP- 090370	128	1	E-UTRA TDD-UTRA TDD cell search (fading)	8.5.0
2009-03	RP#43	RP- 090370	129	1	E-UTRA TDD-UTRA TDD handover	8.5.0
2009-03	RP#43	RP- 090370	132	1	Addition of E-UTRA FDD to UTRA FDD reselection test cases	8.5.0
2009-03	RP#43	RP-	141	1	Correction and introduction of some test related parameters	8.5.0

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2009-03	RP#43	RP- 090370	143		Description of Annex A in TS 36.133	8.5.0
2009-03	RP#43	RP- 090370	148		Reselection from E-UTRA to GSM cell test case	8.5.0
2009-03	RP#43	RP-	149		Radio Link Monitoring Test Cases	8.5.0
2009-05	RP#44	090370 RP-	151		E-UTRA FDD UTRA TDD HO delay test case	8.6.0
2009-05	RP#44	090546 RP-	153		Correction of CQI reporting periodicity for TDD RLM test	8.6.0
2009-05	RP#44	090546 RP-	157		cases  Correction to inter RAT reselection requirements to exclude	8.6.0
		090546			equal priority. (Technically Endorsed CR in R4-50bis - R4-091092)	
2009-05	RP#44	RP- 090546	167		Clarification of the number of monitoring carriers in idle mode. (Technically Endorsed CR in R4-50bis - R4-091394)	8.6.0
2009-05	RP#44	RP- 090546	180		Correction of Core spec references in A.9 Measurements performance test cases	8.6.0
2009-05	RP#44	RP- 090546	984		UTRA FDD-E-UTRA FDD/ TDD handover test cases	8.6.0
2009-05	RP#44	RP- 090546	184		SON ANR UTRAN FDD Cell Search Test Case	8.6.0
2009-05	RP#44	RP- 090546	187		E-UTRAN FDD cdma2000 1x RTT Cell Reselection Test Case; Cdma2000 1X of Low Priority	8.6.0
2009-05	RP#44	RP- 090546	188		E-UTRAN FDD cdma2000 HO Test cases	8.6.0
2009-05	RP#44	RP-	190		E-UTRAN Random Access Test Cases	8.6.0
2009-05	RP#44	090546 RP-	191		E-UTRAN RRC Re-establishment Test Cases	8.6.0
2009-05	RP#44	090546 RP-	192		E-UTRAN TDD - GSM Cell Search Test Case in AWGN	8.6.0
2009-05	RP#44	090546 RP-	197		Correction to E-UTRAN FDD - GSM Handover Test case	8.6.0
2009-05	RP#44	090546 RP-	173	1	Correction of cell reselection test cases	8.6.0
2009-05	RP#44	090546 RP-	179	1	Test cases of E-UTRA TDD intra-frequency cell search in	8.6.0
2009-05	RP#44	090546 RP-	152	1	fading environment when DRX is used  E-UTRA TDD GSM handover test case	8.6.0
2009-05	RP#44	090546 RP-	178	1	Test cases of E-UTRA FDD intra-frequency cell search in	8.6.0
2009-05	RP#44	090546 RP-	201	1	fading environment when DRX is used Test case for E-UTRA FDD E-UTRA FDD inter frequency	8.6.0
2009-05	RP#44	090546 RP-	185	1	cell search when DRX is used in fading conditions  Correction to Radio Link Monitoring Tests	8.6.0
2009-05	RP#44	090546 RP-	203		Correction to E-UTRAN FDD to HRPD Cell Reselection Test	8.6.0
2009-05	RP#44	090546 RP-	177	1	Case Introduction of New Reference Channels and OCNG Patterns	8.6.0
2009-05	RP#44	090546 RP-	200	2	for 1.4MHz Bandwidth  Test case for E-UTRA TDD E-UTRA TDD inter frequency	8.6.0
		090546		2	cell search when DRX is used in fading conditions	
2009-05	RP#44	RP- 090547	158		Alignment of inter frequency and inter RAT RRM reselection testcases with core requirements. (Technically Endorsed CR in R4-50bis - R4-091094)	8.6.0
2009-05	RP#44	RP- 090547	160		Correction relating E-UTRAN TDD - UE Transmit Timing Accuracy Tests. (Technically Endorsed CR in R4-50bis - R4-	8.6.0
2009-05	RP#44	RP-	165		091198)  Modifications of T3 and the verification point for in-sync test	8.6.0
2009-05	RP#44	090547 RP-	172		cases. (Technically Endorsed CR in R4-50bis - R4-091386) E-UTRAN UE Timing Accuracy Related Test Cases.	8.6.0
2009-05	RP#44	090547 RP- 090547	171	1	(Technically Endorsed CR in R4-50bis - R4-091517)  Reference measurement Channels for Radio Link Monitoring Tests with 2 Antennas. (Technically Endorsed CR in R4-	8.6.0
2009-05	RP#44	RP-	170		50bis - R4-091508)  Misalignment between TS36.133 and TS36.321. (Technically	8.6.0
2009-05	RP#44	090548 RP-	193		Endorsed CR in R4-50bis - R4-091457)  Correction to Inter-RAT HO Interruption Time Definition	8.6.0
2009-05	RP#44	090548 RP-	195		CR c2k RRC delay	8.6.0
2009-05	RP#44	090548 RP-	196		CR c2k interruption time	8.6.0
	1	090548	Ī	1		

		090548	T		Endorsed CR in R4-50bis - R4-091357)	
2009-05	RP#44	RP- 090548	176		Corrections of Random Access Requirements	8.6.0
2009-05	RP#44	RP- 090548	154		Correction of TGRP in clause 8.1.2.1.1	8.6.0
2009-05	RP#44	RP- 090548	168		Clarifications for the Relative RSRP and RSRQ measurement requirements. (Technically Endorsed CR in R4-50bis - R4-091407)	8.6.0
2009-05	RP#44	RP- 090549	161		E-UTRAN UTRAN HO Command Processing Delay. (Technically Endorsed CR in R4-50bis - R4-091291)	8.6.0
2009-05	RP#44	RP- 090549	175		Corrections of Cell Reselection Requirements in Idle Mode	8.6.0
2009-05	RP#44	RP- 090549	181	2	Removal of [] from ranking criteria in Idle mode cell reselection	8.6.0
2009-05	RP#44	RP- 090550	156		Correction on the TDD-TDD inter frequency measurements. (Technically Endorsed CR in R4-50bis - R4-091071)	8.6.0
2009-05	RP#44	RP- 090550	159		Correction to the Referenced Clause Number for Tinter1. (Technically Endorsed CR in R4-50bis - R4-091153)	8.6.0
2009-05	RP#44	RP- 090551	166		Further clarification of DRX/Non-DRX state. (Technically Endorsed CR in R4-50bis - R4-091389)	8.6.0
2009-05	RP#44	RP- 090551	202		Correction on reference to 3GPP2 specification	8.6.0
2009-05	RP#44	RP- 090551	169		OCNG simplification. (Technically Endorsed CR in R4-50bis - R4-091410)	8.6.0
2009-05	RP#44	RP- 090559	155		Introduction of Extended LTE800 requirements. (Technically Endorsed CR in R4-50bis - R4-091063)	9.0.0
2009-05	RP#45	RP- 090817	211		Correction to TDD RMC references in RLM test cases	9.1.0
2009-05	RP#45	RP- 090880	205		Introduction of Reference DRX configurations	9.1.0
2009-05	RP#45	RP- 090880	207		Addition of DRX configurations into non DRX test cases	9.1.0
2009-05	RP#45	RP- 090880	225		Correction to HO Test Cases	9.1.0
2009-05	RP#45	RP- 090880	227		Correction to E-UTRAN GSM BSIC Identification Requirements with DRX	9.1.0
2009-05	RP#45	RP- 090880	259		Corrections of Test Cases	9.1.0
2009-05	RP#45	RP- 090880	314		E-UTRA FDD - E-UTRA FDD and UTRA FDD cell search test cases	9.1.0
2009-05	RP#45	RP- 090880	315		E-UTRAN Radio Link Monitoring Test Cases in DRX	9.1.0
2009-05	RP#45	RP- 090880	316		Inter-frequency E-UTRA - E-UTRA HO test cases: unknown target cell	9.1.0
2009-05	RP#45	RP- 090880	263	2	E-UTRA FDD UTRA FDD Blind Handover test case: unknown target cell	9.1.0
2009-05	RP#45	RP- 090836	321	1	Small corrections to Measurements performance tests parameters	9.1.0
2009-05	RP#45	RP- 090836	285	1	E-UTRAN GSM Cell Search in DRX Test Cases	9.1.0
2009-05	RP#45	RP- 090836	267		Set 3.2. E-UTRA TDD to UTRA TDD cell search in DRX under fading	9.1.0
2009-05	RP#45	RP- 090836	269		Set 3.6. Test case of E-UTRA TDD to E-UTRA TDD and UTRA TDD combined cell search under fading	9.1.0
2009-05	RP#45	RP- 090836	271		Set 3.12. E-UTRA TDD to UTRA TDD blind handover test	9.1.0
2009-05	RP#45	RP- 090836	279		E-UTRAN FDD - UTRAN FDD Cell Search in DRX Test Cases	9.1.0
2009-05	RP#45	RP- 090836	281		E-UTRAN TDD- E-UTRAN TDD and E-UTRAN TDD Inter- frequency Cell Search Test Case	9.1.0
2009-05	RP#45	RP- 090836	283		E-UTRAN GSM Blind Handover Test Cases	9.1.0
2009-05	RP#45	RP- 090836	287		E-UTRAN FDD cdma2000 Blind HO Test cases	9.1.0
2009-05	RP#45	RP- 090836	302		RRM Test case for multiple E-UTRAN FDD-FDD Inter- frequency event triggered reporting under fading propagation conditions	9.1.0
2009-05	RP#45	RP- 090836	304		Fading reselection test case between E-UTRA and UTRA (UTRA of lower priority	9.1.0
2009-05	RP#45	RP- 090828	233		CR SI HRPD correction	9.1.0
2009-05	RP#45	RP- 090879	215	1	Corrections to Measurements of HRPD cells and cdma2000 1X	9.1.0
2009-05	RP#45	RP-	231		CR reference correction	9.1.0

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2009-05	RP#45	RP- 090879	235	1	Corrections to Measurements of GSM cells in RRC_IDLE	9.1.0
2009-05	RP#45	RP- 090879	247		Range of Idle Mode Es/lot side conditions	9.1.0
2009-05	RP#45	RP-	249		Removal of [] from Tdetect, Tmeasure and Tevaluate	9.1.0
2009-05	RP#45	090879 RP-	245	1	Clarification to applicability of RSRP side conditions in Idle	9.1.0
2009-05	RP#45	090879 RP-	317		CR Idle mode IF measurement condition	9.1.0
2009-05	RP#45	090879 RP-	318		CR Idle mode IF measurement period	9.1.0
2009-05	RP#45	090879 RP-	217	2	Corrections to E-UTRAN RRC_IDLE state mobility	9.1.0
2009-05	RP#45	090879 RP-	265	1	requirements  Correction to Random Access	9.1.0
2009-05	RP#45	090814 RP-	221		E-UTRAN TDD-TDD inter frequency cell	9.1.0
2009-05	RP#45	090816 RP-	223		search/measurement requirements when DRX is used  E-UTRAN inter RAT measurement requirements	9.1.0
		090816			· ·	
2009-05	RP#45	RP- 090816	229		Correction to Monitoring of Multiple Layers Using Gaps	9.1.0
2009-05	RP#45	RP- 090816	219	1	E-UTRAN FDD-FDD inter frequency measurements when DRX is used	9.1.0
2009-05	RP#45	RP- 090816	322		CR GSM measurement period	9.1.0
2009-05	RP#45	RP- 090816	323		CR cdma2000 1x and HRPD number of carriers	9.1.0
2009-05	RP#45	RP- 090816	213	1	Editorial correction on E-UTRAN inter frequency measurements	9.1.0
2009-05	RP#45	RP- 090816	261	1	E-UTRAN TDD intra frequency measurements	9.1.0
2009-05	RP#45	RP- 090816	319	1	Clarification of the number of monitoring cells for intra frequency measurements	9.1.0
2009-05	RP#45	RP-	237		Correction of timing advance adjustment accuracy test case	9.1.0
2009-05	RP#45	090815 RP-	291		Correction to UE Transmit Timing Requirements	9.1.0
2009-12	RP-46	090815 RP-	329		Defining requirements for UTRA TDD measurements for	9.2.0
2009-12	RP-46	091275 RP-	332		SON (Technically endorsed at RAN 4 52bis in R4-093512)  Modification of test case of E-UTRA TDD intra frequency cell	9.2.0
		091272			reselection (Technically endorsed at RAN 4 52bis in R4-093552)	
2009-12	RP-46	RP- 091272	333		Modification of test case of E-UTRA TDD inter frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093553)	9.2.0
2009-12	RP-46	RP- 091286	334		Introduction of Extended LTE1500 requirements for TS36.133 (Technically endorsed at RAN 4 52bis in R4-093636)	9.2.0
2009-12	RP-46	RP- 091272	336		Addition of E-UTRA TDD to UTRA FDD reselection test cases (Technically endorsed at RAN 4 52bis in R4-093686)	9.2.0
2009-12	RP-46	RP- 091271	338		Correction of missing accuracy requirements for UTRAN FDD (Technically endorsed at RAN 4 52bis in R4-093689)	9.2.0
2009-12	RP-46	RP-	340		CR cdma2000 HRPD measurement period (Technically	9.2.0
2009-12	RP-46	091275 RP-	342		endorsed at RAN 4 52bis in R4-093720)  CR cdma2000 1x measurement period (Technically endorsed	9.2.0
2009-12	RP-46	091275 RP-	344	+ +	at RAN 4 52bis in R4-093721)  Correction for E-UTRAN FDD - UTRAN FDD Cell Search in	9.2.0
		091272			DRX Test Cases (Technically endorsed at RAN 4 52bis in R4-093890)	
2009-12	RP-46	RP- 091272	346		Revise geometry factors for Intra freq Reselection Test Cases	9.2.0
2009-12	RP-46	RP- 091271	348		Corrections on RRM parameters for Bands 12, 14, 17	9.2.0
2009-12	RP-46	RP- 091271	351	1	Corrections to PDSCH RMC-s	9.2.0
2009-12	RP-46	RP- 091271	353		Corrections of TS36.133	9.2.0
2009-12	RP-46	RP-	356	1	UTRA TDD P-CCPCH RSCP absolute accuracy	9.2.0
2009-12	RP-46	091275 RP-	358	1	measurement in E-UTRAN  E-UTRAN TDD - UTRAN TDD cell search for SON	9.2.0
2009-12	RP-46	091275 RP-	361		Cell Search Requirements for Intra-LTE Handover to	9.2.0

		091275			Unknown Target Cell	
2009-12	RP-46	RP- 091273	365		Combined E-UTRAN interfrequency and GSM cell search test cases (Scenario set 3.2)	9.2.0
2009-12	RP-46	RP- 091271	367	1	Correction in UE UTRA TDD P-CCPCH RSCP measurement	9.2.0
2009-12	RP-46	RP-	374		capability for R9  E-UTRAN GSM RSSI Measurement Accuracy Tests	9.2.0
2009-12	RP-46	091273 RP-	375		E-UTRAN_UTRAN FDD CPICH RSCP Measurement	9.2.0
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2009-12	RP-46	091273 RP-	378		Accuracy Tests  Cell Timing Change Requirements for Event Triggered	9.2.0
2009-12	RP-46	091275 RP-	380		Reporting  Correction to Power Headroom Requirements	9.2.0
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2009-12	RP-46	091271 RP-	387		Editorial corrections to the time units for RRC Re-	9.2.0
		091271			establishment test cases	
2009-12	RP-46	RP- 091272	389	1	Introduction of cell search test case in DRX to verify L3 filtering	9.2.0
2009-12	RP-46	RP- 091271	391		Correction to ONCG Patterns	9.2.0
2009-12	RP-46	RP- 091275	329		Defining requirements for UTRA TDD measurements for SON (Technically endorsed at RAN 4 52bis in R4-093512)	9.2.0
2009-12	RP-46	RP- 091272	332		Modification of test case of E-UTRA TDD intra frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093552)	9.2.0
2009-12	RP-46	RP- 091272	333		Modification of test case of E-UTRA TDD inter frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093553)	9.2.0
2010-03	RP-47	RP- 100254	410		Idle mode corrections	9.3.0
2010-03	RP-47	RP- 100254	405	1	UE measurement capability requirements in Idle and Connected	9.3.0
2010-03	RP-47	RP-	423	1	Correction to UE Measurement Capability Requirements in	9.3.0
2010-03	RP-47	100254 RP- 100254	412		Idle Mode  Removal of activation time from interRAT handover requirements	9.3.0
2010-03	RP-47	RP- 100254	417	1	Correction to UE Transmit Timing Requirements	9.3.0
2010-03	RP-47	RP- 100254	402	1	Correction of E-UTRAN TDD inter frequency	9.3.0
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2010-03	RP-47	100254 RP-	415	1	Enhanced GSM Requirements for CSFB	9.3.0
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2010-03	RP-47	100255 RP-	421		Addition of missing Es/Noc parameters in RRM test cases	9.3.0
2010-03	RP-47	100255 RP-	427		Correction to RRC Re-establishment Test Case	9.3.0
		100255		1	Correction of UE transmit timing test case	
2010-03	RP-47	RP- 100255	419	1	Correction to RLM Test Cases	9.3.0
2010-03	RP-47	RP- 100262	407		Editorial Corrections in TS36.133(Rel-9)	9.3.0
2010-03	RP-47	RP- 100263	413		Introduction of LTE in 800 MHz for Europe requirements in TS 36.133	9.3.0
2010-03	RP-47	RP- 100264	395		Corrections for Extended UMTS1500 in TS36.133(Rel-9)	9.3.0
2010-03	RP-47	RP- 100269	393		AOA and TA measurement report mappings	9.3.0
2010-03	RP-47	RP- 100269	403	2	Mapping of UE RxTx time difference measurement	9.3.0
2010-03	RP-47	RP- 100266	425		Home eNode B synchronization requirement	9.3.0
2010-03	RP-47	RP- 100266	424	2	Minimum requirements on SI reading for HeNB inbound mobility	9.3.0
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2010-06	RP-48	RP- 100622	464		Correction to RRM Requirements	9.4.0
2010-06	RP-48	RP- 100622	462	1	Correction to Absolute RSRP/RSRQ Definitions	9.4.0
2010-06	RP-48	RP- 100622	457		UE Measurement Capability Requirements for CDMA2000	9.4.0
2010-06	RP-48	RP- 100622	455	1	Correction of E-UTRAN Inter-frequency Cell Re-selection Requirements	9.4.0
2010-06	RP-48	RP- 100622	451	1	Correction to idle mode requirements(Rel-9)	9.4.0
2010-06	RP-48	RP- 100622	449	1	Editorial corrections to 36.133(Rel-9)	9.4.0
2010-06	RP-48	RP- 100622	447		Correction to TDD intrafrequency accuracy test case	9.4.0
2010-06	RP-48	RP- 100622	441	1	Correction of Io value in E-UTRAN FDD and TDD Inter frequency RSRP tests	9.4.0
2010-06	RP-48	RP- 100627	444	2	Corrections to CSG SI reading core requirement	9.4.0
2010-06	RP-48	RP- 100627	445	1	RSRQ idle mode requirements	9.4.0
2010-06	RP-48	RP- 100630	470	1	Test cases for R9 cell reselection enhancements	9.4.0
2010-06	RP-48	RP- 100630	460		Missing E-UTRA - UTRA FDD DRX Requirements	9.4.0
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2010-09	RP-49	RP- 100919	537		A clarification text in the RSTD intra-frequency accuracy requirements	9.5.0
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2010-09	RP-49	RP- 100915	508		Correction of Io value in RSRP FDD and TDD Intra frequency test	9.5.0
2010-09	RP-49	RP- 100920	521	1	Editorial corrections to 36.133 (R9)	9.5.0
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2010-09	RP-49	RP- 100919	538	1	Correction to Enhanced BSIC Verification Requirements	9.5.0
2010-09	RP-49	RP- 100919	539		Enhanced CSFB Requirements with DRX	9.5.0
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2010-09	RP-49	RP- 100920	544	1	Addition of UTRA and GSM enhanced cell identification test cases	9.5.0
2010-09	RP-49	RP- 100920	547	1	E-UTRAN FDD UE Rx – Tx Time Difference Measurement Accuracy test case	9.5.0
2010-09	RP-49	RP- 100914	479	1	Scrambling code change time in RRM Test cases	9.5.0
2010-09	RP-49	RP- 100914	549		Introduction of CSG cell reselection requirements	9.5.0
2010-09	RP-49	RP- 100920	527		correction of redundant Hysteresis(Hys) for 36.133(R9)	9.5.0

2010-09	RP-49	RP-	488	2	Test case for TDD UE Rx-Tx time difference measurement	9.5.0
2010-09	RP-49	100920 RP-	483			9.5.0
		100914			Clarification of Radio link monitoring test cases	
2010-09	RP-49	RP- 100915	485		Test case for E-UTRA TDD event triggered reporting when L3 filtering is used in R9	9.5.0
2010-09	RP-49	RP- 100915	487		E-UTRA TDD - UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority in R9	9.5.0
2010-09	RP-49	RP-	492		Test case for E-UTRAN TDD in the existence of non-allowed	9.5.0
2010-09	RP-49	100924 RP-	494		CSG cell PDCCH Aggregation level for RRM tests	9.5.0
		100915				
2010-09	RP-49	RP- 100915	503		Correction of ES/lot value in E-UTRAN RSRQ FDD intra frequency test	9.5.0
2010-09	RP-49	RP- 100915	496		Corrections to RRM OCNG Patterns	9.5.0
2010-09	RP-49	RP-	498		RRC timer accuracy requirement	9.5.0
2010-09	RP-49	100919 RP-	501		Correction of OCNG	9.5.0
2010-09	RP-49	100915 RP-	477	1	Cell identity change time in RRM Test cases	9.5.0
		100914		'	, ,	
2010-09	RP-49	RP- 100919	537		A clarification text in the RSTD intra-frequency accuracy requirements	9.5.0
2010-09	RP-49	RP- 100920	506		Correction of drx-RetransmissionTimer parameters	9.5.0
2010-09	RP-49	RP-	508		Correction of Io value in RSRP FDD and TDD Intra frequency	9.5.0
2010-09	RP-49	100915 RP-	521	1	test Editorial corrections to 36.133 (R9)	9.5.0
2010-09	RP-49	100920 RP-	523		Alignment of REFSENS between 36.101 and 36.133(R9)	9.5.0
		100914			, ,	
2010-09	RP-49	RP- 100920	525	1	Correction of Time to Trigger unit for 36.133(R9)	9.5.0
2010-09	RP-49	RP- 100915	505	1	Corrections to 36.133(R9)	9.5.0
2010-09	RP-49	RP-	528	1	E-UTRAN FDD Intra Frequency RSTD Measurement	9.5.0
2010-09	RP-49	100920 RP-	538	1	Accuracy test case  Correction to Enhanced BSIC Verification Requirements	9.5.0
2010-09	RP-49	100919 RP-	539		Enhanced CSFB Requirements with DRX	9.5.0
		100919 RP-			·	
2010-09	RP-49	100919	540		Correction to E-CID Requirements	9.5.0
2010-09	RP-49	RP- 100920	544	1	Addition of UTRA and GSM enhanced cell identification test cases	9.5.0
2010-09	RP-49	RP-	547	1	E-UTRAN FDD UE Rx – Tx Time Difference Measurement	9.5.0
2010-09	RP-49	100920 RP-	479	1	Accuracy test case Scrambling code change time in RRM Test cases	9.5.0
2010-09	RP-49	100914 RP-	549		Introduction of CSG cell reselection requirements	9.5.0
		100914			·	
2010-09	RP-49	RP- 100920	527		correction of redundant Hysteresis(Hys) for 36.133(R9)	9.5.0
2010-09	RP-49	RP- 100920	488	2	Test case for TDD UE Rx-Tx time difference measurement	9.5.0
2010-09	RP-49	RP-	483		Clarification of Radio link monitoring test cases	9.5.0
2010-09	RP-49	100914 RP-	485		Test case for E-UTRA TDD event triggered reporting when	9.5.0
2010-09	RP-49	100915 RP-	487		L3 filtering is used in R9  E-UTRA TDD - UTRA TDD cell reselection in fading	9.5.0
		100915			propagation conditions: UTRA TDD is of lower priority in R9	
2010-09	RP-49	RP- 100924	492		Test case for E-UTRAN TDD in the existence of non-allowed CSG cell	9.5.0
2010-09	RP-49	RP- 100915	494		PDCCH Aggregation level for RRM tests	9.5.0
2010-09	RP-49	RP-	503		Correction of ES/lot value in E-UTRAN RSRQ FDD intra	9.5.0
2010-09	RP-49	100915 RP-	496		frequency test  Corrections to RRM OCNG Patterns	9.5.0
2010-09	RP-49	100915 RP-	498		RRC timer accuracy requirement	9.5.0
		100919				
2010-09	RP-49	RP- 100915	501		Correction of OCNG	9.5.0

2010-09	RP-49	RP- 100927	497		CR LTE_TDD_2600_US spectrum band definition additions to TS 36.133	10.0.0
2010-12	RP-50	RP-	635		Corrections to 36.133 performance requirements	10.1.0
2010-12	RP-50	101331 RP- 101331	638		Correction to intra frequency cell identification time for FDD and TDD	10.1.0
2010-12	RP-50	RP- 101331	566	1	Corrections and Clarifications to TS36.133	10.1.0
2010-12	RP-50	RP- 101331	592	2	Correction to Radio link monitoring test cases	10.1.0
2010-12	RP-50	RP- 101332	563		PDCCH Aggregation Level for RRM Tests	10.1.0
2010-12	RP-50	RP- 101332	571		MIMO correlation scenario for RLM test cases	10.1.0
2010-12	RP-50	RP- 101332	580		Removal of [] from PDSCH and PCFICH/PDCCH/PHICH Measurement Channel references in Annex A.	10.1.0
2010-12	RP-50	RP- 101332	585		Enabling HARQ for RRM Tests	10.1.0
2010-12	RP-50	RP- 101335	643	1	Completion of CSG cell reselection requirements	10.1.0
2010-12	RP-50	RP- 101343	568		Clarification of measurements requirements for HRPD and cdma2000 1x	10.1.0
2010-12	RP-50	RP- 101343	589		Addition of Band 18, 19 and 21 into UE Rx - Tx time difference requirements	10.1.0
2010-12	RP-50	RP- 101343	604		Correction to Enhanced GSM Cell Identification Requirement	10.1.0
2010-12	RP-50	RP- 101343	632		Correction of reselection requirement for UTRAN FDD cells	10.1.0
2010-12	RP-50	RP- 101343	640		Correction to Enhanced UTRA FDD Cell Identification Requirements	10.1.0
2010-12	RP-50	RP- 101343	645		E-UTRAN TDD Intra Frequency RSTD Measurement Accuracy test case	10.1.0
2010-12	RP-50	RP- 101343	621	1	Correction for Measurements of inter-RAT cells	10.1.0
2010-12	RP-50	RP- 101343	598	2	E-UTRAN FDD intra-frequency RSTD measurement reporting delay test case	10.1.0
2010-12	RP-50	RP-	600	2	E-UTRAN TDD intra-frequency RSTD measurement	10.1.0
2010-12	RP-50	101343 RP- 101356	644		reporting delay test case  Band 42 and 43 parameters for UMTS/LTE 3500 (TDD) for TS 36.133	10.1.0
2010-12	RP-50	RP- 101361	552		Introduction of L-band in TS36.133	10.1.0
2010-12	RP-50	RP- 101388	648		Removal of square brackets from scope of TS36.133	10.1.0
2011-04	RP-51	RP- 110359	065 8	-	Addition of UE RRM capabilities for CA	10.2.0
2011-04	RP-51	RP- 110340	066	-	Correction to E-UTRAN TDD in-sync test requirements	10.2.0
2011-04	RP-51	RP- 110348	066 5	1	RSTD requirements, RMC and OCNG patterns	10.2.0
2011-04	RP-51	RP- 110350	066 9	-	CR to 36.133: Aligning relavant RRM requirements for Band 41 with the reference sensitivity values in 36.101	10.2.0
2011-04	RP-51	RP- 110339	067 6	-	Modification on test case of E-UTRA TDD to UTRA TDD cell reselection(R10)	10.2.0
2011-04	RP-51	RP- 110339	068	1	Value of MS_TXPWR_MAX_CCH for EUTRA-GSM reselection test cases A.4.4.x	10.2.0
2011-04	RP-51	RP- 110339	068	1	Rearrangement of Time periods for EUTRA-UTRA reselection test case A.4.3.1.1	10.2.0
2011-04	RP-51	RP- 110339	069	1	Removal of "Force to Cell 2" during initialisation for EUTRA- UTRA reselection test case A.4.3.1.2	10.2.0
2011-04	RP-51	RP- 110340	069	1	SNR for RRM A.8.x test cases using ETU70	10.2.0
2011-04	RP-51	RP- 110408	069 7	1	Requirements for Minimaztion of Drive Tests (MDT) in LTE	
2011-04	RP-51	RP- 110339	070	-	Correction to test cases of E-UTRA to UTRA cell reselection when UE is in idle state	10.2.0
2011-04	RP-51	RP- 110359	070 6	2	Introduction of measurement requirements for carrier aggregation	10.2.0
2011-04	RP-51	RP- 110347	070 9	1	Addition of test cases for FDD intra-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-	10.2.0
2011-04	RP-51	RP- 110347	071	1	Addition of test cases for FDD inter-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-	10.2.0

2011-04	RP-51	RP-	071	1	Introduction of core requirements of radio link monitoring in	10.2.0
2011-04	RP-51	110359 RP-	3 071	1	CA  Modification on Test Requirements in E-UTRA - UTRA TDD	10.2.0
2011-04	RP-51	110339	9	'	SON Test Case (A.8.7.3) (R10)	
2011-04	RP-51	RP- 110348	072 7	2	Requirements for reporting criteria with positioning measurements	10.2.0
2011-04	RP-51	RP- 110340	073 6	-	Correction of RLM evaluation period in DRX	10.2.0
2011-04	RP-51	RP- 110340	073 9	-	Correction of inter-frequency measurement accuracy test cases	10.2.0
2011-04	RP-51	RP- 110339	074 4	-	Modification on Test Requirements in E-UTRA GSM cell reselection Test Case (A.4.4) (R10)	10.2.0
2011-04	RP-51	RP-	074	1	Corrections to RSTD measurement for Rel-9	10.2.0
2011-04	RP-51	110348 RP-	074	-	Correction on FDD Intra Frequency RSTD Measurement	10.2.0
2011-04	RP-51	110348 RP-	8 075	1	Accuracy test case RSTD test case corrections	10.2.0
2011-04	RP-51	110348 RP-	075	-	Correction of serving cell performance requirements for	10.2.0
2011-06	RP-52	110344 RP-	3 078	1	autonomous SI acquisition Simplification of frequency dependent requirements in 36.133	10.3.0
2011-00	KF-32	110753	5		(Table B.2.2-1 contains erroneous values. These wrong values will be corrected in the RAN#53 meeting.)	10.3.0
2011-06	RP-52	RP- 110793	754		E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency	10.3.0
2011-06	RP-52	RP- 110793	755		E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency	10.3.0
2011-06	RP-52	RP- 110807	757		Core requirements on RRC connection mobility control in CA	10.3.0
2011-06	RP-52	RP- 110807	758		Timing core requirements in CA	10.3.0
2011-06	RP-52	RP- 110807	759		Introduction of Handover Requirements for Carrier Aggregation	10.3.0
2011-06	RP-52	RP- 110793	760		E-UTRAN FDD Inter Frequency RSTD Measurement Accuracy test case	10.3.0
2011-06	RP-52	RP- 110793	761		E-UTRAN TDD Inter Frequency RSTD Measurement Accuracy test case	10.3.0
2011-06	RP-52	RP- 110786	765		Rearrangement of Time periods for EUTRA-UTRA reselection test case A.4.3.4.1	10.3.0
2011-06	RP-52	RP- 110786	768		Removal of "Force to Cell 2" during initialisation for EUTRA - UTRA reselection test cases	10.3.0
2011-06	RP-52	RP- 110807	776		Introduction of UE interruption requirements in SCC measurements with de-activated SCell	10.3.0
2011-06	RP-52	RP- 110794	797		Editorial Correction to Cell Re-selection Requirements	10.3.0
2011-06	RP-52	RP- 110789	808		Correction to side conditions for TDD inter-frequency CGI identification for Rel-10	10.3.0
2011-06	RP-52	RP- 110786	814		Correction to inter-RAT cell identificiation time in DRX for Rel-10	10.3.0
2011-06	RP-52	RP- 110787	817		Correction to identification time of UTRA FDD cell for SON in DRX for Rel-10	10.3.0
2011-06	RP-52	RP- 110787	822		Correction to requirements of E-UTRAN TDDUTRAN TDD measurements for SON when DRX is used for Rel-10	10.3.0
2011-06	RP-52	RP- 110807	829		Corrrection to the side condition for measurements for E- UTRA carrier aggregation	10.3.0
2011-06	RP-52	RP- 110803	850		CR Timestamp accuracy requirements for MDT	10.3.0
2011-06	RP-52	RP- 110812	778	1	Add 2GHz S-Band (Band 23) in 36.133	10.3.0
2011-06	RP-52	RP- 110796	787	1	Clarification on inter-frequency layers for RSTD	10.3.0
2011-06	RP-52	RP-	780	1	Correction to RSTD measurement for Rel-10	10.3.0
2011-06	RP-52	110794 RP-	852	1	Pcmax,c mapping	10.3.0
2011-06	RP-52	110807 RP- 110787	771	1	Clarification of Radio link monitoring test requirements (The CR was not implemented as it is not based on	10.3.0
2011-06	RP-52	RP-	793	1	the latest version of the specification)  E-CID Measurement Requirements under Pcell Switching	10.3.0
2011-06	RP-52	110807 RP-	775	1	Removal of undefined intra-freq RSRQ relative accuracy	10.3.0

		110807			requirements in CA	
2011-06	RP-52	RP- 110789	856		Correction on E-UTRAN FDD RSTD intra frequency case	10.3.0
2011-06	RP-52	RP- 110796	800	1	Addition of E-UTRAN FDD/TDD cdma2000 1xRTT measurements requirement for SON for Rel-10	10.3.0
2011-06	RP-52	RP- 110790	804	1	Addition of test cases for TDD intra-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-	10.3.0
2011-06	RP-52	RP- 110790	806	1	Addition of test cases for TDD inter-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-	10.3.0
2011-06	RP-52	RP- 110787	828	1	Addition of missing EsNoc parameters in E-UTRAN TDD UTRAN TDD Measurements test cases for Rel-10	10.3.0
2011-06	RP-52	RP- 110807	835	1	Clarification of UE Rx-Tx time difference measurement requirement for carrier aggregation	10.3.0
2011-06	RP-52	RP- 110804	859		Expanded 1900 MHz addition to 36.133	10.3.0
2011-06	RP-52	RP- 110811	860		Introduction of RLM requirement for eICIC	10.3.0
2011-06	RP-52	RP- 110796	794	1	E-CID Measurement Requirements under Handover	10.3.0
2011-06	RP-52	RP- 110811	762	1	CR on RLM requirements for elCIC	10.3.0
2011-06	RP-52	RP- 110811	788	2	RSRP and RSRQ measurement requirements for elCIC	10.3.0
2011-06	RP-52	RP- 110811	851	1	CR on RSRP and RSRQ measurement accuracy requirements for eICIC	10.3.0
2011-06	RP-52	RP- 110807	802	2	Addition of OTDOA measurement requirement for E-UTRAN carrier aggregation	10.3.0
2011-09	RP-53	RP- 111246	863		Thresholds and margins for reporting of neighbour cells in RRM test A.8.9.1	10.4.0
2011-09	RP-53	RP- 111246	902		Thresholds and margins for RRM tests A.5.2.1 and A.5.2.2	10.4.0
2011-09	RP-53	RP- 111246	905		Thresholds and margins for RRM tests A.5.2.4 and A.5.2.5	10.4.0
2011-09	RP-53	RP- 111247	889		Removing [] in clause 8.1.2.2.2.2 for Rel-10	10.4.0
2011-09	RP-53	RP- 111247	915		Adding condition of UTRA TDD measurement report delay requirements applied	10.4.0
2011-09	RP-53	RP- 111247	930		Clarify time points and time duration for RLM tests A.7.3.x	10.4.0
2011-09	RP-53	RP- 111251	926	1	Adding enhanced UTRA TDD cell identification requirements for Rel-10	10.4.0
2011-09	RP-53	RP- 111251	969		CR for E-UTRAN FDD GSM event triggered reporting in AWGN with enhanced BSIC identification in R10	10.4.0
2011-09	RP-53	RP- 111252	894		Requirements for RRC Connection Release with Redirection	10.4.0
2011-09	RP-53	RP- 111252	960		Missing RSRQ in Intra-frequency measurement requirements	10.4.0
2011-09	RP-53	RP- 111252	965	1	Requirements for RRC Connection Release with Redirection for TDD in R10	10.4.0
2011-09	RP-53	RP- 111255	946		Introduction of Band 22	10.4.0
2011-09	RP-53	RP- 111255	979	1	Modifications of Band 42 and 43	10.4.0
2011-09	RP-53	RP- 111263	879	1	Correction to RRC connection mobility control in CA	10.4.0
2011-09	RP-53	RP- 111263	895	2	RSTD Measurement Requirements under Handover	10.4.0
2011-09	RP-53	RP- 111263	896	2	RSTD Measurement Requirements under Pcell Switching	10.4.0
2011-09	RP-53	RP- 111263	920	1	Editorial corrections for 36.133 (Rel-10)	10.4.0
2011-09	RP-53	RP- 111263	924	1	Correction to RRC connection mobility control in CA	10.4.0
2011-09	RP-53	RP- 111263	927		Modifications on TDD inter frequency measurements with autonomous gaps	10.4.0
2011-09	RP-53	RP- 111263	945	1	Frequency band related requirements to 36.133	10.4.0
2011-09	RP-53	RP- 111263	949	1	Correction of references	10.4.0
2011-09	RP-53	RP- 111263	950		Alignment of the carrier aggregation terminology	10.4.0
2011-09	RP-53	RP-	951		Band simplification for core requirements	10.4.0

		1				1
2011-09	RP-53	111263 RP-	952		Clarification in inter-frequency RSTD accuracy tests	10.4.0
2011-09	RP-53	111263 RP-	953	1	Editorial corrections for RRM requirements	10.4.0
2011-09	RP-53	111263 RP- 111263	961		Missing RSRQ in E-UTRA carrier aggregation measurement requirements	10.4.0
2011-09	RP-53	RP- 111265	874	1	Clarification of TDD uplink-downlink subframe configurations applicability for RSTD measurement in CA	10.4.0
2011-09	RP-53	RP- 111265	875	3	CR on UE interruption requirements in SCC measurements with de-activated SCell when common DRX is used	10.4.0
2011-09	RP-53	RP- 111265	883	1	Alignment of terminology for SCell measurement cycle	10.4.0
2011-09	RP-53	RP- 111265	921	1	Introduction of Pcmax,c reporting requirements for carrier aggregation	10.4.0
2011-09	RP-53	RP- 111266	849	3	RSTD Accuracy Requirements for Carrier Aggregation	10.4.0
2011-09	RP-53	RP- 111266	898	1	Introduction of power headroom reporting requirement for carrier aggregation	10.4.0
2011-09	RP-53	RP- 111308	891	1	RSRP and RSRQ measurement requirements for elClC	10.4.0
2011-12	RP-54	RP- 111681	982		Corrections of inter-frequency measurement accuracy RSRP and RSRQ test cases	10.5.0
2011-12	RP-54	RP- 111682	984		Removing [] in CSFB requirement for Rel-10	10.5.0
2011-12	RP-54	RP- 111693	985		Reference channel for RLM testing with elCIC	10.5.0
2011-12	RP-54	RP- 111683	987		Clarification on RSTD test cases	10.5.0
2011-12	RP-54	RP- 111690	988		RSRP Measurement performance lo corrections	10.5.0
2011-12	RP-54	RP- 111686	989		RLM measurement requirements for elClC	10.5.0
2011-12	RP-54	RP- 111693	990		PDCCH/PCFICH transmission parameters for RLM	10.5.0
2011-12	RP-54	RP- 111683	992		Clarification on PRS bandwidth	10.5.0
2011-12	RP-54	RP- 111735	993		Missing RSRQ in intra-frequency measurement requirements for elCIC	10.5.0
2011-12	RP-54	RP- 111686	994	1	Test case for TDD RSRQ Accuracy for Carrier Aggregation	10.5.0
2011-12	RP-54	RP- 111686	995		Cell identification requirements without DRX	10.5.0
2011-12	RP-54	RP- 111693	997	1	Test case for cell identification with eICIC in E-UTRAN FDD	10.5.0
2011-12	RP-54	RP- 111693	998	1	Test case for cell identification with eICIC in E-UTRAN TDD	10.5.0
2011-12	RP-54	RP- 111691	999	1	Carrier aggregation RSRP measurement test case for TDD	10.5.0
2011-12	RP-54	RP- 111690	100 1		Test case for enhanced UTRA TDD cell identification for R10	10.5.0
2011-12	RP-54	RP- 111690	100 3		Test case for RRC connection release redirection to UTRA TDD for R10	10.5.0
2011-12	RP-54	RP- 111735	100 5		Clarification of the Successful Percentage for Measurement Performance Requirements	10.5.0
2011-12	RP-54	RP- 111691	100 7	2	FDD Absolute and Relative RSRQ Accuracy test in CA	10.5.0
2011-12	RP-54	RP- 111691	101 1	1	FDD absolute and relative RSRP accuracies test in CA	10.5.0
2011-12	RP-54	RP- 111693	101 4	1	E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under time domain measurement resource restriction	10.5.0
2011-12	RP-54	RP- 111735	101 6		E-UTRAN FDD - UTRAN TDD enhanced cell identification test under AWGN propagation conditions in R10	10.5.0
2011-12	RP-54	RP- 111735	101 8	1	E-UTRAN FDD RRC connection release with redirection to UTRAN TDD in R10	10.5.0
2011-12	RP-54	RP- 111735	102 1	1	CR for Inter-RAT SI reading	10.5.0
2011-12	RP-54	RP- 111687	102 2		Addition of E-UTRAN FDD - TDD Inter frequency cell reselection test case	10.5.0
2011-12	RP-54	RP- 111687	102 3		Addtion of E-UTRAN TDD - FDD Inter frequency cell reselection test case	10.5.0
2011-12	RP-54	RP- 111687	102 4		Addtion of E-UTRAN FDD - TDD Inter frequency handover test case	10.5.0
2011-12	RP-54	RP-	102		Addtion of E-UTRAN TDD - FDD Inter frequency handover	10.5.0

		111687	5	1 1	test sees	
2011-12	RP-54	RP-	102		test case Addtion of E-UTRAN TDD-FDD Inter-frequency event	10.5.0
2011-12	IXI 34	111687	6		triggered reporting under fading propagation conditions in asynchronous cells test case	10.5.0
2011-12	RP-54	RP-	102	1	Addtion of E-UTRAN FDD-TDD Inter-frequency event	10.5.0
		111687	7		triggered reporting under fading propagation conditions in	
					asynchronous cells test case	
2011-12	RP-54	RP-	102		Addtion of E-UTRAN FDD - TDD inter frequency	10.5.0
2011-12	RP-54	111687 RP-	103	1	measurement accuracy test case  Correction for the identification time in DRX for UTRA TDD in	10.5.0
2011-12	KP-54	111681	103		R10	10.5.0
2011-12	RP-54	RP-	103		Correction the side condition for SCH in R10	10.5.0
		111735	2			
2011-12	RP-54	RP-	103	1	Correction to event triggered reporting for TS 36.133 in R10	10.5.0
		111735	3			
2011-12	RP-54	RP-	103 9	1	Correction of E-UTRAN TDD-TDD inter frequency handover	10.5.0
2011-12	RP-54	111681 RP-	104		test case in R10 Clarification of Expected RSTD and Expected RSTD	10.5.0
2011-12	111-54	111735	1		uncertainty in RSTD test cases in R10	10.5.0
2011-12	RP-54	RP-	104		Thresholds and margins for RRM tests A.8.11.3 and A.8.11.4	10.5.0
		111680	3		3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
2011-12	RP-54	RP-	104		Thresholds and margins for RRM tests A.8.11.5 and A.8.11.6	10.5.0
		111683	6			
2011-12	RP-54	RP-	104	2	RLM Out of Sync Detection Test for eICIC	10.5.0
2011-12	RP-54	111693 RP-	7	1	RRC Connection Release with Redirection from E-UTRAN	10.5.0
2011-12	KF-54	111683	9		FDD to GERAN	10.5.0
2011-12	RP-54	RP-	105		Colliding CRS in non-MBSFN ABS	10.5.0
		111693	1		3 maining 3 n t 3 m m m 2 5 n m m 2 5	
2011-12	RP-54	RP-	105		RRC Connection Release with Redirection from E-UTRAN	10.5.0
		111683	2		TDD to GERAN	
2011-12	RP-54	RP-	105	1	RLM In Sync Detection Test for FDD eICIC	10.5.0
2044.42	RP-54	111693 RP-	105	1	DI M In Come Detection Test for EDD a ICIC	40.5.0
2011-12	RP-54	111693	105	1	RLM In Sync Detection Test for FDD elCIC	10.5.0
2011-12	RP-54	RP-	105	1	FDD Event triggered reporting on deactivated Scell in non-	10.5.0
2011 12	111 01	111691	5	.	DRX	10.0.0
2011-12	RP-54	RP-	105	1	TDD Event triggered reporting on deactivated Scell in non-	10.5.0
		111691	6		DRX	
2011-12	RP-54	RP-	105		Adding Band XX	10.5.0
2011-12	RP-54	111683 RP-	106	1	Optional faster higher priority reselection	10.5.0
2011-12	KP-54	111690	106	'	Optional faster higher phonty reselection	10.5.0
2011-12	RP-54	RP-	106	1	Addition of a test case at lower RSRP level for the serving	10.5.0
		111735	4		cell measurement accuracy	
2011-12	RP-54	RP-	106		Test cases for RRC connection release with redirection to	10.5.0
		111683	6		UTRAN FDD	
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2011-12	101 54	111683	4		Applicable 1 No BW for No 18 accuracy requirements	10.5.0
2012-03	RP-55	RP-	107	1	RSTD signalling modifications	10.6.0
		120304	7			
2012-03	RP-55	RP-	107	1	Test case for E-UTRA TDD RRC connection release	10.6.0
2040.00	חם ככ	120294	9		redirection to UTRA TDD without SI provided for R10	10.00
2012-03	RP-55	RP- 120294	108 1	1	Test case for E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided for R10	10.6.0
2012-03	RP-55	RP-	108	+ -	Thresholds and margins for E-UTRAN to C2K RRM	10.6.0
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2012-03	RP-55	RP-	108		Addition of E-UTRAN TDD-HRPD Cell Reselection: HRPD is	10.6.0
		120294	7		of Lower Priority test case R10	
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		120294	3		R10	6.0
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00:5		120294	9		measurement accuracy test case R10	10
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		120304	9		deactivated Scell in non-DRX	
					CR not implemented as it is based on the wrong version of the spec	
2012-03	RP-55	RP-	114		Core requirements for E-UTRAN TDD inter-RAT UTRAN	10.6.0
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0040.00	DD 50	120770	5		accuracy test case parameters	44.4.0
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2012-06	RP-56	RP- 120769	118 9		Addition of E-UTRAN FDD-TDD Inter-frequency event triggered reporting when DRX is used under fading	11.1.0
		120709	3		propagation conditions in asynchronous cells R11	
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2012300	111-00	120777	5	'	under fading propagation conditions test case R11	11.1.0
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0040.00	DD 50	120769	8		reporting under fading propagation conditions test case R11	44.4.0
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03-2014	RP-63	RP- 140389	218 2		Clarification on FDD reference measurement channels for 5 MHz tests	12.3.0
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06-2014	RP-64	RP- 140743	236 6	1	SCell activation and deactivation delay test case for known SCell	12.4.0
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06-2014	RP-64	RP- 140910	226 7		RRM: Clean-up of time offset between cells in RSTD tests (Rel-12)	12.4.0
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06-2014	RP-64	RP- 140911	237		Correction to periodicity of ABS pattern in elCIC RRM test cases	12.4.0
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06-2014	RP-64	140918 RP- 140923	5 238 7		E-UTRAN FDD RSTD measurement reporting in carrier	12.4.0
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06-2014	RP-64	140923 RP-	229 0		10MHz+5MHz  E-UTRAN FDD absolute and relative RSRP accuracies in CA	12.4.0
06-2014	RP-64	140923 RP- 140923	229		for 10MHz+5MHz  E-UTRAN TDD absolute and relative RSRP accuracies in CA for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP- 140926	233		Introduction of Band 32/XXXII	12.4.0
06-2014	RP-64	RP- 140928	239	1	Introduce RRM measurement requirements for eIMTA	12.4.0
06-2014	RP-64	RP- 140928	239 6	1	Inter frequency measurements using autonomous gaps	12.4.0
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12-2015	RP-70	RP- 152131	312 0	-		Correction of definition of antenna connection in some RSTD tests	12.10.0
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12-2015	RP-70	RP-	318	1		Update to RRM test case for E-UTRAN TDD-FDD 3DL CA	12.10.0
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12-2015	RP-70	RP-	319	_		Correction to Cells in OTDOA assistance data in 3DL RSTD	12.10.0
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12-2015	RP-70	RP- 152133	322 2	-		Adding the title of A.8.22 in TS 36.133 R12	12.10.0
12-2015	RP-70	RP- 152133	322 6	1		Correction on A.8.16.17 E-UTRAN FDD activation and deactivation of known SCell in non-DRX	12.10.0
12-2015	RP-70	RP-	322	1		Correction on A.8.16.18 E-UTRAN TDD activation and	12.10.0
12-2015	RP-70	152133 RP-	323	1		deactivation of known SCell in non-DRX  Correction on A.8.16.35 3 DL PCell in FDD CA Activation and	12.10.0
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12-2015	RP-70	RP-	323	1		Correction on A.8.16.36 3 DL PCell in TDD CA Activation and	12.10.0
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12-2015	RP-70	RP- 152133	323	1		Correction on A.8.16.38 3DL TDD CA activation and	12.10.0
12-2015	RP-70	152133 RP-	324	-		deactivation of known SCell in non-DRX CR on editorial and some minor changes for clarification for	12.10.0
12-2015	RP-70	152133 RP-	9 327	1	+	Rel-12 category 0 MTC requirements CR on ProSe UE transmission timing in Any Cell Selection	12.10.0
		152135	4	<u> </u>		State	
12-2015	RP-70	RP- 152133	327 8	-		Alignment of time when UE starts CSI reporting for activated SCell	12.10.0
03-2016	RP-71	RP- 160489	328 2	-		CR for correction to syncOffsetIndicator parameter in D2D resource pool configuration	12.11.0
03-2016	RP-71	RP- 160489	328 7	-		Change OGNG for 3DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions, A.8.16.32+A.8.16.33	12.11.0
03-2016	RP-71	RP- 160489	329 2	-		Correction of errors in Annex A Activation/Deactivation Test cases	12.11.0
03-2016	RP-71	RP- 160489	329 4	-		Modification for MBSFN measurements for R12	12.11.0
03-2016	RP-71	RP- 160489	330 6	1		CR on separation of section for D2D Core and Performance requirement	12.11.0
03-2016	RP-71	RP-	332	-		Correction to felCIC TDD RSRP accuracy OCNG in TS	12.11.0
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03-2016	RP-71	RP-	332	1	CR on E-UTRAN TDD-FDD CA activation and deactivation of	12.11.0
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		160489	4		unknown SCell in non-DRX with PCell in FDD for Rel-12	
03-2016	RP-71	RP-	333	-	CR on maximum UL transmission time difference for R12 DC	12.11.0
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03-2016	RP-71	RP-	337	-	CR for IncMon requirements alignment 36.133 Rel-12	12.11.0
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## History

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