ETSI TS 136 331 V8.2.0 (2008-11)

Technical Specification

LTE;
Evolved Universal Terrestrial Radio Access (E-UTRA);
Radio Resource Control (RRC);
Protocol specification
(3GPP TS 36.331 version 8.2.0 Release 8)

Reference
DTS/TSGR-0236331v820

Keywords
LTE

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://webapp.etsi.org/IPR/home.asp).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Contents

Foreword

This Technical Specification has been produced by the 3rd 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:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- 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 the Radio Resource Control protocol for the UE-E-UTRAN radio interface.

The scope of the present document also includes:

- the radio related information transported in a transparent container between source eNB and target eNB upon inter eNB handover;
- the radio related information transported in a transparent container between a source or target eNB and another system upon inter RAT handover.

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.
- 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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS nn.nnn: "Radio Interface Protocol Architecture".

Editor's note: Document not yet available.

[3] 3GPP TS 36.302: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Services provided by the physical layer ".

[4] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); "UE Procedures in Idle Mode".

[5] 3GPP TS 36.306 "Evolved Universal Terrestrial Radio Access (E-UTRA); "UE Radio Access Capabilities".

[6] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Medium Access Control (MAC) protocol specification".

[7] 3GPP TS 36.322:"Evolved Universal Terrestrial Radio Access (E-UTRA); "Radio Link Control (RLC) protocol specification".

[8] 3GPP TS 36.323: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Packet Data Convergence Protocol (PDCP) Specification".

[9] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Overall description; Stage 2".

[10] 3GPP TS 22.011: " Service accessibility".

[11] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode".

[12] 3GPP2 C.S0002-A: 'Physical Layer Standard for cdma2000 Spread Spectrum Systems – Release A'.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] 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 [1].

(For further study).

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] 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 [1].

1xRTT	CDMA2000 1x Radio Transmission Technology
AM	Acknowledged Mode
ASN.1	Abstract Syntax Notation.1
ARQ	Automatic Repeat Request
AS	Access Stratum
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
CCCH	Common Control Channel
CCO	Cell Change Order
CP	Control Plane
C-RNTI	Cell RNTI
CSG	Closed Subscriber Group
DCCH	Dedicated Control Channel
DRB	(user) Data Radio Bearer
DRX	Discontinuous Reception
DTCH	Dedicated Traffic Channel
DTX	Discontinuous Transmission
DL	Downlink
DL-SCH	Downlink Shared Channel
ETWS	Earthquake and Tsunami Warning System
E-UTRA	Evolved Universal Terrestrial Radio Access
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
ENB	Evolved Node B
EPC	Enhanced Packet Core
EPS	Enhanced Packet System
FLOOR	Mathematical function used to "round down" i.e. to the nearest integer having a lower value
FDD	Frequency Division Duplex
FFS	For Further Study
GERAN	GSM/EDGE Radio Access Network
GSM	Global System for Mobile Communications
HARQ	Hybrid Automatic Repeat Request
HRPD	CDMA2000 High Rate Packet Data
IE	Information element
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
L1	Layer 1
L2	Layer 2
L3	Layer 3
MAC	Media Access Control
MBMS	Multimedia Broadcast Multicast Service
MBSFN	Multimedia Broadcast multicast service Single Frequency Network
MIB	Master Information Block
N/A	Not Applicable
NACC	Network Assisted Cell Change

NAS	Non Access Stratum
PCCH	Paging Control Channel
PDU	Protocol Data Unit
PDCP	Packet Data Convergence Protocol
PLMN	Public Land Mobile Network
P-RNTI	Paging RNTI
PTM-MC	Point-to-Multipoint, Multi-Cell
PTM-SC	Point-to-Multipoint, Single-Cell
PTP	Point-to-Point
QoS	Quality of Service
RACH	Random Access CHannel
RA-RNTI	Random Access RNTI
RAT	Radio Access Technology
RB	Radio Bearer
RLC	Radio Link Control
RNTI	Radio Network Temporary Identifier
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSRP	Reference Signal Received Power
RSSI	Received Signal Strength Indicator
SAE	System Architecture Evolution
SAP	Service Access Point
SI	Scheduling Information
SIB	System Information Block
SI-RNTI	System Information RNTI
SRB	Signalling Radio Bearer
S-TMSI	SAE Temporary Mobile Station Identifier
TA	Tracking Area
TDD	Time Division Duplex
TM	Transparent Mode
UE	User Equipment
UICC	Universal Integrated Circuit Card
UL	Uplink
UM	Unacknowledged Mode
UL-SCH	Uplink Shared Channel
UP	User Plane
UTRAN	Universal Terrestrial Radio Access Network

4 General

4.1 Introduction

This specification is organised as follows:

- sub-clause 4.2 describes the RRC protocol model;
- sub-clause 4.3 specifies the services provided to upper layers as well as the services expected from lower layers;
- sub-clause 4.4 lists the RRC functions;
- clause 5 specifies RRC procedures, including UE state transitions;
- clause 6 specifies the RRC message in a tabular format;
- clause 7 specifies the variables (including protocol timers and constants) and counters to be used by the UE;
- clause 8 specifies the encoding of the RRC messages.

4.2 Architecture

4.2.1 UE states and state transitions including inter RAT

A UE is in RRC_CONNECTED when an RRC connection has been established. If this is not the case, i.e. no RRC connection is established, the UE is in RRC_IDLE state. The RRC states can further be characterised as follows:

- **RRC_IDLE**:
  - A UE specific DRX may be configured by upper layers.
  - UE controlled mobility;
  - The UE:
    - Monitors a Paging channel to detect incoming calls;
    - Performs neighbouring cell measurements and cell (re-)selection;
    - Acquires system information.
- **RRC_CONNECTED**:
  - Transfer of unicast data to/from UE.
  - At lower layers, the UE may be configured with a UE specific DRX/ DTX.
  - Network controlled mobility, i.e. handover and cell change order with network assistance (NACC) to GERAN;
  - The UE:
    - Monitors control channels associated with the shared data channel to determine if data is scheduled for it;
    - Provides channel quality and feedback information;
    - Performs neighbouring cell measurements and measurement reporting;
    - Acquires system information.

The following figure not only provides an overview of the RRC states in E-UTRA, but also illustrates the mobility support between E-UTRAN, UTRAN and GERAN.

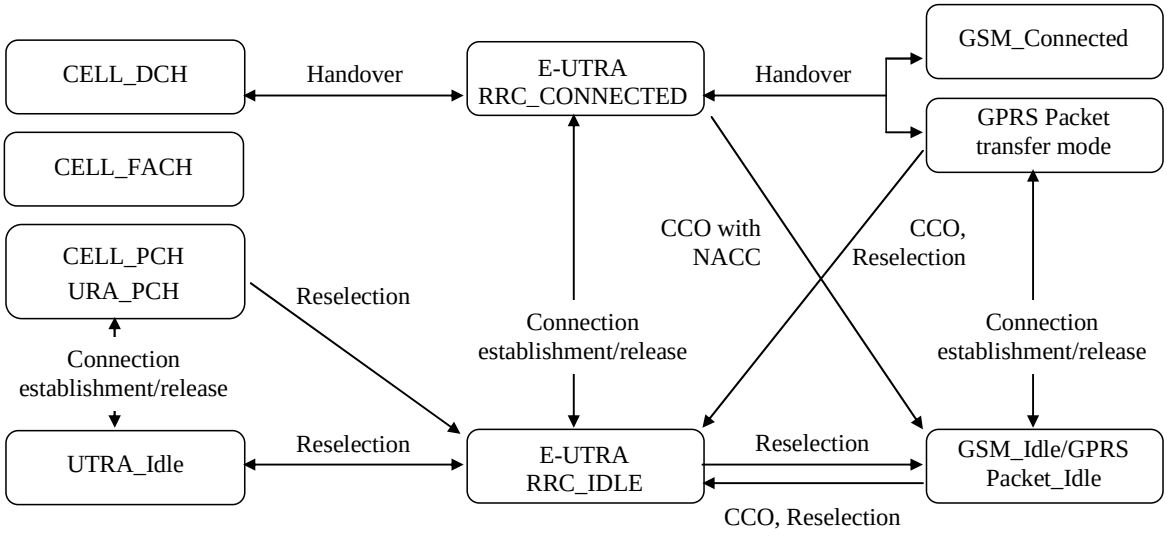

Figure 4.2.1-1: E-UTRA states and inter RAT mobility procedures, 3GPP

The following figure illustrates the mobility support between E-UTRAN, CDMA2000 1xRTT and CDMA2000 HRPD. The details of the CDMA2000 state models are out of the scope of this specification.

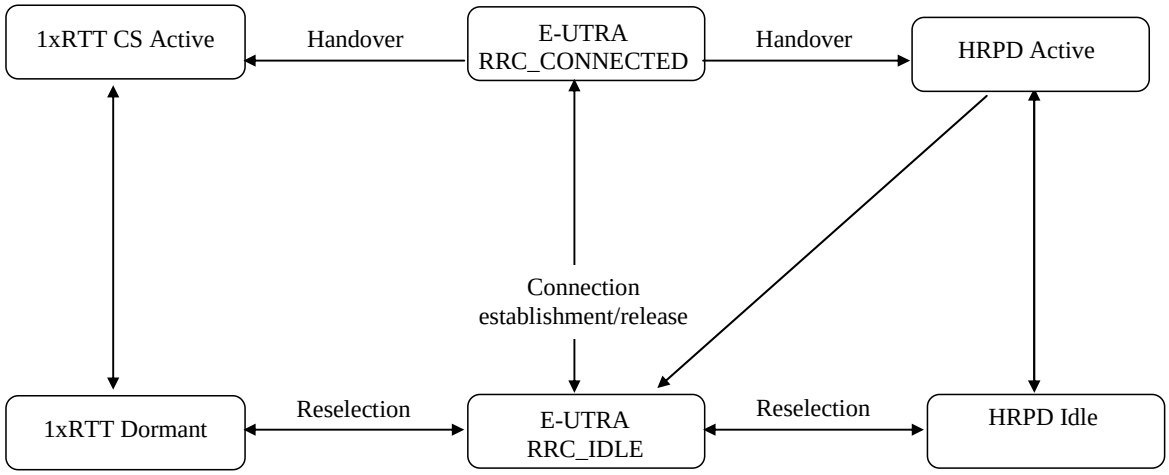

Figure 4.2.1-2: Mobility procedures between E-UTRA and CDMA2000

Editor's note: In Fig. 4.2.1-2, the procedure name is missing for some transitions. Terminology to be added is FFS.

The inter-RAT handover procedure(s) supports the case of signalling, conversational services (including a 'voice call continuity' procedure [FFS depending on SA2 discussions]), non- conversational services and combinations of these. The mobility between E-UTRA and non-3GPP systems other than CDMA2000 is FFS.

In addition to the state transitions shown in Figure 4.2.1-1 and Figure 4.2.1-2 there is support for connection release with redirection information from E-UTRA RRC_CONNECTED to GERAN, UTRAN and CDMA2000, Idle/Dormant mode.

4.2.2 Signalling radio bearers

"Signalling Radio Bearers" (SRBs) are defined as Radio Bearers (RB) that are used only for the transmission of RRC and NAS messages. More specifically, the following three SRBs are defined:

- SRB0 is for RRC messages using the CCCH logical channel;
- SRB1 is for RRC messages (which may include a piggybacked NAS message) as well as for NAS messages prior to the establishment of SRB2, all using DCCH logical channel;
- SRB2 is for NAS messages, using DCCH logical channel. SRB2 has a lower-priority than SRB1 and is always configured by E-UTRAN after security activation.

In downlink piggybacking of NAS messages is used only for one dependant (i.e. with joint success/ failure) procedure: bearer establishment/ modification. In uplink NAS message piggybacking is used only for transferring the initial NAS message during connection setup.

NOTE The NAS messages transfereed via SRB2 are also contained in RRC messages, which however do not include any RRC protocol control information.

All RRC messages, including those containing a NAS or a non-3GPP message, are integrity protected and ciphered by PDCP. NAS independently applies integrity protection and ciphering to the NAS messages.

4.3 Services

4.3.1 Services provided to upper layers

The RRC protocol offers the following services to upper layers:

- Broadcast of general control information;
- Notification of UEs in RRC_IDLE, e.g. about a terminating call, for ETWS;
- Transfer of dedicated control information, i.e. information for one specific UE.

4.3.2 Services expected from lower layers

In brief, the following are the main services that RRC expects from lower layers:

- PDCP: integrity protection and ciphering
- RLC: Reliable and in-sequence transfer of information, without introducing duplicates and with support for segmentation and concatenation

Further details about the services provided by Packet Data Convergence Control layer (e.g. integrity and ciphering) are provided in [8]. The services provided by Radio Link Control layer (e.g. the RLC modes) are specified in [7]. Further details about the services provided by Medium Access Control layer (e.g. the logical channels) are provided in [6]. The services provided by physical layer (e.g. the transport channels) are specified in [3].

4.4 Functions

The RRC protocol includes the following main functions:

- Broadcast of system information:
  - Including NAS common information;

Editor's note: It seems there is no NAS common information anymore

  - Information applicable for UEs in RRC_IDLE, e.g. cell (re-)selection parameters, neighbouring cell information and information (also) applicable for UEs in RRC_CONNECTED, e.g. common channel configuration information.
- RRC connection control:
  - Paging;
  - Establishment/ modification/ release of RRC connection, including e.g. assignment/ modification of UE identity (C-RNTI), establishment/ modification/ release of SRB1 and SRB2, access class barring;
  - Initial security activation, i.e. initial configuration of AS integrity protection (CP) and AS ciphering (CP, UP);
  - RRC connection mobility including e.g. intra-frequency and inter-frequency handover, associated security handling, i.e. key and/ or algorithm change, specification of RRC context information transferred between network nodes;
  - Establishment/ modification/ release of (ptp) RBs carrying user data (DRBs);
  - Radio configuration control including e.g. assignment/ modification of ARQ configuration, HARQ configuration, DRX configuration;
  - QoS control including assignment/ modification of semi-persistent configuration information for DL and UL, assignment/ modification of parameters for UL rate control in the UE, i.e. allocation of a priority and a prioritised bit rate (PBR) for each RB;

  - Recovery from radio link failure;

- Inter-RAT mobility including e.g: security activation, transfer of RRC context information;
- Measurement configuration control and reporting:
  - Establishment/ modification/ release of measurements (e.g. Intra-frequency, inter-frequency and inter- RAT mobility, Quality, UE internal, Positioning);
  - Configuration and (de-)activation of measurement gaps;
  - Measurement reporting.
- Other functions including e.g. transfer of dedicated NAS information and non-3GPP dedicated information, transfer of UE radio access capability information, support for E-UTRAN sharing (multiple PLMN identities);
- Multicast/ broadcast:
  - Notification of service/ session start;
  - Indication of available services;
  - Establishment/ modification/ release of ptm RBs.
- Generic protocol error handling;
- Support of self-configuration and self-optimisation;

NOTE Random access is specified entirely in the MAC i.e. including initial power estimation.

5 Procedures

5.1 General

5.1.1 Introduction

The procedural requirements are structured according to the main functional areas: system information (5.2), connection management (5.3), inter-RAT mobility (5.4) and measurements (5.5). In addition there is a section other (5.6) that covers e.g. NAS dedicated information transfer, UE capability transfer.

5.1.2 General requirements

The UE shall:

1> process the received messages in order of reception by RRC, i.e. the processing of a message shall be completed before starting the processing of a subsequent message;

NOTE: E-UTRAN may initiate a subsequent procedure prior to receiving the UEs response of a previously initiated procedure.

1> set the *rrc-TransactioIdentifier* in the response message, if included, to the same value as included in the message received from E-UTRAN that triggered the response message;

Editor's note: The above is based on the following working assumptions: a) so far no need has been identified for an activation time, b) for procedure completion there is not need to wait for an L2 ACK

Editor's note: The UE can only initiate the UL information transfer procedure while in RRC_CONNECTED, i.e. this does not include the transient states while the UE is waiting for a response to connection request or a connection re-establishment request.

Editor's note: The UE continuously ongoing actions in idle and connected (i.e. normative versions of the statements in 4.2.1) are specified within the respective sections, e.g. system information, paging (36.304), measurements. Same applies for the actions upon state transitions.

To be completed

5.2 System information

5.2.1 Introduction

5.2.1.1 General

System information is divided into the *MasterInformationBlock* (MIB) and a number of *SystemInformationBlocks* (SIBs). The MIB includes a limited number of most essential and frequently transmitted parameters to acquire other information from the cell, and is transmitted on BCH. SIBs other than *SystemInformationBlockType1* are carried in *SystemInformation* (SI) messages and mapping of SIBs to SI messages is flexibly configurable by *schedulingInformation* included in *SystemInformationBlockType1*, with restrictions that: each SIB is contained only in a single SI message, only SIBs having the same scheduling requirement (periodicity) can be mapped to the same SI message, and *SystemInformationBlockType2* is always mapped to the SI message that corresponds to the first entry in the list of SI messages in *schedulingInformation*. There may be multiple SI messages transmitted with the same periodicity. *SystemInformationBlockType1* and all SI messages are transmitted on DL-SCH.

5.2.1.2 Scheduling

The MIB uses a fixed schedule with a periodicity of 40 ms and repetitions made within 40 ms. The first transmission of the MIB is scheduled in subframe #0 of radio frames for which the SFN mod 4 = 0, and repetitions are scheduled in subframe #0 of all other radio frames.

The *SystemInformationBlockType1* uses a fixed schedule with a periodicity of 80 ms and repetitions made within 80 ms. The first transmission of *SystemInformationBlockType1* is scheduled in subframe #5 of radio frames for which the SFN mod 8 = 0, and repetitions are scheduled in subframe #5 of all other radio frames for which SFN mod 2 = 0.

The SI messages are transmitted within periodically occurring time domain windows (referred to as SI-windows) using dynamic scheduling. Each SI message is associated with a SI-window and the SI-windows of different SI messages do not overlap. That is, within one SI-window only the corresponding SI is transmitted. The length of the SI-window is common for all SI messages, and is configurable. Within the SI-window, the corresponding SI message can be transmitted a number of times in any subframe other than MBSFN subframes, uplink subframes in TDD, and subframe #5 of radio frames for which SFN mod 2 = 0. The UE acquires the detailed time-domain scheduling (and other information, e.g. frequency-domain scheduling, used transport format) from decoding SI-RNTI on PDCCH.

A single SI-RNTI is used to address *SystemInformationBlockType1* as well as all SI messages.

SystemInformationBlockType1 configures the SI-window length and the transmission periodicity for the SI messages.

Editor's note: It seems best to specify the handling of the scheduling information by means of an "elementary procedure", i.e. related to the reception of the related information elements.

Editor's note: In the unlikely event that serving cell paging and target cell DBCH overlap in time one of the two activities will need to be prioritised. This may lead into paging reception loss or increases in cell reselection interruption time.

5.2.1.3 System information validity and notification of changes

System information changes only occur at specific radio frames i.e. the concept of a modification period is used. SI messages may be transmitted a number of times with the same content within a modification period, as defined by its scheduling. The modification period boundaries are defined by SFN mod N. N is configured by system information.

When the network changes (some of the) system information, it first notifies the UEs about this change i.e. this may be done throughout a modification period. In the next modification period, the network transmits the updated system information. These general principles are illustrated in figure 5.2.1.4-1, in which different colours indicate different system information. Upon receiving a change notification, the UE knows that the current system information is valid

until the next modification period boundary. After this boundary, the UE acquires the new system information. There is a (short) period during which the UE does not have valid system information.

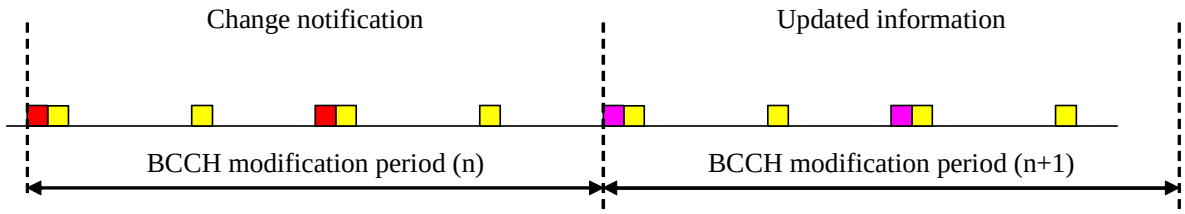

Figure 5.2.1.3-1: Change of system Information

The *Paging* message is used to inform UEs in RRC_IDLE and UEs in RRC_CONNECTED about a system information change. If the UE receives a Paging message including the *systemInfoModification*, it knows that the system information changes at the next modification period boundary. Although the UE may be informed about changes in system information, no further details are provided e.g. regarding which SI message has changed. The change notification mechanism is not used for the system information using an expiry timer (intended for the more dynamic system information).

SystemInformationBlockType1 includes a value tag that indicates if a change has occurred in the SI messages. UEs may use this value tag e.g. upon return from out of coverage, to verify if the previously acquired system information is still valid. The UE considers system information to be valid for at most 6 hours from the moment it was received.

Editor's note: The UE requirements corresponding with the above descriptive text are still to be captured elsewhere, e.g. within the paging procedure which may trigger the BCCH acquisition procedure.

Editor's note: It is FFS when UEs in RRC_CONNECTED monitor paging for system information change detection. For example, UE may only need to monitor one paging occasion per one BCCH modification period, or it may need to monitor several paging occasion per one BCCH modification period with certain periodicity.

Editor's note: If it will be agreed that the ETWS primary notification is performed by means of paging, ETWS capable UEs will be required to read paging.

5.2.2 System information acquisition

5.2.2.1 General

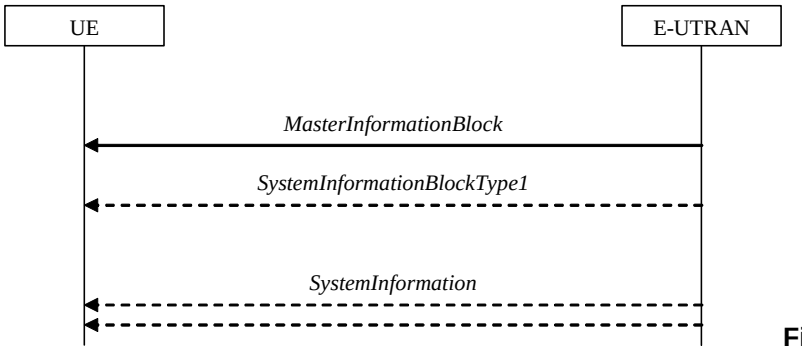

Figure 5.2.2.1-1: System information acquisition, normal

The UE applies the system information acquisition procedure to acquire the AS- and NAS- system information that is broadcasted by the E-UTRAN. The procedure applies to UEs in RRC_IDLE and to UEs in RRC_CONNECTED.

5.2.2.2 Initiation

The UE shall apply the system information acquisition procedure upon selecting (e.g. upon power on) and upon re-selecting a cell, after handover completion, after entering E-UTRA from another RAT, upon return from out of coverage, upon receiving a notification that the system information has changed and upon exceeding the maximum validity duration.

5.2.2.3 System information required by the UE

The UE shall

1> ensure having a valid version, as defined below, of (at least) the following system information, also referred to as the "required" System Information:

2> if in RRC_IDLE:

3> the *MasterInformationBlock and SystemInformationBlockType1* messages as well as *SystemInformationBlockType2* through *SystemInformationBlockType8*, depending on support of the concerned RATs;

2> if in RRC_CONNECTED:

3> the *MasterInformationBlock, the SystemInformationBlockType1* and the *SystemInformationBlockType2* messages*;*

1> consider any stored system information to be invalid if it was received more than 6 hours ago;

1> consider any stored system information to be invalid if the value tag included in the *SystemInformationBlockType1* message transmitted on BCCH is different from the one of the stored system information;

5.2.2.4 System information acquisition by the UE

The UE shall

1> if the procedure is triggered by a system information change:

2> start aquiring the required system information, as defined in 5.2.2.3, from the beginning of the modification period following the one in which the change notification was received;

1> if the UE is in RRC_IDLE and enters a cell for which the UE does not have stored a valid version of the system information required in RRC_IDLE, as defined in 5.2.2.3:

2> acquire the system information required in RRC_IDLE, as defined in 5.2.2.3.

1> following successful handover completion to a cell for which the UE does not have stored a valid version of the system information required in RRC_CONNECTED, as defined in 5.2.2.3:

2> acquire the system information required in RRC_CONNECTED, as defined in 5.2.2.3;

Editor's note: It has been agreed that the time critical information, i.e. the information required to continue the user plane in the target cell, shall be included in the handover command. The UE obtains the other information, e.g. the modification period, from system information.

1> following a request from CDMA upper layers:

2> acquire *SystemInformationBlockType8*;

Editor's note: It is FFS if there is a need to explicitly specify which operations the UE is not required to perform prior to receiving the required system information i.e. this may be implied from the other, not time critical, configuration information.

1> not initiate the RRC connection establishment or RRC connection re-establishment procedure if it does not have a valid version of the system information required in RRC_CONNECTED, as defined in 5.2.2.3.

The UE may apply the received SIBs immediately i.e. the UE does not need to delay using a SIB until all SI messages have been received.

Editor's note: It seems best to specify the scheduling by means of an "elementary procedure", i.e. related to the reception of the related information elements.

5.2.2.5 Essential system information missing

The UE shall

1> if in RRC_IDLE and the cell does not transmit the *MasterInformationBlock*, the *SystemInformationBlockType1* or the *SystemInformationBlockType2*:

2> Consider the cell to be barred in accordance with TS 36.304 [4].

5.2.2.6 Actions upon reception of the *MasterInformationBlock* message

Upon receiving the *MasterInformationBlock* message the UE shall:

1>

To be completed

Editor's note: The aim is to specify only a minimum of specific behaviour in these sections

5.2.2.7 Actions upon reception of the *SystemInformationBlockType1* message

Upon receiving the *SystemInformationBlockType1* message the UE shall:

1> if the IE *mbsfn-SubframeConfiguration* is included:

2> consider that no other DL assignments occur in the MBSFN subframes indicated in the IE *mbsfn-SubframeConfiguration*.

To be completed

Editor's note: The aim is to specify only a minimum of specific behaviour in these sections i.e. only the behaviour related to system information reception e.g. scheduling information, value tags, etc.

5.2.2.8 Actions upon reception of *SystemInformation* messages

Upon receiving an *SystemInformation* message the UE shall:

1>

To be completed

Editor's note: The following sections aim to cover specific actions e.g. the triggering of a procedure upon receipt of an IE within a SIB. UE handling related to IEs may also be included in the procedures using the information e.g. the connection establishment includes actions related to the access class barring info. For some SIBs a section may not be needed.

5.2.2.9 Actions upon reception of *SystemInformationBlockType2*

Upon receiving *SystemInformationBlockType2*, the UE shall:

1> if a (UE specific) paging cycle was received (signalling details FFS):

Editor's note: It is FFS is the UE specific DRX value is signalled by NAS or AS.

2> Apply the lowest of the paging cycle and the *defaultPagingCycle* included in the *semiStaticCommonChConfig*:

1> else:

2> Apply the *defaultPagingCycle* included in the *semiStaticCommonChConfig*:

1> TBS

5.2.2.10 Actions upon reception of *SystemInformationBlockType3*

Upon receiving *SystemInformationBlockType3*, the UE shall:

1> TBS

5.2.2.11 Actions upon reception of *SystemInformationBlockType4*

Upon receiving *SystemInformationBlockType4*, the UE shall:

1> TBS

5.2.2.12 Actions upon reception of *SystemInformationBlockType5*

Upon receiving *SystemInformationBlockType5*, the UE shall:

1> TBS

5.2.2.13 Actions upon reception of *SystemInformationBlockType6*

Upon receiving *SystemInformationBlockType6*, the UE shall:

1> TBS

5.2.2.14 Actions upon reception of *SystemInformationBlockType7*

Upon receiving *SystemInformationBlockType7*, the UE shall:

1> TBS

5.2.2.15 Actions upon reception of *SystemInformationBlockType8*

Upon receiving *SystemInformationBlockType8*, the UE shall:

1> if the IE *hrpd-PreRegistrationInfo* is included:

2> forward the *hrpd-PreRegistrationInfo* to CDMA upper layers;

1> if the IE *onexrtt-LongCodeState* is included:

2> forward the *onexrtt-LongCodeState* to CDMA upper layers;

1> if the IE *CDMA2000-SystemTimeInfo* is included:

2> forward the *CDMA2000-SystemTimeInfo* to CDMA upper layers;

1> TBC

5.2.3 Acquisition of an SI message

When acquiring an SI message, the UE shall:

1> determine the start of the SI-window for the concerned SI message as follows:

2> for the concerned SI message, determine the number *n* which corresponds to the order of entry in the list of SI messages configured by *schedulingInformation* in *SystemInformationBlockType1*;

2> determine the integer value $x = (n - 1)*w$, where w is the *si-WindowLength*;

2> the SI-window starts at the subframe #*a*, where *a* = *x* mod 10, in the next radio frame for which SFN mod T = FLOOR(*x*/10), where T is the *si-Periodicity* of the concerned SI message;

Editor's note: It is FFS whether SFN mod T = FLOOR(*x*/10) + 8 should be used instead.

1> start reception of DL-SCH using the SI-RNTI from the start of the SI-window and continue until the end of the SI-window whose absolute length in time is given by *si-WindowLength*, or until the SI message was received, excluding the following subframes:

2> subframe #5 in radio frames for which SFN mod 2 = 0;

2> any MBSFN subframes;

2> any uplink subframes in TDD;

1> if the SI message was not received by the end of the SI-window, repeat reception at the next SI-window occasion for the concerned SI message.

5.3 Connection control

5.3.1 Introduction

5.3.1.1 RRC connection control

RRC connection establishment involves the establishment of SRB1. E-UTRAN completes RRC connection establishment prior to completing the establishment of the S1 connection, i.e. prior to receiving the UE context information from the EPC. Consequently, AS security is not activated during the initial phase of the RRC connection. During this initial phase of the RRC connection, the E-UTRAN may configure the UE to perform measurement reporting. However, the UE only accepts a handover command when security is activated.

Upon receiving the UE context from the EPC, E-UTRAN activates security (both ciphering and integrity protection) using the initial security activation procedure. The RRC messages to activate security (command and response) are integrity protected, while ciphering is started only after completion of the procedure. That is, the response to the message used to activate security is not ciphered, while the subsequent messages (e.g. used to establish radio bearers) are both integrity protected and ciphered.

After having initiated the initial security activation procedure, E-UTRAN initiates the establishment of SRB2 and of radio bearers carrying user data (DRBs), i.e. E-UTRAN may do this prior to receiving the confirmation of the initial security activation from the UE. In any case, E-UTRAN will apply both ciphering and integrity protection for the RRC connection reconfiguration messages used to establish SRB2 and DRBs. E-UTRAN should release the RRC connection if the initial security activation and/ or the radio bearer establishment fails (i.e. security activation and DRB establishment are triggered by a joint S1-procedure, which does not support partial success).

For SRB 2 and for DRBs, security is always activated from the start, i.e. the E-UTRAN does not establish these bearers prior to activating security.

5.3.1.2 Security

AS security comprises of the integrity protection of RRC signalling as well as the encryption of RRC signalling and user data. RRC handles the integrity protection configuration, which is common for signalling radio bearers SRB1 and SRB2. RRC also handles the ciphering configuration, which is common for all radio bearers, i.e. the configuration is used for the radio bearers carrying signalling (SRB1, SRB2) as well as for those carrying user data (DRBs).

RRC integrity and ciphering are always activated together, i.e. in one message/ procedure. RRC integrity and ciphering are never de-activated. However, it is possible to switch to a "NULL" ciphering algorithm (eea0). Use of a "NULL" integrity protection algorithm is FFS.

NOTE 1 Security is always activated although in some cases a "NULL" algorithm and/ or "dummy keys" may be used, e.g. in case of UICC-less emergency calls

NOTE 2 Lower layers discard RRC messages for which the integrity check has failed

The AS applies three different security keys: one for the integrity protection of RRC signalling, one for the encryption of RRC signalling and one for the encryption of user data. It is FFS whether or not the same key can be used for the encryption of RRC signalling and of user data. All three AS keys (in the following referred to as AS derived-keys) are derived from an AS base-key, which is eNB specific (K_{eNB}).

Upon connection establishment new AS keys are derived. No AS-parameters are exchanged to serve as inputs for the derivation of the new AS keys.

The integrity and ciphering of the RRC message used to perform handover is based on the security configuration used prior to the handover and is performed by the source eNB.

The integrity and ciphering algorithms can only be changed upon handover. The AS keys (both the base-key and the derived-keys) change upon every handover. No additional AS-parameters (i.e. specific for this purpose) are exchanged to serve as inputs for the derivation of the new AS keys. An intra cell handover *based* procedure may be used to change the keys in RRC_CONNECTED.

Editor's note: For key change, no need for any changes compared to normal handover procedure have been identified so far.

For each radio bearer an independent counter (COUNT) is used as input for ciphering. For SRBs, the same COUNT is used as input for integrity protection. Except for identical re-transmissions, it is not allowed to use the same COUNT value more than once for a given security key. In order to limit the signalling overhead, individual messages/ packets include a short sequence number (SN). In addition, an overflow counter mechanism is used: the hyper frame number (HFN). The HFN needs to be synchronized between the UE and the eNB. The eNB is responsible for avoiding reuse of the COUNT with the same RB identity and with the same AS base-key, e.g. due to the transfer of large volumes of data, release and establishment of new RBs. In order to avoid such re-use, the eNB may e.g. use different RB identities for successive RB establishments, trigger an intra cell handover or an RRC_CONNECTED to RRC_IDLE to RRC_CONNECTED transition.

5.3.1.3 Connected mode mobility

In RRC_CONNECTED, the network controls UE mobility, i.e. the network decides when the UE shall move to which cell (which may be on another frequency or RAT). The network triggers the handover procedure e.g. based on radio conditions, load. To facilitate this, the network may configure the UE to perform measurement reporting (possibly including the configuration of measurement gaps). The network may also initiate handover blindly, i.e. without having received measurement information from the UE.

For mobility within E-UTRA, handover is the only procedure that is defined. Before sending the handover command to the UE, the source eNB prepares one or more target cells. The target eNB generates the message used to perform the handover, i.e. the message including the AS-configuration to be used in the target cell. The source eNB transparently (i.e. does not alter values/ content) forwards the handover message/ information received from the target to the UE. When appropriate, the source eNB may initiate data forwarding for (a subset of) the radio bearers.

After receiving the handover command, the UE attempts to access the target cell at the first available RACH occasion, i.e. the handover is asynchronous. Consequently, when allocating dedicated preambles for the random access in the target cell, E-UTRA shall ensure they are available from the first RACH occasion the UE may use. Upon successful completion of the handover, the UE sends a handover confirmation.

After the successful completion of handover, PDCP SDUs may be re-transmitted in the target cell. This only applies for radio bearers carrying user data and using RLC-AM mode. The further details are specified in [8].

After the successful completion of handover, the SN and the HFN are reset except for the radio bearers carrying user data and using RLC-AM mode (for which both SN and HFN continue). The further details are specified in [8].

Editor's note: W.r.t. handover there is one UE behaviour regardless of the handover procedures used within the network (e.g. whether the handover includes X2 or S1 signalling procedures).

The source eNB should, for some time, maintain a context to enable the UE to return in case of handover failure. After having detected handover failure, the UE attempts to resume the RRC connection either in the source or in another cell using the RRC re-establishment procedure (see RL failure). This connection resumption succeeds only if the accessed cell is prepared, i.e. concerns a cell of the source eNB or of another eNB towards which handover preparation has been performed.

5.3.2 Paging

5.3.2.1 General

Figure 5.3.2.1-1: Paging

The purpose of this procedure is to transmit paging information to a UE in RRC_IDLE and/ or to inform UEs in RRC_IDLE and UEs in RRC_CONNECTED about a system information change. The paging information is provided to upper layers, which in response may initiate RRC connection establishment, e.g. to receive an incoming call.

5.3.2.2 Initiation

E-UTRAN initiates the paging procedure by transmitting the PAGING message at the UE"s paging occasion as specified in TS 36.304 [4]. E-UTRAN may identify multiple UEs within a *Paging* message.

5.3.2.3 Reception of the *Paging* message by the UE

Upon receiving the *Paging* message, the UE shall:

1> For each of the Paging records included in the *Paging* message:

2> If the *ue-identity* included in the *pagingRecordList* matches one of the UE identities allocated by upper layers:

3> forward the *ue-Identity* and the *pagingCause* to the upper layers.

1> If the *systemInfoModification* is included:

2> re-acquire the system information using the system information acquisition procedure as specified in 5.2.2.

5.3.3 RRC connection establishment

5.3.3.1 General

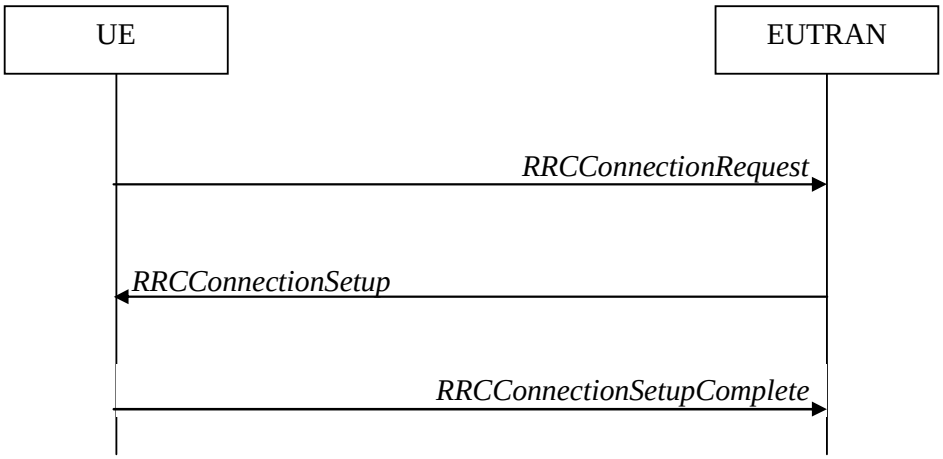

Figure 5.3.3.1-1: RRC connection establishment, successful

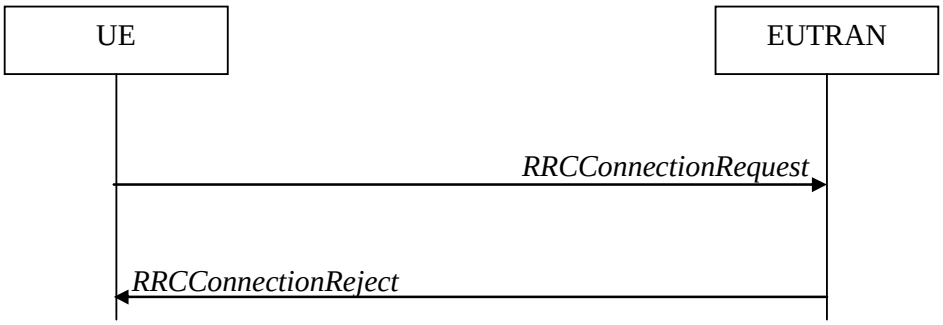

Figure 5.3.3.1-2: RRC connection establishment, network reject

The purpose of this procedure is to establish an RRC connection. RRC connection establishment involves SRB1 establishment. The procedure is also used to transfer the initial NAS dedicated information/ message from the UE to E-UTRAN.

E-UTRAN applies the procedure as follows:

- to establish SRB1 only.

5.3.3.2 Initiation

The UE initiates the procedure when upper layers request establishment of an RRC connection while the UE is in RRC_IDLE state.

Upon initiation of the procedure, the UE shall:

1> if *SystemInformationBlockType2* includes the *accessBarringInformation*:

2> if the UE is establishing the RRC connection to perform an emergency call:

3> if the *accessClassBarring* for AC 10 is set to *FALSE*:

4> consider access to the cell as not barred;

3> else if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15 and

3> for at least one of these Access Classes the *accessClassBarring* is set to *FALSE* and, according to TS 22.011[10] and TS 23.122 [11], it is valid for the UE to use this Access Class:

NOTE 1: ACs 12, 13, 14 are only valid for use in the home country and ACs 11, 15 are only valid for use in the HPLMN/ EHPLMN

4> consider access to the cell as not barred;

3> else:

4> consider access to the cell as barred;

2> else

3> if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15 and

3> for at least one of these Access Classes the *accessClassBarring* is set to *FALSE* and, according to TS 22.011[10] and TS 23.122 [11], it is valid for the UE to use this Access Class:

4> consider access to the cell as not barred;

3> else if the UE is establishing the RRC connection to perform a mobile terminating call:

4> consider access to the cell as not barred;

3> else:

4> if T303 is running:

5> consider access to the cell as barred;

4> else:

5> draw a random number, "rand", uniformly distributed in the range: 0 ≤ rand < 1

5> if 'rand' is lower than the value indicated by the *accessProbabilityFactor* included in *SystemInformationBlockType2*:

6> consider access to the cell as not barred;

5> else:

6> consider access to the cell as barred;

1> else:

2> consider access to the cell as not barred;

1> If access to the cell, as specified above, is not barred:

2> Stop acting on *Paging* messages;

2> apply the default configuration applicable for the *antennaInformation* as specified in 9.2.3, until explicitly receiving a configuration;

2> Initiate transmission of the *RRCConnectionRequest* message in accordance with 5.3.3.3;

2> Start timer T300

NOTE 2: Upon initiating the connection establishment procedure, the UE is not required to ensure it maintains up to date system information applicable only for UEs in RRC_IDLE state. However, the UE needs to perform system information acquisition upon re-selection.

1> else:

2> if the UE is not establishing the RRC connection to perform an emergency call:

3> if T303 is not running:

4> draw a random number rand that is uniformly distributed in the range 0 < rand < 1:

4> Start timer T303 with a timer value calculated as follows, using the *accessClassBarringTime* included in *SystemInformationBlockType2*:

T303= (0.7+ 0.6 * rand) * *accessClassBarringTime*

2> inform upper layers about the failure to establish the RRC connection, upon which the procedure ends.

Editor's note: It has been agreed that a mechanism to differentiate access control of signalling traffic is necessary. The details of the mechanism are FFS.

5.3.3.3 Actions related to transmission of *RRCConnectionRequest* message

The UE shall set the contents of *RRCConnectionRequest* message as follows:

1> set the IE *ue-Identity* as follows:

2> if upper layers provide an S-TMSI:

3> set the *identityType* to *s-TMSI*;

3> set the *S-TMSI* to the value received from upper layers;

2> else

3> set the *identityType* to *randomNumber*;

3> draw a random value and set the *randomNumber* to this value;

NOTE 1 Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

1> Set the *establishmentCause* in accordance with the information received from upper layers;

The UE shall submit the *RRCConnectionRequest* message to lower layers for transmission.

The UE shall continue cell re-selection related measurements as well as cell re-selection evaluation. If the conditions for cell re-selection are fulfilled, the UE shall perform cell re-selection as specified in 5.3.3.6.

5.3.3.4 Reception of the *RRCConnectionSetup* by the UE

NOTE: Prior to this, lower layers allocate a C-RNTI. For further details see TS 36.321 [6];

The UE shall:

1> establish SRB1 in accordance with the received *radioResourceConfiguration* and as specified in 5.3.9;

NOTE 1: The details of how the signalling radio bearer configuration is signalled are FFS, i.e. the use of a default RLC configuration has been agreed for SRB1. Use of default configurations for other parts of the Radio resource configuration is not precluded.

1> If stored, discard the Inter-frequency priority information and the Inter-RAT priority information provided via dedicated signalling using the IE 'Idle mode mobility control information';

1> stop timer T300;

1> stop timer T303, if running;

1> stop timer T320, if running;

1> enter RRC_CONNECTED state;

1> stop the cell re-selection procedure;

1> set the content of *RRCConnectionSetupComplete* message as follows:

2> set the *selectedPLMN-Identity* to the PLMN selected by upper layers [TS 23.122, TS 24.008] from the PLMN(s) included in the plmn-IdentityList broadcast, within *SystemInformationBlockType1*, in the cell where the RRC connection was established;

2> if upper layers provide the "Registered MME", set the *registeredMME* to the value received from upper layers;

2> set the *nas-DedicatedInformation* to include the information received from upper layers;

2> submit the *RRCConnectionSetupComplete* message to lower layers for transmission, upon which the procedure ends.

5.3.3.5 T302 timeout

The UE shall:

1> if timer T302 expires:

2> Start timer T300;

2> transmit a new *RRCConnectionRequest* message in accordance with 5.3.3.3.

5.3.3.6 T300 expiry or cell re-selection

The UE shall:

1> If timer T300 expires or

1> if cell reselection occurs during RRC connection establishment:

2> stop timer T300, if running;

2> stop timer T302, if running;

2> stop timer T303, if running;

2> reset MAC and re-establish RLC for all RBs that are established;

2> resume acting on *Paging* messages;

2> inform upper layers about the failure to establish the RRC connection, upon which the procedure ends.

5.3.3.7 Reception of the *RRCConnectionReject* by the UE

The UE shall:

1> stop timer T300;

1> start timer T302, with a timer value set according to the value of the *waitTime*;

Editor's note: The need for a definite reject (i.e. no AS- retries, UE immediately enters RRC_IDLE) is FFS. Such a definite reject could either be modelled by a wait time of '0' (as in UTRA), or by absence of the IE "Wait time".

5.3.4 Initial security activation

5.3.4.1 General

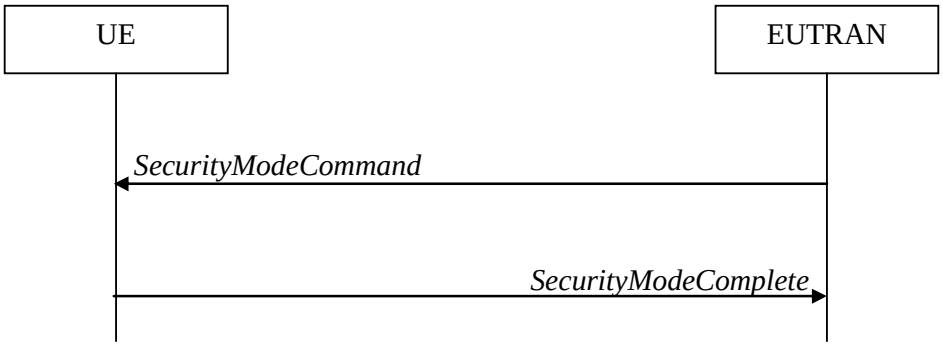

Figure 5.3.4.1-1: Security mode command, successful

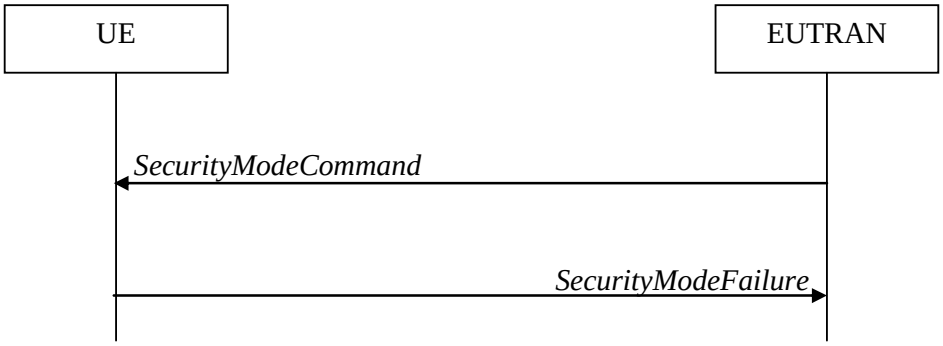

Figure 5.3.4.1-2: Security mode command, failure

The purpose of this procedure is to activate AS security upon RRC connection establishment.

5.3.4.2 Initiation

E-UTRAN initiates the security mode command procedure to a UE in RRC_CONNECTED. Moreover, E-UTRAN applies the procedure as follows:

- when only SRB1 is established, i.e. prior to establishment of SRB2 and/ or DRBs.

5.3.4.3 Reception of the *SecurityModeCommand* by the UE

The UE shall:

Editor's note: It is FFS which SN the UE applies as input for deriving the AS base-key (K_{eNB}) upon idle to active i.e. there are two possible approaches. A) The UE applies the SN included in the initial uplink NAS message. In the unlikely event that the NAS message is re-transmitted, the UE and MME may apply a different SN, in which case the initial security activation will fail upon which E-UTRAN releases the connection. B) The MME provides the used SN to the eNB as part of the initial context. The eNB includes the SN in the SMC message. Awaiting further liaison from CT1, in reply to R2-082036.

1> request lower layers to verify the integrity protection of the *SecurityModeCommand* message, using the algorithm indicated by the *integrityProtAlgorithm* as included in the *SecurityModeCommand* message;

1> If the *SecurityModeCommand* message passes the integrity protection check:

2> configure lower layers to apply integrity protection using the indicated algorithm immediately, i.e. integrity protection shall be applied to all subsequent messages received and sent by the UE, including the *SecurityModeComplete* message;

2> configure lower layers to apply ciphering using the indicated algorithm after completing the procedure, i.e. ciphering shall be applied to all subsequent messages received and sent by the UE, except for the *SecurityModeComplete* message which is sent unciphered;

2> consider AS-security to be activated;

2> submit the *SecurityModeComplete* message to lower layers for transmission, upon which the procedure ends.

1> else:

2> continue using the configuration used prior to the reception of the *SecurityModeCommand* message, i.e. neither apply integrity protection nor ciphering.

2> submit the *SecurityModeFailure* message to lower layers for transmission, upon which the procedure ends.

5.3.5 RRC connection reconfiguration

5.3.5.1 General

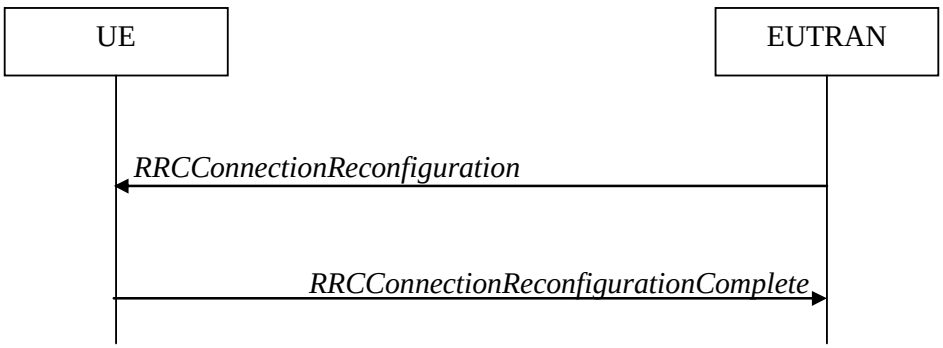

Figure 5.3.5.1-1: RRC connection reconfiguration, successful

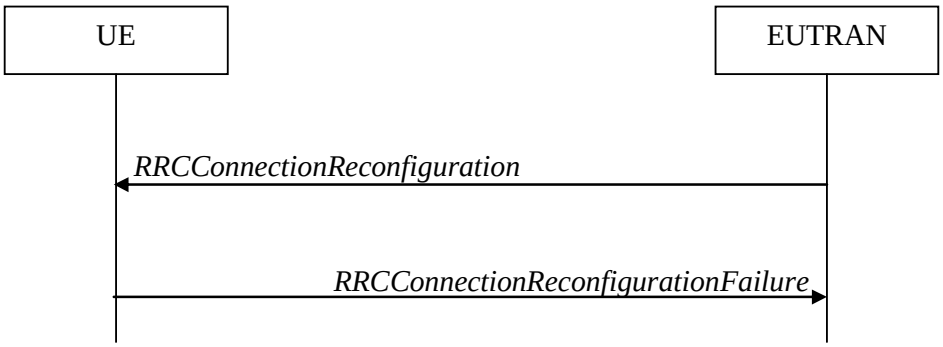

Figure 5.3.5.1-2: RRC connection reconfiguration, failure

The purpose of this procedure is to modify an RRC connection, e.g. to establish/ modify/ release RBs, to perform handover, to configure/ modify measurements. As part of the procedure, NAS dedicated information may be transferred from E-UTRAN to the UE.

5.3.5.2 Initiation

E-UTRAN may initiate the RRC connection reconfiguration procedure to a UE in RRC_CONNECTED. E-UTRAN applies the procedure as follows:

- the *mobilityControlInformation* is included only when AS-security has been activated;
- the establishment of RBs (other than SRB1, that is established during RRC connection establishment) is included only when AS-security has been activated;

5.3.5.3 Reception of the *RRCConnectionReconfiguration* by the UE

The UE shall:

1> If the RRCConnectionReconfiguration message includes the radioResourceConfiguration:

2> perform the Radio resource configuration procedure as specified in 5.3.9;

1> If the *RRCConnectionReconfiguration* message includes the ue-*RelatedInformation*:

2> set the C-RNTI to the value of the *newUE-Identity*, if received;

1> If the *RRCConnectionReconfiguration* message includes the *mobilityControlInformation*:

2> perform the handover procedure as specified in 5.3.6;

NOTE 1: Security reconfiguration only applies in case of a handover and hence is specified in the corresponding section.

1> If the *RRCConnectionReconfiguration* message includes the *nas-DedicatedInformation*:

2> Forward the *nas-DedicatedInformation* to upper layers;

1> If the *RRCConnectionReconfiguration* message includes the *measurementConfiguration*:

2> perform the Measurement configuration procedure as specified in 5.5.2;

NOTE 2: If the *RRCConnectionReconfiguration* message includes the establishment of radio bearers others than SRB1, the UE may start using these radio bearers immediately, i.e. there is no need to wait for an outstanding acknowledgment of the *SecurityModeComplete* message.

1> If the UE successfully completes all the procedures invoked by the *RRCConnectionReconfiguration* message:

2> perform the actions related to the transmission of the *RRCConnectionReconfigurationComplete* message as specified in 5.3.5.4.

2> the procedure ends.

1> else if the *RRCConnectionReconfiguration* message includes the *mobilityControlInformation*:

2> apply the handover failure procedure as specified in 5.3.6.3;

1> else:

2> revert back to the configuration used prior to the reception of the *RRCConnectionReconfiguration* message;

NOTE 3: If one or more procedure fails, the UE rejects all procedures invoked by the *RRCConnectionReconfiguration* message i.e. including the ones it is able to complete successfully.

2> perform the actions related to the transmission of the *RRCConnectionReconfigurationFailure* message as specified in 5.3.5.5.

5.3.5.4 Actions related to transmission of *RRCConnectionReconfigurationtComplete* message

The UE shall

1> submit the *RRCConnectionReconfigurationComplete* message to lower layers for transmission using the new configuration.

5.3.5.5 Actions related to transmission of *RRCConnectionReconfigurationtFailure* message

The UE shall

Editor's note: So far, the *RRCConnectionReconfigurationFailure* is a message not including any diagnostics information, i.e. not even an indication of the parts that cause the failure, e.g. the type of reconfiguration, the identity of a failed RB.

1> submit the *RRCConnectionReconfigurationFailure* message to lower layers for transmission, upon which the procedure ends.

5.3.6 Handover

NOTE: The UE should perform the handover as soon as possible following the reception of the RRC message triggering the handover, which could be before confirming successful reception (HARQ and ARQ) of this message.

Editor's note: When performing handover, the RRCConnectionReconfiguration message may not include all the DRBs that are established (partial handover). For the DRBs not included in the reconfiguration message, the UE behaviour upon handover needs to be specified.

5.3.6.1 Reception of the handover command

The UE shall:

1> start timer T304;

1> stop timer T310, if running;

1> if the *eutra-CarrierFreq* is included:

2> consider the target cell to be one on the frequency indicated by the *eutra-CarrierFreq* with a physical cell identity indicated by the *targetCellIdentity*;

1> else:

2> consider the target cell to be one on the current frequency with a physical cell identity indicated by the *targetCellIdentity*;

1> if the *dl-Bandwidth* is included:

2> for the target cell, apply the downlink bandwidth indicated by the *dl-Bandwidth;*

1> else:

2> for the target cell, apply the same downlink bandwidth as for the current cell*;*

1> if the *ul-Bandwidth* is included:

2> for the target cell, apply the uplink bandwidth indicated by the *ul-Bandwidth;*

1> else:

2> for the target cell, apply the same uplink bandwidth as for the current cell*;*

1> synchronise to the DL of the target cell;

1> configure lower layers in accordance with the received *semiStaticCommonChConfig*;

Editor's note: It has been agreed that the UE is not required to determine the SFN of the target cell by acquiring system information from that cell.

1> If the *RRCConnectionReconfiguration* message includes the *securityConfiguration*:

2> apply the AS-derived keys associated with the AS-base key indicated by the *keyIndicator*;

2> configure lower layers to apply the indicated integrity protection algorithm immediately, i.e. the new algorithm shall be applied to all subsequent messages received and sent by the UE, including the message used to indicate the successful completion of the procedure;

2> configure lower layers to apply the indicated ciphering algorithm immediately, i.e. the new algorithm shall be applied to all subsequent messages received and sent by the UE, including the message used to indicate the successful completion of the procedure;

Editor"s note The handling of the radio configuration is covered by the general reconfiguration procedure. It has been agreed that the configuration used in the target cell may either be specified as a delta to the one used in the serving cell or by providing the full configuration (signalling details are FFS)

Editor"s note Currently it is specified that the keyIndicator always needs to be provided upon handover as a result of which the securityConfiguration becomes mandatory in case of handover. If however the securityConfiguration would be optional in case of handover, the case the IE is not included needs to be covered also.

1> reset MAC and re-establish RLC for all RBs that are established;

1> indicate the occurrence of handover to PDCP;

NOTE: The handling of the radio bearers after the successful completion of handover, e.g. the re-transmission of unacknowledged PDCP SDUs (as well as the associated status reporting), the handling of the SN and the HFN, is specified in [8].

1> submit the *RRCConnectionReconfigurationComplete* message to lower layers for transmission.

5.3.6.2 Successful handover completion

1> If MAC indicates successful completion of the random access procedure:

2> stop timer T304;

Editor's note: So far no need has been identified for including handover related RRC information in the RRCConnectionReconfigurationComplete message (as would be specified in this section)

5.3.6.3 T304 expiry (handover failure)

The UE shall:

1> If T304 expires (handover failure):

2> start timer T311;

2> reset MAC and re-establish RLC for all RBs that are established;

NOTE Following T304 expiry dedicated preambles, if provided within the *DedicatedRandomAccessParams*, are not available for use by the UE anymore.

2> select a suitable cell in accordance with the cell selection process as specified in [4];

Editor's note: It has been agreed that the UE shall prioritise E-UTRA frequencies, but is allowed to select another RAT prior to T311 expiry. It is FFS if constraints will be specified regarding how long the UE shall refrain from considering other RATs.

2> revert back to the configuration used in the source cell (details are FFS);

Editor's note: The UE ignores the configuration received in the message triggering the handover and applies the source cell configuration e.g. C-RNTI. Further details are FFS, i.e. which part of the configuration is restored (e.g. upper parts of L2) and what part of the configuration is cleared (e.g. parts of/ complete L1-configuration)

2> Upon selecting an E-UTRA cell while T311 is running:

3> initiate the connection re-establishment procedure as specified in 5.3.7, upon which initiation the procedure ends.

2> Upon selecting an inter-RAT cell while T311 is running:

3> perform the actions upon moving from RRC_CONNECTED to RRC_IDLE as specified in 5.3.11.

Editor's note: The actions the UE shall perform upon T311 expiry are assumed to be covered by 5.3.10.5 i.e. it is assumed that there is no need to specify these requirements in this section also.

5.3.7 RRC connection re-establishment

5.3.7.1 General

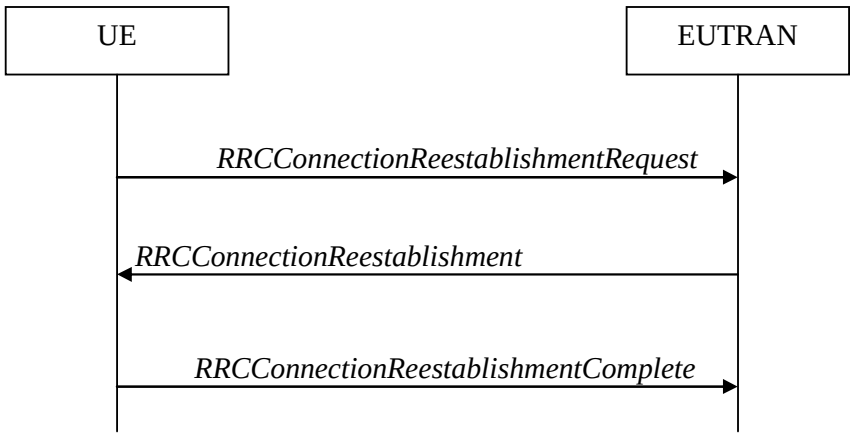

Figure 5.3.7.1-1: RRC connection e-establishment, successful

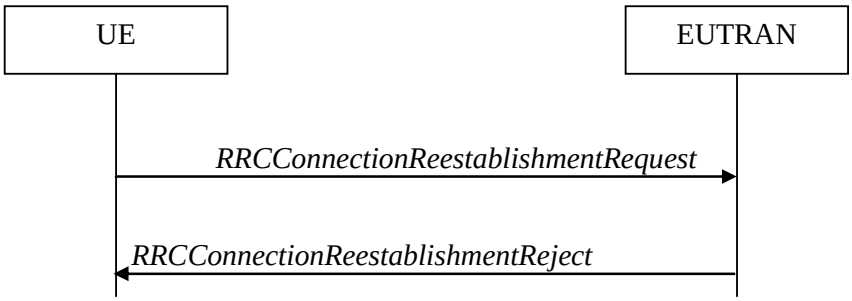

Figure 5.3.7.1-2: RRC connection re-establishment, failure

The purpose of this procedure is to re-establish the RRC connection, which involves the resumption of SRB1 operation and the re-activation of security.

A UE in RRC_CONNECTED, for which security has been activated, may initiate the procedure in order to continue the RRC connection. The connection re-establishment succeeds only if the concerned cell is prepared i.e. has a valid UE context. In case E-UTRAN accepts the re-establishment, SRB1 operation resumes while the operation of other radio bearers remains suspended. If security has not been activated, the UE does not initiate the procedure but instead moves to RRC_IDLE directly.

E-UTRAN applies the procedure as follows:

- to reconfigure SRB1 and to resume data transfer only for this RB;
- to re-activate security without changing algorithms.

5.3.7.2 Initiation

The UE shall only initiate the procedure when security has been activated. The UE initiates the procedure when one of the following conditions is met:

1> upon re-entry of the service area after having detected radio link failure, in accordance with 5.3.10; or

1> upon handover failure, in accordance with 5.3.6.3; or

1> when lower layers detect problems, as specified in TS 36.322 [7].

Upon initiation of the procedure, the UE shall:

1> reset MAC and re-establish RLC for all RBs that are established;

Editor's note:: It is FFS if, considering the different triggering conditions for this procedure, the start of T311 as well as the cell selection aspects are best specified as part of the re-establishment procedure. For the case of lower layer failure, the start of T311 and cell selection (if applicable) is missing.

1> initiate transmission of the *RRCConnectionReestablishmentRequest* message in accordance with 5.3.7.3;

5.3.7.3 Actions related to transmission of *RRCConnectionReestablishmentRequest* message

The UE shall set the contents of *RRCConnectionReestablishmentRequest* message as follows:

1> set the IE *ue-Identity* as follows:

2> set the *c-RNTI* to the C-RNTI used in the source cell (handover failure case) or used in the cell in which the trigger for the re-establishment occured (other cases);

2> set the *cellIdentity* to the Physical layer identity of the source cell (handover failure case) or of the cell in which the trigger for the re-establishment occured (other cases);

2> set the *authenticationCode* to a MAC-I calculated over:

3> the C-RNTI used in the source cell (handover failure case) or used in the cell in which the trigger for the re-establishment occured (other cases);

3> the Physical layer identity of the source cell (handover failure case) or of the cell in which the trigger for the re-establishment occured (other cases)

3> the identity of the target cell (details FFS)

Editor's note: SA3 indicated that a size of around 16 may be used for the MAC-I i.e. using truncation (see R2-081917).

The UE shall submit the *RRCConnectionReestablishmentRequest* message to lower layers for transmission.

5.3.7.4 Reception of the *RRCConnectionReestablishment* by the UE

NOTE: Prior to this, lower layers allocate a C-RNTI. For further details see TS 36.321 [6];

The UE shall:

1> Stop T311;

1> resume SRB1 after reconfiguring it in accordance with the received *radioResourceConfiguration* and as specified in 5.3.9;

Editor's note: It has been agreed that the procedure is the same irrespective of whether the UE returns to the same cell. So, e.g. the UE always derives a new AS base-key (K_{eNB})

1> configure lower layers to re-activate integrity protection using the previously configured algorithm immediately, i.e. integrity protection shall be applied to all subsequent messages received and sent by the UE, including the message used to indicate the successful completion of the procedure;

1> configure lower layers to apply ciphering using the previously configured algorithm immediately, i.e. ciphering shall be applied to all subsequent messages received and sent by the UE, including the message used to indicate the successful completion of the procedure;

1> send the *RRCConnectionReestablishmentComplete* message as specified in 5.3.7.5;

1> Resume the RRC connection with the restriction that the use of all radio bearers other than SRB1 is suspended until a subsequent *RRCConnectionReconfiguration* message is received;

Editor's note: A subsequent RRC connection reconfiguration procedure is used to re-activate the measurements. The concerned *RRCConnectionReconfiguration* message can, for the RLC/MAC & measurement configuration, either apply delta or full signalling. In case of "full signalling" the UE completely deletes the existing configuration and replaces this with the newly received configuration. The use of "full signalling" for PDCP is FFS, but should be aligned with what is agreed for handover. Upon successful connection re-establishment, the UE applies the same rules to the measurement configuration as defined for the case of handover.

5.3.7.5 Actions related to transmission of *RRCConnectionReestablishmentComplete* message

The UE shall set the contents of the *RRCConnectionReestablishmentComplete* message as follows:

1> FFS (To be specified)

5.3.7.6 Selected cell no longer suitable

When the selected cell becomes no longer suitable according to the cell selection criteria as specified in [4], the UE shall:

1> perform the actions upon moving from RRC_CONNECTED to RRC_IDLE as specified in 5.3.11.

Editor's note: It is up to upper layers to take further action. To facilitate this, the cause of the release may need to be indicated to upper layers.

5.3.7.7 RRC re-establishment reject

Upon receiving the *RRCConnectionReestablishmentReject* message, the UE shall:

1> perform the actions upon moving from RRC_CONNECTED to RRC_IDLE as specified in 5.3.11.

Editor's note: It is up to upper layers to take further action. To facilitate this, the cause of the release may need to be indicated to upper layers.

5.3.8 RRC connection release

5.3.8.1 General

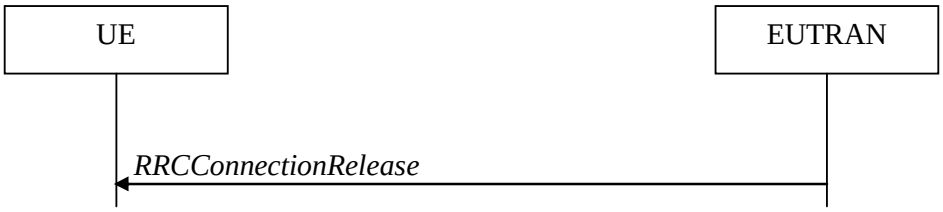

Figure 5.3.8.1-1: RRC connection release, successful

The purpose of this procedure is to release the RRC connection, which includes the release of the established radio bearers as well as all radio resources.

5.3.8.2 Initiation

E-UTRAN initiates the RRC connection release procedure to a UE in RRC_CONNECTED. It is FFS if redirection can be done from E-UTRAN before security is activated.

Editor's note: Awaiting reply from SA3 (in response to R2-080602)

5.3.8.3 Reception of the *RRCConnectionRelease* by the UE

The UE shall:

1> indicate the release of the RRC connection to upper layers;

1> release all radio resources no earlier than TBD ms from the moment the UE received the *RRCConnectionRelease* message;

NOTE: The time specified above enables lower layers to confirm successful reception of the release message.

1> If the *RRCConnectionRelease* message includes the *idleModeMobilityControlInfo*:

2> store the *idleModeMobilityControlInfo*

2> If the *cellReselectionPriorityExpiryTimer* is included:

3> start timer T320;

1> If the *RRCConnectionRelease* message includes the *redirectionInformation* :

2> select a suitable cell on the (E-UTRA or inter-RAT) frequency indicated by the *redirectionInformation* in accordance with the cell selection process as specified in [4];

1> enter RRC_IDLE.

5.3.9 Radio resource configuration

5.3.9.1 SRB addition/ modification

The UE shall:

1> if the received *radioResourceConfiguration* includes the *srb-ToAddModifyList*:

2> for each *srb-Identity* value included in the *srb-ToAddModifyList* that is not part of the current UE configuration (SRB establishment):

3> if the *rlc-Configuration* is set to "*explicit*":

4> establish an RLC entity in accordance with the received *RLC-Configuration* IE;

3> else if the *rlc-Configuration* is set to "*default*":

4> establish an RLC entity in accordance with the default configuration applicable for this *srb-identity* as specified in 9.2.1;

3> if the *logicalChannelConfig* is set to "*explicit*":

4> establish a DCCH logical channel in accordance with the received *LogicalChannelConfig* IE;

3> else if the *logicalChannelConfig* is set to "*default*":

4> establish a DCCH logical channel in accordance with the default configuration applicable for this *srb-identity* as specified in 9.2.1;

2> for each *srb-Identity* value included in the *srb-ToAddModifyList* that is part of the current UE configuration (SRB reconfiguration):

3> if the *rlc-Configuration* is set to "*explicit*":

4> reconfigure the RLC entity in accordance with the received *RLC-Configuration* IE;

3> else if the *rlc-Configuration* is set to "*default*":

4> reconfigure the RLC entity in accordance with the default configuration applicable for this *srb-identity* as specified in 9.2.1.1;

3> if the *logicalChannelConfig* is set to "*explicit*":

4> reconfigure the DCCH logical channel in accordance with the received *LogicalChannelConfig* IE;

3> else if the *logicalChannelConfig* is set to "*default*":

4> reconfigure the DCCH logical channel in accordance with the default configuration applicable for this *srb-identity* as specified in 9.2.1.1;

NOTE "Infinity" is the only applicable value for the *prioritizedBitRate* for SRB1 and SRB2

5.3.9.2 DRB release

The UE shall:

1> if the received *radioResourceConfiguration* includes the *drb-ToReleaseList*:

2> for each *drb-Identity* value included in the *drb-ToReleaseList* that is part of the current UE configuration (DRB release):

3> release the PDCP entity;

3> release the RLC entity;

3> release the DTCH logical channel;

2> indicate the release of the DRB(s) to upper layers;

5.3.9.3 DRB addition/ modification

NOTE: Reconfiguration of the RLC mode of DRBs is not supported

The UE shall:

1> if the received *radioResourceConfiguration* includes the *drb-ToAddModifyList*:

2> for each *drb-Identity* value included in the *drb-ToAddModifyList* that is not part of the current UE configuration (DRB establishment):

3> establish a PDCP entity in accordance with the received *PDCP-Configuration* IE;

3> establish an RLC entity in accordance with the received *RLC-Configuration* IE;

3> establish a DTCH logical channel in accordance with the received *LogicalChannelConfig* IE;

2> for each *drb-Identity* value included in the *drb-ToAddModifyList* that is part of the current UE configuration (DRB reconfiguration):

3> reconfigure the PDCP entity in accordance with the received *PDCP-Configuration* IE;

3> if the *rlc-ReestablishmentRequest is included,* re-establish RLC for the corresponding DRB;

3> reconfigure the RLC entity in accordance with the received *RLC-Configuration* IE;

3> reconfigure the DTCH logical channel in accordance with the received *LogicalChannelConfig* IE;

5.3.9.4 Transport channel reconfiguration

The UE shall:

1> if the received *radioResourceConfiguration* includes the *TransportChannelConfiguration*:

2> if the current UE configuration does not include a DL-SCH transport channel configuration (DL-SCH establishment):

3> if the *transportChannelConfig* is set to "*explicit":*

4> establish an DL-SCH transport channel in accordance with the received *dl-SCH-Configuration*;

3> else if the *transportChannelConfig* is set to "*default*":

4> establish a DL-SCH transport channel in accordance with the default configuration for SRB1 as specified in 9.2.1.1;

2> else:

3> if the *transportChannelConfig* is set to "*explicit":*

4> reconfigure the DL-SCH transport channel in accordance with the received *dl-SCH-Configuration*;

3> else if the *transportChannelConfig* is set to "*default*":

4> reconfigure the DL-SCH transport channel in accordance with the default configuration for SRB1 as specified in 9.2.1.1;

2> if the current UE configuration does not include a UL-SCH transport channel configuration (UL-SCH establishment):

3> if the *transportChannelConfig* is set to "*explicit"*

4> establish an UL-SCH transport channel in accordance with the received *ul-SCH-Configuration*;

3> else if the *transportChannelConfig* is set to "*default*":

4> establish a UL-SCH transport channel in accordance with the default configuration for SRB1 as specified in 9.2.1.1;

2> else:

3> if the *transportChannelConfig* is set to "*explicit"*

4> reconfigure the UL-SCH transport channel in accordance with the received *dl-SCH-Configuration*;

3> else if the *transportChannelConfig* is set to "*default"*:

4> reconfigure the UL-SCH transport channel in accordance with the default configuration for SRB1 as specified in 9.2.1.1;

5.3.9.5 Physical channel reconfiguration

The UE shall:

1> if the received *radioResourceConfiguration* includes the *physicalChConfiguration*:

2> if the current UE configuration does not include a physical channel configuration (physical channel establishment):

3> establish the physical channel configuration in accordance with the received *physicalChConfiguration*;

2> else:

3> reconfigure the physical channel configuration in accordance with the received *physicalChConfiguration*;

1> apply the default configuration applicable for the *antennaInformation* as specified in 9.2.3, until explicitly receiving a configuration;

5.3.10 Radio link failure related actions

5.3.10.1 Initiation

The UE shall:

1> while T300, T304 or T311 is running:

2> do not act upon radio link problem indications provided by lower layers, i.e. neither act upon receiving indications about physical layer failure problems nor upon receiving indications about Random Access (RA) problems;

NOTE Radio link problems is the term used to cover the following lower layer problems: physical layer problem, Random Access problem

Upon detecting physical layer problems, the UE shall:

1> start a timer T310.

The criteria for detecting physical layer problems are FFS i.e. whether RRC considers this condition to be met upon receiving a certain number of physical layer failure indications within a predefined time-period.

It is FFS if a counter will be used instead of timer T310.

Upon receiving a Random Access problem indication from the MAC, the UE shall:

1> start a timer T312.

5.3.10.2 Radio link recovery

Upon detecting physical layer recovery while T310 was running, the UE shall:

1> stop timer T310.

NOTE In this case, the UE resumes the RRC connection without explicit signalling i.e. the UE resumes the entire radio resource configuration.

The criteria for detecting physical layer recovery are FFS.

Upon receiving an indication that the MAC recovered from the Random Access problem while T312 was running, the UE shall:

1> stop timer T312.

5.3.10.3 T310 or T312 expiry

Upon T310 or T312 expiry, the UE detects radio link failure and shall:

1> If security is not activated:

2> perform the actions upon moving from RRC_CONNECTED to RRC_IDLE as specified in 5.3.11;

1> else:

2> stop timer T310, if running;

2> stop timer T312, if running;

2> start timer T311;

2> select a suitable cell in accordance with the cell selection process as specified in [4].

Editor's note: It has been agreed that the UE shall prioritise E-UTRA frequencies, but is allowed to select another RAT prior to T311 expiry. It is FFS if constraints will be specified regarding how long the UE shall refrain from considering other RATs.

5.3.10.4 Re-entry of service area while T311 is running

Upon selecting an E-UTRA cell while T311 is running, the UE shall:

1> initiate the Connection re-establishment procedure as specified in 5.3.7.

NOTE This procedure applies also if the UE returns to the source cell

The criteria for re-entry of service area, i.e. for detecting "in service" are FFS.

Upon selecting an inter-RAT cell while T311 is running, the UE shall:

1> perform the actions upon moving from RRC_CONNECTED to RRC_IDLE as specified in 5.3.11.

5.3.10.5 T311 expiry

Upon T311 expiry, the UE shall:

1> perform the actions upon moving from RRC_CONNECTED to RRC_IDLE as specified in 5.3.11.

Editor's note: It is up to upper layers to take further action. To facilitate this, the cause of the release may need to be indicated to upper layers.

5.3.11 UE actions upon moving from RRC_CONNECTED to RRC_IDLE

Upon moving from RRC_CONNECTED to RRC_IDLE, the UE shall:

1> reset MAC and re-establish RLC for all RBs that are established;

Editor's note: The above is to stop ongoing procedures e.g. random access.

1> stop all timers, if one or more is running;

1> release all radio resources;

1> indicate the release of the RRC connection to upper layers;

1> enter RRC_IDLE.

5.4 Inter-RAT mobility

5.4.1 Introduction

The general principles of connected mode mobility are described in 5.3.1.3. In case of mobility to CDMA2000, the eNB decides when to move to the other RAT while the target RAT determines to which cell the UE shall move.

For inter RAT mobility from E-UTRA a single procedure is defined that supports both handover and cell change order possibly with network assistance (NACC).

The general principles of the security handling upon connected mode mobility are described in 5.3.1.2.

NOTE The E-UTRA procedures are based on the assumption that handover to E-UTRA is performed only after integrity protection has been activated in UTRAN

5.4.2 Handover to E-UTRA

5.4.2.1 General

Editor's note: It may be desirable to avoid, to some extend, duplication of specification for parts that are common for the regular RRC connection reconfiguration procedure and the inter RAT handover case.

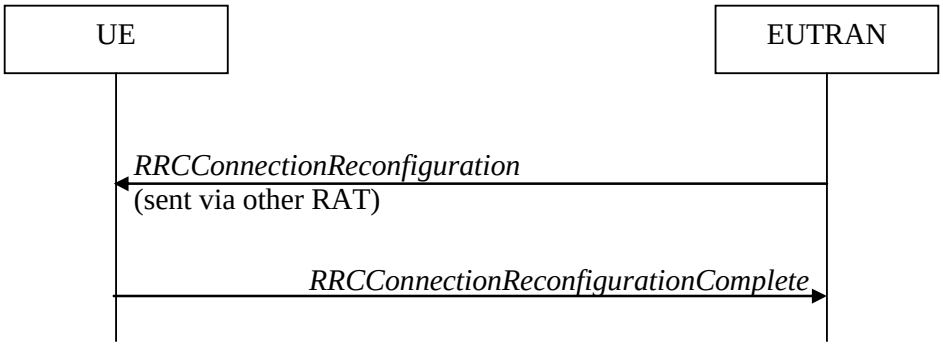

Figure 5.4.2.1-1: Handover to E-UTRA, successful

The purpose of this procedure is to, under the control of the network, transfer a connection between the UE and another Radio Access Network (e.g. GERAN or UTRAN) to E-UTRAN.

The handover to E-UTRA procedure applies when SRBs, possibly in combination with DRBs, are established in another RAT.

E-UTRAN applies the procedure as follows:

- to activate ciphering, possibly using NULL algorithm, if not yet activated in the other RAT ;
- to establish SRB1, SRB2 and one or more DRBs i.e. at least the DRB associated with the default EPB bearer is established;

Editor's note: The entire procedure needs updating to align with the regular handover procedure.

5.4.2.2 Initiation

The RAN using another RAT initiates the Handover to E-UTRA procedure, in accordance with the specifications applicable for the other RAT, by sending the *RRCConnectionReconfiguration* message via the radio access technology from which the inter-RAT handover is performed.

5.4.2.3 Reception of the *RRCConnectionReconfiguration* by the UE

The UE shall:

1> act upon the received radio configuration in accordance with 5.3.9.

1> request MAC to perform the random acess procedure as specified in TS 36.321 [6], using the applicable (e.g. random access/ PRACH) configuration parameters.

Editor's note: The structure should be re-organised with the conditions for success/ failure specified jointly in this subclause, while the following subclauses specify the subsequent UE actions, i.e. with ..4 being actions related to setting the reconfiguration complete and ..5 the actions related to setting the failure message.

5.4.2.4 Successful completion of the handover to E-UTRA

The UE shall:

Editor's note: There may be a need to re-map information regarding e.g. EPS bearers, security context, initialisation of variables

1> If the UE successfully completes Handover to E-UTRA procedure (details to be specified):

Editor's note: The conditions for success/ failure need to be clarified i.e. integrity failure, use of a timer similar to T304, etc.

2> configure lower layers to apply integrity protection using the indicated algorithm immediately, i.e. integrity protection shall be applied to all subsequent messages received and sent by the UE, including the message used to indicate the successful completion of the procedure;

2> configure lower layers to apply ciphering using the indicated algorithm immediately, i.e. ciphering shall be applied to all subsequent messages received and sent by the UE, including the message used to indicate the successful completion of the procedure;

2> set the contents *RRCConnectionReconfigurationComplete* message as follows:

3> Tbs

2> submit the *RRCConnectionReconfigurationComplete* message to lower layers for transmission,

2> enter E-UTRA RRC_CONNECTED, upon which the procedure ends.

To be completed

5.4.2.5 Handover to E-UTRA failure

The UE shall:

1> If the UE fails to connect to the target cell indicated in the *RRCConnectionReconfiguration* message OR

Editor's note: Further details need to be specified regarding when the UE shall assume it succeeds to connect, e.g. receiving a response to a RACH preamble

1> if the *RRCConnectionReconfiguration* message content is not supported by the UE (need to specify the UE behaviour for this error case is FFS):

2> act in accordance with the specifications applicable for the other RAT for this failure case;

5.4.3 Mobility from E-UTRA

5.4.3.1 General

Figure 5.4.3.1-1: Mobility from E-UTRA, successful

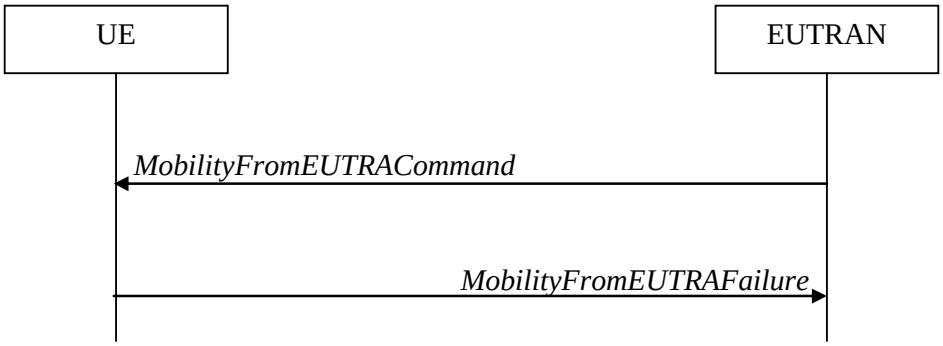

Figure 5.4.3.1-2: Mobility from E-UTRA, failure

The purpose of this procedure is to move a UE in RRC_CONNECTED to a cell using another Radio Access Technology (RAT), e.g. GERAN, UTRA or CDMA2000 systems. The mobility from E-UTRA procedure covers both:

- handover, i.e. the *MobilityFromEUTRACommand* message includes radio resources that have been allocated for the UE in the target cell and
- cell change order, i.e. the *MobilityFromEUTRACommand* message may include information facilitating access of and/ or connection establishment in the target cell, e.g. system information. Cell change order is applicable only to GERAN.

The mobility from E-UTRA procedure applies when SRBs are established, possibly in combination with DRBs.

5.4.3.2 Initiation

E-UTRAN initiates the mobility from E-UTRA procedure to a UE in RRC_CONNECTED, possibly in response to a *MeasurementReport* message by sending a *MobilityFromEUTRACommand* message. E-UTRA initiates the procedure only when security has been activated.

5.4.3.3 Reception of the *MobilityFromEUTRACommand* by the UE

The UE shall:

1> If the inter RAT message included in the *MobilityFromEUTRACommand* message concerns a "handover command":

2> access the target cell indicated in the *MobilityFromEUTRACommand* message using the dedicated resources included in the inter RAT message in accordance with the specifications of the other RAT;

2> If the *MobilityFromEUTRACommand* message includes a subset of the established DRBs (FFS):

3> inform upper layers about the failure to continue the DRBs not included in the *MobilityFromEUTRACommand* message;

1> else (inter RAT message does not concern a "handover command"):

2> establish the connection to the target cell indicated in the *MobilityFromEUTRACommand* message in accordance with the specifications of the other RAT and the inter RAT message(s) included in the *MobilityFromEUTRACommand* message;

5.4.3.4 Successful completion of the mobility from E-UTRA

Upon successfully completing the handover, the UE shall:

1> clear or set variables upon leaving E-UTRA RRC_CONNECTED as specified in subclause XX.X.

Editor's note: There may be a need to re-map information regarding, e.g. EPS bearers, security as well as clearing of variables, UE context. Also, timers monitoring the successful completion (if specified), may need to be stopped.

To be specified

5.4.3.5 Mobility from E-UTRA failure

The UE shall:

1> If the UE fails to connect to the target cell indicated in the *MobilityFromEUTRACommand* message:

2> If the UE succeeds to revert back to the source E-UTRA cell and the configuration used prior to the reception of the *MobilityFromEUTRACommand* message (FFS):

Editor's note: Further details need to be specified regarding the (part of the) previously used configuration that the UE shall resume.

3> send a *MobilityFromEUTRAFailure* message;

2> else:

3> act as specified for the case of detecting radio link failure (FFS);

The details of the handover failure handling are FFS, i.e. whether the failure handling is the same for handover and cell change order, whether RL failure operation will be re-used, whether UE shall (always) revert to source cell

5.4.4 Handover from E-UTRA preparation request (CDMA2000)

5.4.4.1 General

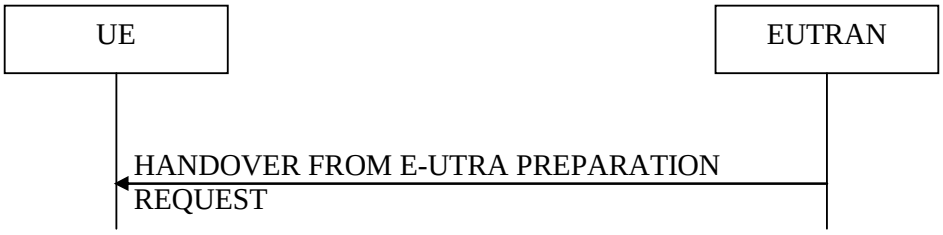

Figure 5.4.4.1-1: Handover from E-UTRA preparation request

The purpose of this procedure is to trigger the UE to prepare for handover to CDMA2000 by requesting a connection with this network. This procedure applies to CDMA2000 capable UEs only.

The Handover from E-UTRA preparation request procedure applies when signalling radio bearers are established.

5.4.4.2 Initiation

E-UTRAN initiates the Handover from E-UTRA preparation request procedure to a UE in RRC_CONNECTED, possibly in response to a *MeasurementReport* message by sending a *HandoverFromEUTRAPreparationRequest* message. E-UTRA initiates the procedure only when security has been activated.

5.4.4.3 Reception of the *HandoverFromEUTRAPreparationRequest* by the UE

Upon reception of the *HandoverFromEUTRAPreparationRequest* message, the UE shall:

1> Indicate the request to prepare handover and forward the *cdma2000-Type* and the cdma2000-DedicatedInfo to the CDMA upper layers;

1> If cdma2000-Type = type1XRTT forward the cdma2000-RAND to the CDMA upper layers.

Upon receiving the request to prepare handover, CDMA upper layers establish a connection with the CDMA network. This involves exchanging CDMA2000 dedicated information, using the UL/ DL information transfer procedure.

Editor's note: It is desirable to specify the requirements listed in the above paragraph elsewhere since it is outside the scope of this specification.

5.4.5 UL handover preparation transfer (CDMA2000)

5.4.5.1 General

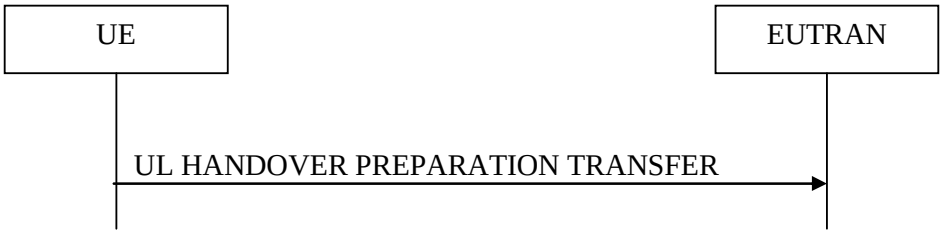

Figure 5.4.5.1-1: UL handover preparation transfer

The purpose of this procedure is to tunnel the handover related CDMA2000 dedicated information from UE to E-UTRAN when requested by the higher layers. The procedure is triggered by the higher layers on receipt of *HandoverFromEUTRAPreparationRequest* message. This procedure applies to CDMA2000 capable UEs only.

5.4.5.2 Initiation

A UE in RRC_CONNECTED initiates the UL Handover Preparation Transfer procedure whenever there is a need to transfer handover related non-3GPP dedicated information. The UE initiates the UL handover preparation transfer procedure by sending the *ULHandoverPreparationTransfer* message.

5.4.5.3 Actions related to transmission of the *ULHandoverPreparationTransfer* message

The UE shall set the contents of the ULHandoverPreparationTransfer message as follows:

1> Include the cdma2000-Type and the cdma2000-DedicatedInfo;

1> If the cdma2000-Type = type1XRTT:

2> Set the cdma2000-MEID to the value received from the CDMA2000 upper layers

5.4.5.4 Failure to deliver the *ULHandoverPreparationTransfer* message

The UE shall:

1> If the UE is unable to guarantee successful delivery of ULHandoverPreparationTransfer messages:

2> Inform upper layers about the possible failure to deliver the information contained in the concerned ULHandoverPreparationTransfer message;

5.5 Measurements

5.5.1 Introduction

The UE reports measurement information in accordance with the measurement configuration as provided by E-UTRAN. E-UTRAN provides the measurement configuration applicable for a UE in RRC_CONNECTED state by means of dedicated signalling, i.e. using the *RRCConnectionReconfiguration* message. The measurement configuration includes the following parameters:

1. **Measurement type**: The following measurement types have been defined.

   - Intra-frequency measurements: measurements at the downlink carrier frequency of the serving cell.

   - Inter-frequency measurements: measurements at frequencies that differ from the downlink carrier frequency of the serving cell.

   - Inter-RAT measurements of UTRA frequencies.

   - Inter-RAT measurements of GERAN frequencies.

   - Inter-RAT measurements of CDMA2000 HRPD or 1xRTT frequencies.

2. **Measurement objects:** The objects on which the UE shall perform the measurements.

   - For intra-frequency and inter-frequency measurements a measurement object is a single E-UTRA carrier frequency. Associated with this carrier frequency, E-UTRAN can configure a list of cell specific offsets and a list of "blacklisted" cells. Blacklisted cells are not considered in event evaluation or measurement reporting.

   - For inter-RAT UTRA measurements a measurement object is a set of cells on a single UTRA carrier frequency.

   - For inter-RAT GERAN measurements a measurement object is a set of GERAN carrier frequencies.

   - For inter-RAT CDMA2000 measurements a measurement object is a set of cells on a single (HRPD or 1xRTT) carrier frequency.

3. **Reporting configurations**: A list of reporting configurations where each reporting configuration consists of the following:

   - Reporting criteria: The criteria that triggers the UE to send a measurement report. This can either be periodical or a single event description.

   - Reporting format: The quantities that the UE includes in the measurement report and associated information (e.g. number of cells to report).

4. **Measurement identities**: A list of measurement identities where each measurement identity links one measurement object with one reporting configuration. By configuring multiple measurement identities it is possible to link more than one measurement object to the same reporting configuration, as well as to link more than one reporting configuration to the same measurement object. The measurement identity is used as a reference number in the measurement report.

5. **Quantity configurations:** One quantity configuration is configured for intra-frequency measurements, one for inter-frequency measurements and one per RAT type. The quantity configuration defines the measurement quantities and associated filtering used for all event evaluation and related reporting of that measurement type. One filter can be configured per measurement quantity.

6. **Measurement gaps:** Periods that the UE may use to perform measurements, i.e. no (UL, DL) transmissions are scheduled. It is FFS if the measurement gaps are common for all gap assisted measurements.

E-UTRAN only configures a single Measurement object for a given frequency, i.e. it is not possible to configure two or more Measurement objects for the same frequency with different associated parameters, e.g. different offsets and/ or blacklists. E-UTRAN may configure multiple instances of the same event e.g. by configuring two reporting configurations with different thresholds.

The Measurement objects are specified per RAT type, with the E-UTRA measurement object list including both the intra-frequency object and the inter-frequency object(s). The Reporting configuration includes separate lists for E-UTRA, Inter-RAT, and for periodical reporting configurations. The E-UTRA reporting configuration list includes both intra- and inter-frequency reporting configurations (and events). There is a single Measurement identities list. Any E-UTRA measurement object can be linked to any E-UTRA reporting configuration. Some E-UTRA reporting configurations may not be linked to a measurement object (or to a "NULL" object).

Editor's note: The use of other measurement configuration parameters, e.g. Measurement validity is FFS.

The UE measures and reports the following types of cells:

1. The serving cell.
2. Listed cells - these are cells listed within the measurement object(s).
3. Detected cells - these are cells that are not listed within the measurement object(s) but are detected by the UE on the carrier frequency(ies) indicated by the measurement object(s).

For E-UTRA, the UE measures and reports on the serving cell, listed cells and detected cells. For Inter-RAT UTRA the UE measures and reports on listed cells. For Inter-RAT GERAN the UE measures and reports on detected cells. For Inter-RAT CDMA2000 the UE measures and reports on listed cells.

Editor's note: RAN2 specifications are based on the assumption that CSG cells of home deployment type are not be indicated within the neighbour list. Furthermore, the assumption is that for non-home deployments, the physical layer identity is unique within the area of a large macro cell (i.e. as for UTRAN).

Editors note: It is FFS if w.r.t. measurement gap configuration additional mechanisms are required to support handover to a CSG cell of home deployment type e.g. whether for this mobility scenario the UE should request the measurement gap.

5.5.2 Measurement configuration

5.5.2.1 General

The UE shall:

1> if the received *measurementConfiguration* includes the *measObjectToRemoveList*:

2> perform the Measurement object removal procedure as specified in 5.5.2.4;

1> if the received *measurementConfiguration* includes the *measObjectToAddModifyList*:

2> perform the Measurement object addition/ modification procedure as specified in 5.5.2.5;

1> if the received *measurementConfiguration* includes the *reportConfigToRemoveList*:

2> perform the Reporting configuration removal procedure as specified in 5.5.2.6;

1> if the received *measurementConfiguration* includes the *reportConfigToAddModifyList*:

2> perform the Reporting configuration addition/ modification procedure as specified in 5.5.2.7;

1> if the received *measurementConfiguration* includes the *measIdToRemoveList*:

2> perform the Measurement identity removal procedure as specified in 5.5.2.2;

1> if the received *measurementConfiguration* includes the *measIdToAddModifyList*:

2> perform the Measurement identity addition/ modification procedure as specified in 5.5.2.3;

1> if the received *measurementConfiguration* includes the *quantityConfig*:

2> perform the Quantity configuration procedure as specified in 5.5.2.8;

1> if the received *measurementConfiguration* includes the *measGapConfig*:

2> perform the Measurement gap configuration procedure as specified in 5.5.2.9;

1> if the received *measurementConfiguration* includes the *s-Measure*:

2> set the parameter *s-Measure* within *VarMeasurementConfiguration* to the received value of *s-Measure*;

1> if the IE *hrpd-PreRegistrationInfo* is included:

2> forward the *hrpd-PreRegistrationInfo* to CDMA upper layers;

1> if the received *measurementConfiguration* includes the *mbsfn-NeighbourCellConfig*:

2> set the parameter *mbsfn-NeighbourCellConfig* within *VarMeasurementConfiguration* to the received value of *mbsfn-NeighbourCellConfig*;

5.5.2.2 Measurement identity removal

The UE shall:

1> for each *measId* value included in the *measIdToRemoveList*:

2> remove the entry, from the parameter *measIdList* within *VarMeasurementConfiguration*, with the corresponding *measId* value;

Editors note It has been agreed that if the UE should NOT autonomously delete any unused measurement objects or reporting configurations.

5.5.2.3 Measurement identity addition/ modification

The UE shall:

1> for each *measId* value included in the *measIdToAddModifyList*:

2> if an entry is included in the parameter *measIdList* within *VarMeasurementConfiguration* with the corresponding *measId* value:

3> set the entry with the corresponding *measId* value within *VarMeasurementConfiguration* to the corresponding entry of the received parameter *measIdToAddModifyList*;

2> else:

3> add the entry with the corresponding *measId* value to the *VarMeasurementConfiguration* and set it to the corresponding entry of the received parameter *measIdToAddModifyList*;

Editors note It has been agreed that if the UE should NOT autonomously delete any unused measurement objects or reporting configurations.

5.5.2.4 Measurement object removal

The UE shall:

1> for each *measObjId* value included in the *MeasObjectToRemoveList*:

2> remove, from the parameter *MeasObjectList* within *VarMeasurementConfiguration*, the entry with the corresponding *measObjId* value;

2> remove, from the parameter *measIdList* within *VarMeasurementConfiguration*, the entry(ies) with the corresponding *measObjId* value, if included;

5.5.2.5 Measurement object addition/ modification

The UE shall:

1> for each *measObjId* value included in the *measObjectToAddModifyList*:

2> if an entry is included in the parameter *measObjectList* within *VarMeasurementConfiguration* with the corresponding *measObjId* value:

3> set the entry with the corresponding *measObjId* value within *VarMeasurementConfiguration* to the corresponding entry of the received parameter *measObjectToAddModifyList*;

2> else:

3> add the entry with the corresponding *measObjId* value to the *VarMeasurementConfiguration* and set it to the corresponding entry of the received parameter *measObjectToAddModifyList*;

5.5.2.6 Reporting configuration removal

The UE shall:

1> for each *reportConfigId* value included in the *reportConfigToRemoveList*:

2> remove, from the parameter *reportConfigList* within *VarMeasurementConfiguration*, the entry with the corresponding *reportConfigId* value;

2> remove, from the parameter *measIdList* within *VarMeasurementConfiguration*, the entry(ies) with the corresponding *reportConfigId* value, if included;

5.5.2.7 Reporting configuration addition/ modification

The UE shall:

1> for each *reportConfigId* value included in the *reportConfigToAddModifyList*:

2> if an entry is included in the parameter *reportConfigList* within *VarMeasurementConfiguration* with the corresponding *reportConfigId* value:

3> set the entry with the corresponding *reportConfigId* value within *VarMeasurementConfiguration* to the corresponding entry of the received parameter *reportConfigToAddModifyList*;

2> else:

3> add the entry with the corresponding *reportConfigId* value to the *VarMeasurementConfiguration* and set it to the corresponding entry of the received parameter *reportConfigToAddModifyList*;

5.5.2.8 Quantity configuration

If the IE *QuantityConfig* is received the UE shall, depending on the measurement quantity, apply filtering of the measurements for that measurement quantity according to the formula below. This filtering shall be performed by the UE before UE event evaluation. The UE shall depending on the reporting quantity also filter the measurements reported in the IE *MeasuredResults*. The filtering shall be performed according to the following formula.

$$F_n = (1-a) \cdot F_{n-1} + a \cdot M_n$$

The variables in the formula are defined as follows:

$\boldsymbol{F_n}$ is the updated filtered measurement result

$\boldsymbol{F_{n-1}}$ is the old filtered measurement result

$\boldsymbol{M_n}$ is the latest received measurement result from physical layer measurements, the unit used for $\boldsymbol{M_n}$ is the same unit as the reported unit in the *MeasurementReport* message or the unit used in the event evaluation.

$\boldsymbol{a} = 1/2^{(k/4)}$, where k is the parameter received in the *filterCoefficent* field of the IE *QuantityConfig*.

NOTE: if $\boldsymbol{k}$ is set to 0 that will mean no layer 3 filtering.

In order to initialise the averaging filter, $\boldsymbol{F_0}$ is set to $\boldsymbol{M_1}$ when the first measurement result from the physical layer measurement is received.

The physical layer measurement results are sampled once every measurement period. Both the measurement period and the accuracy for a certain measurement are defined in [2].

Layer 3 filtering is applicable to all UE measurement quantities listed in [1]. The layer 3 filtering shall be performed in the same domain as the measurement or reporting is done, i.e. logarithmic filtering for logarithmic measurements, etc.

There shall only be one layer 3 filter per measurement quantity.

Editors note For E-UTRA, it is possible to configure more than one measurement quantity (RSRP, RSRQ) for triggering/ reporting. Nevertheless, there currently is only one filter configuration for E-UTRA. It is FFS if for E-UTRA more than one filter configuration should be supported i.e. one for each quantity.

5.5.2.9 Measurement gap configuration

The UE shall:

1> if *gapActivation* is set to *activate*

2> if a measurement gap configuration is active, deactivate the measurement gap configuration;

2> activate the measurement gap configuration indicated by the received *gapPattern* at the SFN and subframe number indicated by the parameters *startSFN* and *startSubframeNumber*.

1> else

2> deactivate the measurement gap configuration.

5.5.3 Measurement report triggering

5.5.3.1 General

The UE shall:

1> If measurement gaps are active or the UE does not require measurement gaps:

2> If Smeasure is not configured or

2> If Smeasure is configured and the serving cell quality (RSRP value) is lower than this value:

3> Peform measurements of neighbouring cells and evaluation of reporting criteria as specified in the following;

1> for each measId included in the measIdList within *VarMeasurementConfiguration*:

2> if the entry condition applicable for this event, i.e. the event corresponding with the eventId of the corresponding reportConfig within *VarMeasurementConfiguration*, is fulfilled for one or more cells applicable for this event for a duration exceeding the value of timeToTrigger defined for this event within the *VarMeasurementConfiguration*

3> if the *reportInterval* defined within the *VarMeasurementConfiguration* for this event is not equal to 0:

4> set the *periodicalReportingOngoing* defined within the V*arEventsTriggered* for this event to *TRUE;*

3> set the *numberOfReportsSent* defined within the V*arEventsTriggered* for this event to 0;

3> include the concerned cell(s) in the *cellsToReportList* defined within the V*arEventsTriggered* for this event, if not included;

3> initiate the measurement reporting procedure, as specified in 5.5.4;

2> Upon expiry of the periodical reporting timer for this:

3> initiate the measurement reporting procedure, as specified in 5.5.4;

2> if the leaving condition applicable for this event is fulfilled for one or more of the cells included in the *cellsToReportList* defined within the V*arEventsTriggered* for this event for a duration exceeding the value of *timeToTrigger* defined within the *VarMeasurementConfiguration* for this event:

3> remove the concerned cell(s) in the *cellsToReportList* defined within the V*arEventsTriggered* for this event;

5.5.3.2 Event A1 (Serving becomes better than threshold)

The UE shall:

1> apply equation A1-1, as specified below, as the entry condition for this event;

1> apply equation A1-2, as specified below, as the leaving condition for this event;

Equation A1-1 (Entering condition)

$$Ms - Hys > Thresh$$

Equation A1-2 (Leaving condition)

$$Ms + Hys < Thresh$$

The variables in the formula are defined as follows:

Ms is the measurement result of the serving cell, not taking into account any cell individual offset.

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Thresh is the threshold parameter for this event (i.e. *a1-Threshold* as defined within the *VarMeasurementConfiguration* for this event)

Ms is expressed in dBm

Hys, Thres are expressed in dB

5.5.3.3 Event A2 (Serving becomes worse than threshold)

The UE shall:

1> apply equation A2-1, as specified below, as the entry condition for this event;

1> apply equation A2-2, as specified below, as the leaving condition for this event;

Equation A2-1 (Entering condition)

$$Ms - Hys < Thresh$$

Equation A2-2 (Leaving condition)

$$Ms + Hys > Thresh$$

The variables in the formula are defined as follows:

Ms is the measurement result of the serving cell, not taking into account any cell individual offset.

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Thresh is the threshold parameter for this event (i.e. *a2-Threshold* as defined within the *VarMeasurementConfiguration* for this event)

Ms is expressed in dBm

Hys, Thres are expressed in dB

5.5.3.4 Event A3 (Neighbour becomes offset better than serving)

The UE shall:

1> apply equation A3-1, as specified below, as the entry condition for this event;

1> apply equation A3-2, as specified below, as the leaving condition for this event;

Equation A3-1 (Entering condition)

$$Mn + Ofn + Ocn - Hys > Ms + Ofs + Ocs + Off$$

Equation A3-2 (Leaving condition)

$$Mn + Ofn + Ocn + Hys < Ms + Ofs + Ocs + Off$$

The variables in the formula are defined as follows:

Mn is the measurement result of the neighbouring cell.

Ofn is the frequency specific offset of the frequency of the neighbour cell

Ocn is the cell specific offset of the neighbour cell

Ms is the measurement result of the serving cell, not taking into account any cell individual offset.

Ofs is the frequency specific offset of the serving frequency

Ocs is the cell specific offset of the serving cell

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Off is the offset parameter for this event (i.e. *a3-Offset* as defined within the *VarMeasurementConfiguration* for this event)

Mn, Ms are expressed in dBm

Ofn, Ocn, Ofs, Ocs, Hys, Off are expressed in dB

5.5.3.5 Event A4 (Neighbour becomes better than threshold)

The UE shall:

1> apply equation A4-1, as specified below, as the entry condition for this event;

1> apply equation A4-2, as specified below, as the leaving condition for this event;

Equation A4-1 (Entering condition)

$$Mn + Ofn + Ocn - Hys > Thresh$$

Equation A4-2 (Leaving condition)

$$Mn + Ofn + Ocn + Hys < Thresh$$

The variables in the formula are defined as follows:

Mn is the measurement result of the neighbouring cell

Ofn is the frequency specific offset of the frequency of the neighbour cell

Ocn is the cell specific offset of the neighbour cell

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Thresh is the threshold parameter for this event (i.e. *a4-Threshold* as defined within the *VarMeasurementConfiguration* for this event)

Mn is expressed in dBm

Ofn, Ocn, Hys, Thresh are expressed in dB

5.5.3.6 Event A5 (Serving becomes worse than threshold1 and neighbour becomes better than threshold2)

The UE shall:

1> apply equation A5-1 and equation A5-2 i.e. both have to be fulfilled, as specified below, as the entry equation for this event;

1> apply equation A5-3 and equation A5-4 i.e. at least one of the two has to be fulfilled, as specified below, as the leaving equation for this event;

Equation A5-1 (Entering condition 1)

$$Ms - Hys < Thresh1$$

Equation A5-2 (Entering condition 2)

$$Mn + Ofn + Ocn - Hys > Thresh2$$

Equation A5-3 (Leaving condition 1)

$$Ms + Hys > Thresh1$$

Equation A5-4 (Leaving condition 2)

$$Mn + Ofn + Ocn + Hys < Thresh2$$

The variables in the formula are defined as follows:

Ms is the measurement result of the serving cell, not taking into account any cell individual offset.

Mn is the measurement result of the neighbouring cell.

Ofn is the frequency specific offset of the frequency of the neighbour cell

Ocn is the cell specific offset of the neighbour cell

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Thresh1 is the threshold parameter for this event (i.e. *a5-Threshold1* as defined within the *VarMeasurementConfiguration* for this event)

Thresh2 is the threshold parameter for this event (i.e. *a5-Threshold2* as defined within the *VarMeasurementConfiguration* for this event)

Mn, Ms are expressed in dBm

Ofn, Ocn, Hys, Thresh1, Thresh2 are expressed in dB

5.5.3.7 Event B1 (Inter RAT neighbour becomes better than threshold)

The UE shall:

1> for UTRA and CDMA2000, only trigger the event for cells included in the corresponding measurement object;

1> apply equation B1-1, as specified below, as the entry condition for this event;

1> apply equation B1-2, as specified below, as the leaving condition for this event;

Equation B1-1 (Entering condition)

$$Mn + Ofn - Hys > Thresh$$

Equation B1-2 (Leaving condition)

$$Mn + Ofn + Hys < Thresh$$

The variables in the formula are defined as follows:

Mn is the measurement result of the neighbouring inter RAT cell.

Ofn is the frequency specific offset of the frequency of the neighbour cell

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Thresh is the threshold parameter for this event (i.e. *b1-Threshold* as defined within the *VarMeasurementConfiguration* for this event)

Mn is expressed in dBm

Ofn, Hys, Thresh are expressed in dB

5.5.3.8 Event B2 (Serving becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2)

The UE shall:

1> for UTRA and CDMA2000, only trigger the event for cells included in the corresponding measurement object;

1> apply equation B2-1 and equation B2-2 i.e. both have to be fulfilled, as specified below, as the entry equation for this event;

1> apply equation B3-3 and equation B2-4 i.e. at least one of the two has to be fulfilled, as specified below, as the leaving equation for this event;

Equation B2-1 (Entering condition 1)

$$Ms - Hys < Thresh1$$

Equation B2-2 (Entering condition 2)

$$Mn + Ofn - Hys > Thresh2$$

Equation B2-3 (Leaving condition 1)

$$Ms + Hys > Thresh1$$

Equation B2-4 (Leaving condition 2)

$$Mn + Ofn + Hys < Thresh2$$

The variables in the formula are defined as follows:

Ms is the measurement result of the serving cell, not taking into account any cell individual offset.

Mn is the measurement result of the neighbouring inter RAT cell.

Ofn is the frequency specific offset of the frequency of the neighbour cell

Hys is the hysteresis parameter for this event (i.e. *hysteresis* as defined within the *VarMeasurementConfiguration* for this event)

Thresh1 is the threshold parameter for this event (i.e. b2-*Threshold1* as defined within the *VarMeasurementConfiguration* for this event)

Thresh2 is the threshold parameter for this event (i.e. *b2-Threshold2* as defined within the *VarMeasurementConfiguration* for this event)

Mn, Ms are expressed in dBm

Ofn, Hys, Thresh1, Thresh2 are expressed in dB

5.5.4 Measurement reporting

For the measId for which the measurement reporting procedure was triggered, the UE shall set the *measuredResults* within the *MeasurementReport* message as follows:

1> set the IE *measId* to the measurement identity that triggered the measurement reporting;

1> set the *mobilityMeasResults* to include all cells included in the *cellsToReportList* as defined within the V*arEventsTriggered* for this event

1> for each included cell include the measured results in accordance with the *reportConfigList* defined in variable *VarMeasurementConfiguration* for that measurement;

1> include the cells in order of decreasing *reportingQuantity*, i.e. the best cell is included first.

Editor's note: It is FFS whether, if multiple cells meet the criteria, ordering is also applied irrespective of the cells carrier frequency

1> increment the *numberOfReportsSent* as defined within the V*arEventsTriggered* for this event by 1;

1> if the *periodicalReportingOngoing* defined within the V*arEventsTriggered* for this event is set to *FALSE* or

1> if the *numberOfReportsSent* as defined within the V*arEventsTriggered* for this event is equal to reportAmount as defined within the reporting configuration for this event as defined in variable *VarMeasurementConfiguration*:

2> set the *periodicalReportingOngoing* defined within the V*arEventsTriggered* for this event to *FALSE;*

1> else:

2> start a timer with the value of *reportInterval* as defined within the *VarMeasurementConfiguration* for this event;

1> if the measured results are for CDMA:

2> set the *preRegistrationStatus* to the UE"s cdma upper layer"s HRPD preRegistrationStatus;

1> submit the MEASUREMENT REPORT message to lower layers for transmission, upon which the procedure ends.

Editor's note: It is FFS which additional cells may be included in a report, e.g. cells of another type (e.g. best inter-frequency cell included in an intra-frequency report.

5.5.5 Measurement related actions

5.5.5.1 Actions upon handover

Editor's note: An alternative way would be to specify these actions together with other measurement related behaviour, e.g. together with the elementary procedure, the actions upon presence/ absence of an IE.

5.5.5.1.1 General

After handover, the UE may re-use measurement samples obtained prior to handover.

Editor's note: It is assumed there is no need for a section for Measurement related actions upon inter-RAT handover since upon handover to E-UTRAN the measurements are established in a similar manner as the normal setup.

5.5.5.1.2 Measurement related actions upon intra-frequency handover

The UE shall:

1> If the *RRCConnectionReconfiguration* message triggering the handover does not include the IE measurement configuration:

2> continue the intra-frequency, inter-frequency and inter-RAT measurements without modifying the measurement configuration.

Further details are to be specified

5.5.5.1.3 Measurement related actions upon inter-frequency handover

The UE shall:

1> If the *RRCConnectionReconfiguration* message triggering the handover does not include the IE measurement configuration:

2> continue the intra-frequency measurements as follows:

3> for each *measId* value in the parameter *measIdList* within *VarMeasurementConfiguration* that is linked to the *measObjId* value in the parameter *measObjectList* within *VarMeasurementConfiguration* whose *eutra-CarrierInfo* is set to the source carrier frequency:

4> link this *measId* value to the *measObjId* value in the parameter *measObjectList* within *VarMeasurementConfiguration* whose *eutra-CarrierInfo* is set to the target frequency;

2> stop all inter-frequency and inter-RAT measurements while keeping the measurement configuration unchanged;

NOTE 2 The UE resumes the applicable inter-frequency measurements after the E-UTRAN has configured the corresponding measurement object and activated the (corresponding) measurement gap(s)

2> deactivate the measurement gap, if activated.

NOTE If the IE *measurementConfiguration* is included, then the normal procedure in 5.5.2 is performed

5.5.5.2 Speed dependant scaling of measurement related parameters

The UE shall adjust the value of the following parameters configured by the E-UTRAN depending on the UE speed: Time to trigger. The UE shall apply 3 different levels, which are selected as follows:

The algorithm to determine the mobility state in RRC_CONNECTED is identical to the one used in RRC_IDLE. It is FFS whether the associated parameters are common for both states. Further details are TBS.

Editor's note: It is assumed that the speed level selection/ detection is specified in [4], both for idle and connected. Furthermore, the scaling of the idle mode parameters is assumed to be specified in [4].

5.6 Other

5.6.1 DL information transfer

5.6.1.1 General

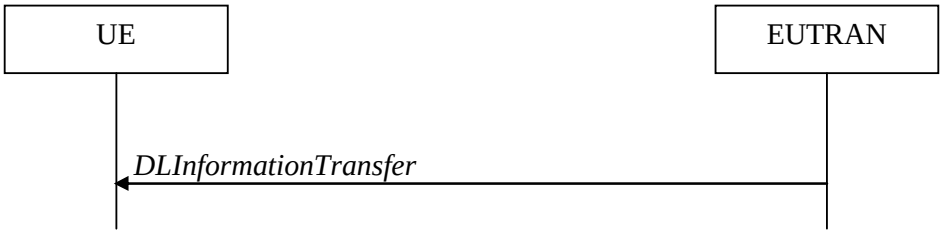

Figure 5.6.1.1-1: DL information transfer

The purpose of this procedure is to transfer NAS or (tunnelled) non-3GPP dedicated information from E-UTRAN to a UE in RRC_CONNECTED.

5.6.1.2 Initiation

E-UTRAN initiates the DL information transfer procedure whenever there is a need to transfer NAS or non-3GPP dedicated information. E-UTRAN initiates the DL information transfer procedure by sending the *DLInformationTransfer* message.

5.6.1.3 Reception of the *DLInformationTransfer* by the UE

Upon receiving *DLInformationTransfer* message, the UE shall:

1> If CHOICE *informationType* is set to *nas3GPP*:

2> Forward the *NAS-DedicatedInformation* to the NAS upper layers.

1> If CHOICE *informationType* is set to *cdma2000*:

2> Forward the *cdma2000-Type* and the *cdma2000-DedicatedInfo* to the CDMA upper layers.

5.6.2 UL information transfer

5.6.2.1 General

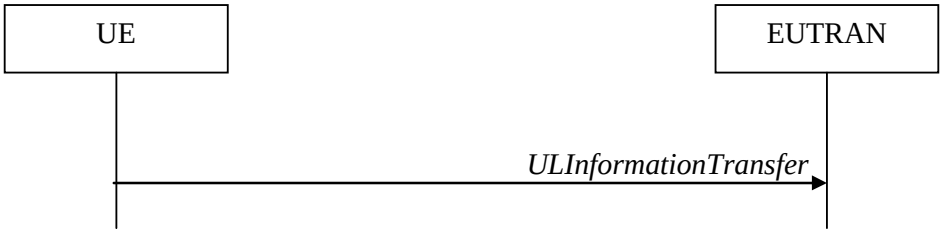

Figure 5.6.2.1-1: UL information transfer

The purpose of this procedure is to transfer NAS or (tunnelled) non-3GPP dedicated information from the UE to E-UTRAN.

5.6.2.2 Initiation

A UE in RRC_CONNECTED initiates the UL information transfer procedure whenever there is a need to transfer NAS or non-3GPP dedicated information. The UE initiates the UL information transfer procedure by sending the *ULInformationTransfer* message.

5.6.2.3 Actions related to transmission of *ULInformationTransfer* message

The UE shall set the contents of the *ULInformationTransfer* message as follows:

1> If there is a need to transfer NAS information:

2> Set the *informationType* to *nas3GPP*.

2> Include the *NAS-DedicatedInformation*.

1> If there is a need to transfer CDMA2000 information:

2> Set the *informationType* to *cdma2000*;

2> Set the *cdma2000-MessageType* in accordance with the information received from CDMA200 upper layers;

2> Include the *cdma2000-Type* and the *cdma2000-DedicatedInfo*;

5.6.2.4 Failure to deliver *ULInformationTransfer* message

The UE shall:

1> If following mobility, the UE is unable to guarantee successful delivery for one or more *ULInformationTransfer* messages:

2> Inform upper layers about the possible failure to deliver the information contained in the concerned *ULInformationTransfer* messages;

Editor's note: Awaiting confirmation from CT1 (in response to R2-080604)

5.6.3 UE capability transfer

5.6.3.1 General

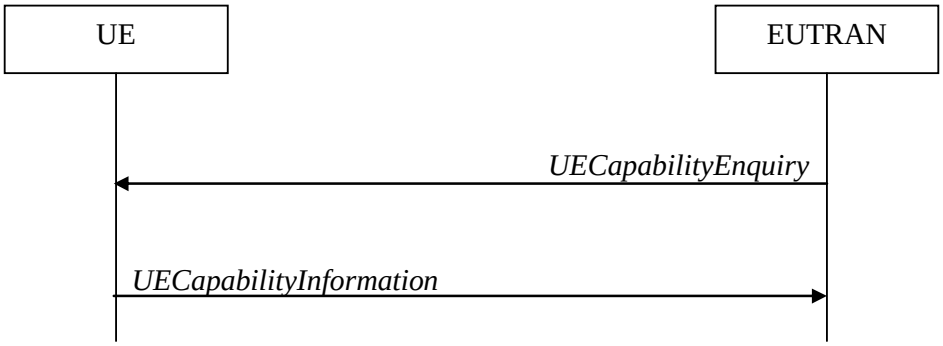

Figure 5.6.3.1-1: UE capability transfer

The purpose of this procedure is to transfer UE radio access capability information from the UE to E-UTRAN.

Editor's note: It is FFS if the security capabilities received via S1 can always be trusted. If this is not the case, there may be a need to support protection against bid down attacks. Awaiting reply from SA3 (in response to R2-080540).

NOTE: The UE capability transfer procedure is based on the assumption that core network deletes the UE capabilities upon detach. Furthermore, the only mechanism for the UE to initiate a change of the UE capabilities used by the network is to perform a detach and re-attach.

5.6.3.2 Initiation

E-UTRAN initiates the procedure to a UE in RRC_CONNECTED when it needs (additional) UE radio access capability information.

5.6.3.3 Reception of the *UECapabilityEnquiry* by the UE

The UE shall:

1> set the contents of *UECapabilityInformation* message as follows:

2> If the *ue-RadioAccessCapRequest* includes E-UTRA:

3> include the *UE-EUTRA-Capability* within a *ueCapabilitiesRAT-Container* and with the *rat-Type* set to *eutra*;

2> If the UE radio access capability request includes GERAN:

3> include the UE radio access capabilities for GERANwithin a *ueCapabilitiesRAT-Container* and with the *rat-Type* set to *geran*;

2> If the UE radio access capability request includes UTRA:

3> include the UE radio access capabilities for UTRA within a *ueCapabilitiesRAT-Container* and with the *rat-Type* set to *utran*;

1> submit the *UECapabilityInformation* message to lower layers for transmission, upon which the procedure ends.

5.7 Generic error handling

6 Protocol data units, formats and parameters

6.1 General

The contents of each RRC message is specified in subclause 6.2 using ASN.1 to specify the message syntax and using tables when needed to provide further detailed information about the information elements specified in the message syntax. The syntax of the information elements that are defined as stand-alone abstract types is further specified in a similar manner in subclause 6.3.

The need for information elements to be present in a message or an abstract type, i.e., the ASN.1 fields that are specified as OPTIONAL in the abstract notation (ASN.1), is specified by means comment text tags attached to the OPTIONAL statement in the abstract syntax, which meaning is specified in table 10.1.

Table 6.1-1: Meaning of abbreviations used to specify the need for information elements to be present

Abbreviation	Meaning
Cond *conditionTag*	*Conditionally present* An information element for which the need is specified by means of conditions. For each *conditionTag*, the need is specified in a tabular form following the ASN.1 segment.
Need OP	*Optionally present* An information element that is optional to signal. If the message is received by the UE, the UE behaviour that applies in case the information element is absent is either specified in a corresponding procedural specification or is implied by the semantics information provided in the field description table following the ASN.1 segment.
Need OC	*Optionally present, Continue* An information element that is optional to signal. If the message is received by the UE, and in case the information element is absent, the UE shall continue to use the existing value (and the associated functionality).
Need OD	*Optionally present, Discontinue* An information element that is optional to signal. If the message is received by the UE, and

Abbreviation	Meaning
	in case the information element is absent, the UE shall discontinue/ stop to use the existing value (and the associated functionality).

6.2 RRC messages

NOTE: The messages included in this section reflect the current status of the discussions. Additional messages may be included at a later stage.

It is FFS whether or not the following messages should be introduced:

- *HandoverToEUTRACommand* (The RRC connection reconfiguration message is currently used, i.e. it is FFS if a specific message is needed)
- *UECapabilityInformationCompact* (The need to introduce a message including a size optimised/ reduced version of the UE capabilities is FFS)

6.2.1 General message structure

– EUTRA-RRC-Definitions

This ASN.1 segment is the start of the E-UTRA RRC PDU definitions.

```
-- ASN1START

EUTRA-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- ASN1STOP
```

– BCCH-BCH-Message

The *BCCH-BCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE via BCH on the BCCH logical channel.

```
-- ASN1START

BCCH-BCH-Message ::= SEQUENCE {
    message                 BCCH-BCH-MessageType
}

BCCH-BCH-MessageType ::=                        MasterInformationBlock

-- ASN1STOP
```

– BCCH-DL-SCH-Message

The *BCCH-DL-SCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE via DL-SCH on the BCCH logical channel.

```
-- ASN1START

BCCH-DL-SCH-Message ::= SEQUENCE {
    message                 BCCH-DL-SCH-MessageType
}

BCCH-DL-SCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        systemInformation                       SystemInformation,
        systemInformationBlockType1             SystemInformationBlockType1
    },
    messageClassExtension   SEQUENCE {}
}
```

```
-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– PCCH-Message

The *PCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the PCCH logical channel.

```
-- ASN1START

PCCH-Message ::= SEQUENCE {
    message                 PCCH-MessageType
}

PCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        paging                                  Paging
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– DL-CCCH-Message

The *DL-CCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink CCCH logical channel.

```
-- ASN1START

DL-CCCH-Message ::= SEQUENCE {
    message                 DL-CCCH-MessageType
}

DL-CCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReestablishment            RRCConnectionReestablishment,
        rrcConnectionReestablishmentReject      RRCConnectionReestablishmentReject,
        rrcConnectionReject                     RRCConnectionReject,
        rrcConnectionSetup                      RRCConnectionSetup
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– DL-DCCH-Message

The *DL-DCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink DCCH logical channel.

```
-- ASN1START

DL-DCCH-Message ::= SEQUENCE {
    message                 DL-DCCH-MessageType
}

DL-DCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        dlInformationTransfer                   DLInformationTransfer,
```

```
        handoverFromEUTRAPreparationRequest     HandoverFromEUTRAPreparationRequest,
        mobilityFromEUTRACommand                MobilityFromEUTRACommand,
        rrcConnectionReconfiguration            RRCConnectionReconfiguration,
        rrcConnectionRelease                    RRCConnectionRelease,
        securityModeCommand                     SecurityModeCommand,
        ueCapabilityEnquiry                     UECapabilityEnquiry,
        spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– UL-CCCH-Message

The *UL-CCCH-Message* class is the set of RRC messages that may be sent from the UE to the E-UTRAN on the uplink CCCH logical channel.

```
-- ASN1START

UL-CCCH-Message ::= SEQUENCE {
    message                 UL-CCCH-MessageType
}

UL-CCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReestablishmentRequest     RRCConnectionReestablishmentRequest,
        rrcConnectionRequest                    RRCConnectionRequest
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– UL-DCCH-Message

The *UL-DCCH-Message* class is the set of RRC messages that may be sent from the UE to the E-UTRAN on the uplink DCCH logical channel.

```
-- ASN1START

UL-DCCH-Message ::= SEQUENCE {
    message                 UL-DCCH-MessageType
}

UL-DCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        measurementReport                       MeasurementReport,
        rrcConnectionReconfigurationComplete    RRCConnectionReconfigurationComplete,
        rrcConnectionReconfigurationFailure     RRCConnectionReconfigurationFailure,
        rrcConnectionReestablishmentComplete    RRCConnectionReestablishmentComplete,
        rrcConnectionSetupComplete              RRCConnectionSetupComplete,
        rrcStatus                               RRCStatus,
        securityModeComplete                    SecurityModeComplete,
        securityModeFailure                     SecurityModeFailure,
        ueCapabilityInformation                 UECapabilityInformation,
        ulInformationTransfer                   ULInformationTransfer,
        spare6 NULL, spare5 NULL, spare4 NULL,
        spare3 NULL, spare2 NULL, spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

6.2.2 Message definitions

– DLInformationTransfer

The *DLInformationTransfer* message is used for the downlink transfer of dedicated NAS information.

Signalling radio bearer: SRB2 or SRB1 (only if SRB2 not established yet)

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***DLInformationTransfer* message**

```
-- ASN1START

DLInformationTransfer ::=           SEQUENCE {
    rrc-TransactioIdentifier            RRC-TransactionIdentifier,                      -- FFS
    criticalExtensions                  CHOICE {
        dlInformationTransfer-r8            DLInformationTransfer-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

DLInformationTransfer-r8-IEs ::=    SEQUENCE {
    informationType                     CHOICE {
        nas3GPP                             NAS-DedicatedInformation,
        cdma2000                            SEQUENCE {
            cdma2000-Type                       CDMA2000-Type,
            cdma2000-DedicatedInfo              OCTET STRING
        }
    },
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***DLInformationTransfer* field descriptions**
nas3GPP Field description is FFS.
cdma2000-Type Field description is FFS.
cdma2000-DedicatedInfo Field description is FFS.

– HandoverFromEUTRAPreparationRequest (CDMA2000)

The *HandoverFromEUTRAPreparationRequest* message is used to trigger the handover preparation procedure with a CDMA2000 RAT.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***HandoverFromEUTRAPreparationRequest* message**

```
-- ASN1START

HandoverFromEUTRAPreparationRequest ::= SEQUENCE {
```

```
    rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        handoverFromEUTRAPreparationRequest-r8
                                            HandoverFromEUTRAPreparationRequest-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

HandoverFromEUTRAPreparationRequest-r8-IEs ::= SEQUENCE {
    cdma2000-Type                       CDMA2000-Type,
    cdma2000-RAND                       BIT STRING (SIZE (32))      OPTIONAL,   -- Cond cdma2000-Type
    cdma2000-DedicatedInfo              OCTET STRING                OPTIONAL,    -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***HandoverFromEUTRAPreparationRequest* field descriptions**
cdma2000-Type Field description is FFS.
cdma2000-RAND A 32 bit random value, generated by the eNB, passed to the CDMA2000 upper layers. Present only if the cdma2000-Type = type1XRTT.
cdma2000-DedicatedInfo Field description is FFS.

Conditional presence	Explanation
cdma2000-Type	The IE is mandatory present if the cdma2000-Type = type1XRTT; otherwise it is not needed.

– MasterInformationBlock

The *MasterInformationBlock* includes the system information transmitted on BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

MasterInformationBlock

```
-- ASN1START

MasterInformationBlock ::=          SEQUENCE {
    dl-SystemBandwidth                  ENUMERATED {ffs},                       -- 4-bit field
    numberOfTransmitAntennas            BIT STRING (SIZE (4)),
    phich-Configuration                 PHICH-Configuration,
    systemFrameNumber                   BIT STRING (SIZE (8))
}


-- ASN1STOP
```

***MasterInformationBlock* field descriptions**
dl-SystemBandwidth type and value range FFS
numberOfTransmitAntennas need and type and value range FFS
systemFrameNumber Defines the 8 most significant bits of the SFN

– MeasurementReport

The *MeasurementReport* message is used for the indication of measurement results.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***MeasurementReport* message**

```
-- ASN1START

MeasurementReport ::=               SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            measurementReport-r8                MeasurementReport-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

MeasurementReport-r8-IEs ::=        SEQUENCE {
    measuredResults                     MeasuredResults,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***MeasurementReport* field descriptions**
measuredResults
Field description is FFS

– MobilityFromEUTRACommand

The *MobilityFromEUTRACommand* message is used to command handover or a cell change from E-UTRA to another RAT (3GPP or non-3GPP).

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***MobilityFromEUTRACommand* message**

```
-- ASN1START

MobilityFromEUTRACommand ::=        SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            mobilityFromEUTRACommand-r8         MobilityFromEUTRACommand-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
```

```
}

MobilityFromEUTRACommand-r8-IEs ::= SEQUENCE {
    interRAT-Target                     InterRAT-Target,
    interRAT-Message                    InterRAT-Message                    OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***MobilityFromEUTRACommand* field descriptions**
interRAT-Target   Field description is FFS.
interRAT-Message   Field description is FFS.

– Paging

The *Paging* message is used for the notification of one or more UEs.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: PCCH

Direction: E-UTRAN to UE

Paging message

```
-- ASN1START

Paging ::=                          SEQUENCE {
    criticalExtensions                  CHOICE {
        paging-r8                           Paging-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

Paging-r8-IEs ::=                   SEQUENCE {
    pagingRecordList                    SEQUENCE (SIZE (1..maxPageRec)) OF SEQUENCE {
        ue-Identity                         PagingUE-Identity,
        pagingCause                         PagingCause
    }       OPTIONAL,                                                       -- Need OP
    systemInfoModification              ENUMERATED {true}                   OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***Paging* field descriptions**
ue-Identity   Field description is FFS.
pagingCause   Field description is FFS.
systemInfoModification   If present: indication of a BCCH modification.

– RRCConnectionReconfiguration

The *RRCConnectionReconfiguration* message is the command to modify an RRC connection. It may convey information for measurement configuration, mobility control, dedicated NAS information, radio resource configuration (including RBs, transport channel configuration and physical channel configuration), security configuration and UE related information.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

RRCConnectionReconfiguration message

```
-- ASN1START

RRCConnectionReconfiguration ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionReconfiguration-r8     RRCConnectionReconfiguration-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReconfiguration-r8-IEs ::= SEQUENCE {
    measurementConfiguration            MeasurementConfiguration            OPTIONAL,   -- Need OP
    mobilityControlInformation          MobilityControlInformation          OPTIONAL,   -- Need OP
    nas-DedicatedInformation            NAS-DedicatedInformation            OPTIONAL,   -- Need OP
    radioResourceConfiguration          RadioResourceConfiguration          OPTIONAL,   -- Need OP
    securityConfiguration               SecurityConfiguration           OPTIONAL,   -- Cond Handover
    ue-RelatedInformation               UE-RelatedInforamtion               OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: Need set to "OP" based on draft tabular. The *measurementConfiguration*, the *mobilityControlInformation*, the *radioResourceConfiguration* and possibly the *ue-RelatedInformation* should evidently be "OC", because it should be possible to send the message with only, for instance, the *measurementConfiguration* included, without deleting the configuration of mobility control, radio resources, etc.

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReconfiguration* field descriptions**
measurementConfiguration Field description is FFS.
mobilityControlInformation Field description is FFS.
nas-DedicatedInformation Field description is FFS.
radioResourceConfiguration Field description is FFS.
securityConfiguration Field description is FFS.
ue-RelatedInformation Field description is FFS.

Conditional presence	Explanation
Handover	The IE is mandatory present in case of inter-RAT handover to E-UTRA; it is optionally present in case of handover within E-UTRA; otherwise it is not needed.

Editor's note: The "*Handover*" condition seems to be based on procedure requirements and should possibly not be specified here; rather a need "OP".

– RRCConnectionReconfigurationComplete

The *RRCConnectionReconfigurationComplete* message is used to confirm the successful completion of an RRC connection reconfiguration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRCConnectionReconfigurationComplete* message**

```
-- ASN1START

RRCConnectionReconfigurationComplete ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReconfigurationComplete-r8
                                            RRCConnectionReconfigurationComplete-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReconfigurationComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.                                                          FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReconfigurationComplete* field descriptions**
%fieldIdentifier%

Editor's note: (Temporary note, just for information, i.e. nothing to be captured) Also when this message is used to confirm a successful handover, the same transfer mechanism applies, i.e. SRB1, RLC AM, DCCH. Contention is handled at the MAC (control element including C-RNTI), while PDCP includes regular MAC-I. If segmentation is needed, the eNB may provide an additional allocation, e.g. in the sub-frame following Msg3 transmission.

– RRCConnectionReconfigurationFailure

The *RRCConnectionReconfigurationFailure* message is used to indicate the unsuccessful completion of an RRC connection reconfiguration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRCConnectionReconfigurationFailure* message**

```
-- ASN1START

RRCConnectionReconfigurationFailure ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReconfigurationFailure-r8
                                            RRCConnectionReconfigurationFailure-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReconfigurationFailure-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.                                                          FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReconfigurationFailure* field descriptions**
%fieldIdentifier%

– RRCConnectionReestablishment

The *RRCConnectionReestablishment* message is used to resolve contention and to establish SRBs.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

***RRCConnectionReestablishment* message**

```
-- ASN1START

RRCConnectionReestablishment ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionReestablishment-r8     RRCConnectionReestablishment-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReestablishment-r8-IEs ::= SEQUENCE {
```

```
    radioResourceConfiguration          RadioResourceConfiguration,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReestablishment* field descriptions**
radioResourceConfiguration
Only SRB1 configuration information is applicable (modification, i.e., delta signalling)

Editor's note: For this message specific HARQ operation applies, i.e., only UEs for which the Initial UE identity matches provide a HARQ acknowledgment.

– RRCConnectionReestablishmentComplete

The *RRCConnectionReestablishmentComplete* message is used to confirm the successful completion of an RRC connection reestablishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRCConnectionReestablishmentComplete* message**

```
-- ASN1START

RRCConnectionReestablishmentComplete ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReestablishmentComplete-r8
                                            RRCConnectionReestablishmentComplete-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReestablishmentComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.                                                          FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReestablishmentComplete* field descriptions**
%fieldIdentifier%

– RRCConnectionReestablishmentReject

The *RRCConnectionReestablishmentReject* message is used to indicate the rejection of an RRC connection reestablishment request.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

***RRCConnectionReestablishmentReject* message**

```
-- ASN1START

RRCConnectionReestablishmentReject ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReestablishmentReject-r8
                                            RRCConnectionReestablishmentReject-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReestablishmentReject-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.                                                          FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReestablishmentReject* field descriptions**
%fieldIdentifier%

– RRCConnectionReestablishmentRequest

The *RRCConnectionReestablishmentRequest* message is used to request the reestablishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

***RRCConnectionReestablishmentRequest* message**

```
-- ASN1START

RRCConnectionReestablishmentRequest ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionReestablishmentRequest-r8
                                            RRCConnectionReestablishmentRequest-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReestablishmentRequest-r8-IEs ::= SEQUENCE {
    ue-Identity                         ReestabUE-Identity,
    spare                               BIT STRING (SIZE (4))
}

-- ASN1STOP
```

***RRCConnectionReestablishmentRequest* field descriptions**
ue-Identity
UE identity included to retrieve UE context and to facilitate contention resolution by lower layers

– RRCConnectionReject

The *RRCConnectionReject* message is used to reject the RRC connection establishment.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

***RRCConnectionReject* message**

```
-- ASN1START

RRCConnectionReject ::=             SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionReject-r8              RRCConnectionReject-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReject-r8-IEs ::=      SEQUENCE {
    waitTime                            INTEGER (1..16),
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReject* field descriptions**
waitTime
Wait time value in seconds.

Editor's note: For this message specific HARQ operation applies, i.e. only UEs for which the Initial UE identity matches provide a HARQ acknowledgment.

– RRCConnectionRelease

The *RRCConnectionRelease* message is used to command the release of an RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***RRCConnectionRelease* message**

```
-- ASN1START

RRCConnectionRelease ::=            SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionRelease-r8             RRCConnectionRelease-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
```

```
}

RRCConnectionRelease-r8-IEs ::=     SEQUENCE {
    redirectionInformation              RedirectionInformation              OPTIONAL,   -- Need OP
    idleModeMobilityControlInfo         IdleModeMobilityControlInfo         OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionRelease* field descriptions**
redirectionInformation Field description is FFS.
idleModeMobilityControlInfo Field description is FFS.

– RRCConnectionRequest

The *RRCConnectionRequest* message is used to request the establishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

***RRCConnectionRequest* message**

```
-- ASN1START

RRCConnectionRequest ::=            SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionRequest-r8             RRCConnectionRequest-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionRequest-r8-IEs ::=     SEQUENCE {
    ue-Identity                         InitialUE-Identity,
    establishmentCause                  EstablishmentCause,                         -- FFS
    spare                               BIT STRING (SIZE (1))
}

-- ASN1STOP
```

***RRCConnectionRequest* field descriptions**
ue-Identity UE identity included to facilitate contention resolution by lower layers.
establishmentCause Field description is FFS.

Editor's note: It has been concluded that there is no need to transfer UE capability info early (i.e. redirection may be performed after the UE context is transferred across S1)

– RRCConnectionSetup

The *RRCConnectionSetup* message is used to establish SRB1.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionSetup message

```
-- ASN1START

RRCConnectionSetup ::=              SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionSetup-r8               RRCConnectionSetup-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionSetup-r8-IEs ::=       SEQUENCE {
    radioResourceConfiguration          RadioResourceConfiguration,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionSetup* field descriptions**
radioResourceConfiguration   Only SRB1 configuration information is applicable

Editor's note: A separate version of the IE *RadioResourceConfiguration* should be considered, allowing only SRB1 configuration. It could remove a number of potential error cases the UE would otherwise have to handle.

Editor's note: For this message specific HARQ operation applies, i.e. only UEs for which the Initial UE identity matches provide a HARQ acknowledgment.

– RRCConnectionSetupComplete

The *RRCConnectionSetupComplete* message is used to confirm the successful completion of an RRC connection establishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionSetupComplete message

```
-- ASN1START

RRCConnectionSetupComplete ::=      SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionSetupComplete-r8       RRCConnectionSetupComplete-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}
```

```
RRCConnectionSetupComplete-r8-IEs ::= SEQUENCE {
    selectedPLMN-Identity               SelectedPLMN-Identity,
    registeredMME                       RegisteredMME                       OPTIONAL,   -- Need OP
    nas-DedicatedInformation            NAS-DedicatedInformation,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionSetupComplete* field descriptions**
selectedPLMN-Identity
Index of the PLMN selected by the UE from the plmn-IdentyList included in SIB1.
registeredMME
Field description is FFS.
nas-DedicatedInformation
Field description is FFS.

– RRCStatus

The *RRCStatus* message is used to indicate an RRC protocol error.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRCStatus* message**

```
-- ASN1START

RRCStatus ::=                       SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,                  -- FFS
    criticalExtensions                  CHOICE {
        rrcStatus-r8                        RRCStatus-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCStatus-r8-IEs ::=                SEQUENCE {
    -- Enter the IEs here.                                                          FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***RRCStatus* field descriptions**
%fieldIdentifier%

– SecurityModeCommand

The *SecurityModeCommand* message is used to command the activation of AS security.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

SecurityModeCommand message

```
-- ASN1START

SecurityModeCommand ::=             SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            securityModeCommand-r8              SecurityModeCommand-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

SecurityModeCommand-r8-IEs ::=      SEQUENCE {
    securityConfiguration               SecurityConfiguration,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

SecurityModeCommand field descriptions
securityConfiguration
Field description is FFS.

– SecurityModeComplete

The *SecurityModeComplete* message is used to confirm the successful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SecurityModeComplete message

```
-- ASN1START

SecurityModeComplete ::=            SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        securityModeComplete-r8             SecurityModeComplete-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

SecurityModeComplete-r8-IEs ::=     SEQUENCE {
    -- Enter the IEs here.                                                  FFS
    ...
```

```
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***SecurityModeComplete* field descriptions**
%fieldIdentifier%

– SecurityModeFailure

The *SecurityModeFailure* message is used to indicate an unsuccessful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***SecurityModeFailure* message**

```
-- ASN1START

SecurityModeFailure ::=             SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        securityModeFailure-r8              SecurityModeFailure-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

SecurityModeFailure-r8-IEs ::=      SEQUENCE {
    -- Enter the IEs here.                                                  FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***SecurityModeFailure* field descriptions**
%fieldIdentifier%

– SystemInformation

The *SystemInformation* message is used convey one or more System Information Blocks. All the SIBs included are transmitted with the same periodicity.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

***SystemInformation* message**

```
-- ASN1START

SystemInformation ::=               SEQUENCE {
```

```
    criticalExtensions                  CHOICE {
        systemInformation-r8                SystemInformation-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

SystemInformation-r8-IEs ::=        SEQUENCE (SIZE (1..maxSIB)) OF SEQUENCE {       -- Size is FFS
    sib-Type                            SIB-Type,                                       -- FFS
    sib-Info                            OCTET STRING,                                   -- FFS
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***SystemInformation* field descriptions**
sib-Type Field description is FFS.
sib-Info Field description is FFS.

Editor's note: In order to support protocol extension, each SIB may be carried in a separate container e.g. an octet string.

– SystemInformationBlockType1

SystemInformationBlockType1 contains information relevant when evaluating if a UE is allowed to access a cell and defines the scheduling of other system information.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

Editor's note RAN1 has agreed (R2-080475) that DL RX Tx power should be indicated on BCCH mapped to DL-SCH. FFS in which SIB and SI this should be provided

***SystemInformationBlockType1* message**

```
-- ASN1START

SystemInformationBlockType1 ::=     SEQUENCE {
    cellAccessRelatedInformation        SEQUENCE {
        plmn-IdentityList                   SEQUENCE (SIZE (1..6)) OF SEQUENCE {
            plmn-Identity                       PLMN-Identity,
            cellReservedForOperatorUse          ENUMERATED {reserved, notReserved}
        },
        trackingAreaCode                    TrackingAreaCode,
        cellIdentity                        CellIdentity,
        cellBarred                          ENUMERATED {barred, notBarred},
        intraFrequencyCellReselection       BOOLEAN                 OPTIONAL,   -- Cond CellBarred
        cellReservationExtension            ENUMERATED {reserved, notReserved},
        csg-Indication                      BOOLEAN
    },
    cellSelectionInfo                   SEQUENCE {
        q-Rxlevmin                          INTEGER (-60..-28),                 -- value range FFS
        q-Rxlevminoffset                    INTEGER (1..8)          OPTIONAL    -- value range FFS
    },                                                                              -- need FFS
    frequencyBandIndicator              INTEGER (1..64),
    schedulinInformation                SEQUENCE (SIZE (1..maxSI-Message)) OF SEQUENCE {
        si-Periodicity                      ENUMERATED {
                                                ms80, ms160, ms320, ms640, ms1280, ms2560, ms5120,
                                                spare},
        sib-MappingInfo                     SEQUENCE (SIZE (1..maxSIB)) OF SIB-Type
```

```
    },
    tdd-Configuration                   TDD-Configuration           OPTIONAL,
    si-WindowLength                     ENUMERATED {
                                            ms1, ms2, ms5, ms10, ms15, ms20,
                                            spare2, spare1},                -- value range is FFS
    systemInformationValueTag           INTEGER (0),                    -- value is 3..5 bits FFS
    mbsfn-SubframeConfiguration         SEQUENCE {  -- FFS in which SIB this IE should be placed
        radioframeAllocation                SEQUENCE {},                        -- coding is FFS
        subframeAllocation                  INTEGER (1..7)
    }       OPTIONAL,
    ...
}


-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

Editor's note: (IE *frequencyBandIndicator*) Is the range going to be 1..64 sufficient? (FFS)

***SystemInformationBlockType1* field descriptions**
cellReservedForOperatorUse As defined in TS 36.304 [4]
trackingAreaCode Common TAC for all the PLMNs listed
cellBarred "Barred" means barred for all calls, as defined in TS 36.304 [4]
intraFrequencyCellReselection FFS if needed
cellReservationExtension As defined in TS 36.304 [4]
csg-Indication If set to TRUE the UE is only allowed to access the cell if the tracking area identity matches an entry in the "white list" that the UE has stored
q-Rxlevmin Actual value *Qrxlevmin* = IE value * 2 RSRP [dBm] FFS within *cellSelectionInfo*
q-Rxlevminoffset Actual value *Qrxlevminoffset* = IE value * 2 [dB] FFS within *cellSelectionInfo*
frequencyBandIndicator Defined in [36.101].
schedulingInformation
si-Periodicity Periociity of the SI-message in milliseconds, such that ms80 denotes 80 milliseconds, ms160 denotes 160 milliseconds, and so on.
sib-MappingInfo List of the SIBs mapped to this *SystemInformation* message.There is no mapping information of SIB2; it is always present in the first *SystemInformation* message listed in the *schedulingInformation* list.
si-WindowLength Common SI scheduling window for all SIs. Unit in milliseconds, where ms1 denotes 1 millisecond, ms2 denotes 2 milliseconds and so on.
systemInformationValueTag Common for all SIs
mbsfn-SubframeConfiguration Defines the subframes that are reserved for MBSFN in downlink . FFS if the parameter shall be in SIB1 or any other SIB.
radioFrameAllocation Defines the radio-frames that contain MBSFN subframes. Coding of this parameter is FFS
subframeAllocation Number of MBSFN subframes within a radio frame carrying MBSFN. The MBSFN subframes are allocated from the beginning of the radio-frame in consequtive order with the restriction that only those subframes that may carry MBSFN are allocated: subframes 0 and 5 are not allocated; subframe 4 is not allocated (FDD) ; subframes 1, 6 and uplink subframes are not allocated (TDD).

Conditional presence	Explanation
CellBarred	The IE is mandatory present if the IE *cellBarred* is set to TRUE; otherwise the IE is not needed.

– UECapabilityEnquiry

The *UECapabilityEnquiry* message is used to request the transfer of UE radio access capabilities for E-UTRA as well as for other RATs.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

UECapabilityEnquiry message

```
-- ASN1START

UECapabilityEnquiry ::=             SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        ueCapabilityEnquiry-r8              UECapabilityEnquiry-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

UECapabilityEnquiry-r8-IEs ::=      SEQUENCE {
    ue-RadioAccessCapRequest            UE-RadioAccessCapRequest,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***UECapabilityEnquiry* field descriptions**
ue-RadioAccesCapabilityReq
Field description is FFS.

– UECapabilityInformation

The *UECapabilityInformation* message is used to transfer of UE radio access capabilities requested by the E-UTRAN.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

UECapabilityInformation message

```
-- ASN1START

UECapabilityInformation ::=         SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            ueCapabilityInformation-r8          UECapabilityInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
```

```
        criticalExtensions                  SEQUENCE {}
    }
}

UECapabilityInformation-r8-IEs ::=  SEQUENCE (SIZE (1..maxRAT-Capabilities)) OF SEQUENCE {
    rat-Type                            RAT-Type,
    ueCapabilitiesRAT-Container         OCTET STRING,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***UECapabilityInformation* field descriptions**
ueCapabilitesRAT-Container Container for the UE capabilities of the indicated RAT. The encoding is defined in the specification of each RAT: For E-UTRA: the encoding of UE capabilities is defined in IE *UE-EUTRA-Capability*. For UTRA: the encoding of UE capabilities is defined in IE [FFS] [25.331]. For GERAN: the encoding of UE capabilities is defined in IE [FFS] [24.008 and/or 44.018; FFS].

– ULHandoverPreparationTransfer (CDMA2000)

The *ULHandoverPreparationTransfer* message is used for the uplink transfer of handover related CDMA2000 information when requested by the higher layers.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***ULHandoverPreparationTransfer* message**

```
-- ASN1START

ULHandoverPreparationTransfer ::=   SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                      CHOICE {
        ulHandoverPreparationTransfer-r8        ULHandoverPreparationTransfer-r8-IEs,
        criticalExtensions                      SEQUENCE {}
    }
}

ULHandoverPreparationTransfer-r8-IEs ::= SEQUENCE {
    cdma2000-Type                       CDMA2000-Type,
    cdma2000-MEID                       BIT STRING (SIZE (56))  OPTIONAL,   -- Cond cdma2000-Type
    cdma2000-DedicatedInfo              OCTET STRING            OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***ULInformationTransfer* field descriptions**
cdma2000-Type Field description is FFS.
cdma2000-DedicatedInfo Field description is FFS.
cdma2000-MEID The 56 bit mobile identification number provided by the CDMA Upper layers.

Conditional presence	Explanation
cdma2000-Type	The IE is mandatory present if the cdma2000-Type = type1XRTT; otherwise it is not needed.

– ULInformationTransfer

The *ULInformationTransfer* message is used for the uplink transfer of dedicated NAS information.

Signalling radio bearer: SRB2 or SRB1(only if SRB2 not established yet)

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

ULInformationTransfer message

```
-- ASN1START

ULInformationTransfer ::=           SEQUENCE {
    criticalExtensions                  CHOICE {
        ulInformationTransfer-r8            ULInformationTransfer-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

ULInformationTransfer-r8-IEs ::=    SEQUENCE {
    informationType                     CHOICE {
        nas3GPP                             NAS-DedicatedInformation,
        cdma2000                            SEQUENCE {
            cdma2000-Type                       CDMA2000-Type,
            cdma2000-MessageType                ENUMERATED {handover, other},
            cdma2000-DedicatedInfo              OCTET STRING
        }
    },
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

***ULInformationTransfer* field descriptions**
nas3GPP Field description is FFS.
cdma2000-Type Field description is FFS.
cdma2000-MessageType Field description is FFS.
cdma2000-DedicatedInfo Field description is FFS.

6.3 RRC information elements

6.3.1 System information blocks

Editor's note: This section was intended for IEs purely related to system information transmission aspects e.g. scheduling, SIB mapping. The SIB types may actually disappear once the further details of the SIs are agreed.
It is FFS if SYSTEM INFORMATION BLOCKS are introduced for the following:
- Dynamic common and shared channel configuration information, e.g. UL interference (FFS)
- Pre-defined configuration information
- Information for UE-based or UE-assisted positioning methods

– SIB-Type

The IE *SIB-Type* is used %%

SIB-Type information element

```
-- ASN1START

SIB-Type ::=                            ENUMERATED {
                                            sibType2, sibType3, sibType4, sibType5,
                                            sibType6, sibType7, sibType8, spare9,
                                            spare8, spare7, spare6, spare5,
                                            spare4, spare3, spare2, spare1}

-- ASN1STOP
```

***SIB-Type* field descriptions**
Void

– SystemInformationBlockType2

The IE *SystemInformationBlockType2* contains common and shared channel information.

NOTE 1: UE timers and constants related to functionality for which parameters are provided in another SIB are included in the corresponding SIB.

NOTE 2: It is FFS whether Uplink EARFCN should be moved to SIB 1. This relates to the discussion on UE capability for variable TX-RX frequency separation.

SystemInformationBlockType2 information element

```
-- ASN1START

SystemInformationBlockType2 ::=     SEQUENCE {
    accessBarringInformation            SEQUENCE {
        accessProbabilityFactor             ENUMERATED {
                                                p00, p05, p10, p15, p20, p25, p30, p40, p50, p60,
                                                p70, p75, p80, p85, p90, p95},
        accessClassBarringTime              ENUMERATED {s4, s8, s16, s32, s64, s128, s256, s512},
        accessClassBarringList              SEQUENCE (SIZE (6)) OF SEQUENCE {
            accessClassBarring                  BOOLEAN
        }
    }       OPTIONAL,                                                                   -- Need OP
    semiStaticCommonChConfig            SemiStaticCommonChConfigSIB,
    semiStaticSharedChConfig            SemiStaticSharedChConfig,
    ue-TimersAndConstants               UE-TimersAndConstants,
    frequencyInformation                SEQUENCE {
        ul-EARFCN                           INTEGER (0..maxEARFCN)          OPTIONAL,   -- Need OP
        ul-Bandwitdh                        ENUMERATED {ffs},                   -- 4-bit field FFS
        additionalSpectrumEmission          INTEGER (0..31)
```

```
    },
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

***SystemInformationBlockType2* field descriptions**
accessProbabilityFactor
accessClassBarringTime Timer value in seconds.
accessClassBarringList Access class barring for AC 10-15. First in the list is for AC 10, second in the list is for AC 11, and so on
ul-EARFCN Default value determined from default TX-RX frequency separation defined in [36.101]
ul-Bandwidth Parameter: Uplink bandwidth [36.101]
additionalSpectrumEmission Defined in [36.101]

– SystemInformationBlockType3

The IE *SystemInformationBlockType3* contains cell re-selection information, mainly related to the serving cell.

***SystemInformationBlockType3* information element**

```
-- ASN1START

SystemInformationBlockType3 ::=     SEQUENCE {
    cellReselectionInfoServingCell      CellReselectionInfoServingCell,
    cellReselectionInfoCommon           CellReselectionInfoCommon,
    q-Hyst                              INTEGER (0..8),                         -- value range FFS
    t-Reselection                       INTEGER (0..7),
    s-IntraSearch                       INTEGER (-60..-28)              OPTIONAL,-- value range FFS
    speedDependentReselection           SEQUENCE {}                     OPTIONAL,           -- FFS
    measurementBandwidth                MeasurementBandwidth            OPTIONAL,       -- Need OP
    sameRefSignalsInNeighbour           BOOLEAN,
    neighbourCellConfiguration          BIT STRING (SIZE (2)),
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

***SystemInformationBlockType3* field descriptions**
cellReselectionInfoServingCell Cell re-selection information of serving cell
cellReselectionInfoCommon Cell re-selection information common for cells, e.g. *Ssearch*
q-Hyst Actual value *q-Hyst* = IE value * 2 In dB
t-Reselection In seconds
s-IntraSearch Actual value *s-IntraSearch* = IE value * 2 In dB
measurementBandwidth Measurement bandwidth information common for all neighbouring cells. If absent, the value represented by the *dl-SystemBandwidth* included in *MasterInformationBlock* applies (FFS)
sameRefSignalsInNeighbour Valid only in TDD operation [RAN1 spec; FFS]. If TRUE: the UE may assume that the same reference signals are available in neighbour cells as in serving cell.
neighbourCellConfiguration Provides information related to MBSFN and TDD UL:DL configuration of neighbour cells [RAN1 spec; cf. RAN2-59: R2-073598; FFS]

– SystemInformationBlockType4

The IE *SystemInformationBlockType4* contains information about the serving frequency and intra-frequency neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType4 information element

```
-- ASN1START

SystemInformationBlockType4 ::=     SEQUENCE {
    servingFreqCellReselectionInfo      SEQUENCE {
        s-NonIntraSearch                    INTEGER (-60..-28)              OPTIONAL,
                                                                                -- value range FFS
        threshServingLow                    INTEGER (-60..-28),             -- value range FFS
        cellReselectionPriority             INTEGER (0..7)                  OPTIONAL
    },                                                                                  -- need FFS
    intraFreqNeighbouringCellList       SEQUENCE (SIZE (1..maxCellIntra)) OF SEQUENCE {
        physicalCellIdentity                PhysicalCellIdentity,
        q-OffsetCell                        INTEGER (-15..15)
    }       OPTIONAL,
    intraFreqBlacklistedCellList        SEQUENCE (SIZE (1..maxCellBlack)) OF SEQUENCE {
        physicalCellIdentity                PhysicalCellIdentity
    }       OPTIONAL,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

***SystemInformationBlockType4* field descriptions**
servingFreqCellReselectionInfo
s-NonIntraSearch Actual value *s-NonIntraSearch* = IE value * 2 In dB
threshServingLow Actual value *threshServingLow* = IE value * 2 In dB
cellReselectionPriority Absolute priority of the serving layer (0 means: highest priority)
intraFreqNeighbouringCellList List of intra-frequency neighbouring cells with specific cell re-selection parameters. Location of this IE is FFS, i.e. it may also be in SIB3
q-OffsetCell Actual value *q-OffsetCell* = IE value * 2. In dB
intraFreqBlacklistedCellList List of blacklisted intra-frequency neighbouring cells

– SystemInformationBlockType5

The IE *SystemInformationBlockType5* contains information about other E-UTRA frequencies and inter-frequency neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType5 information element

```
-- ASN1START

SystemInformationBlockType5 ::=     SEQUENCE {
    interFreqCarrierFreqList            SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {
        eutra-CarrierFreq                   EUTRA-DL-CarrierFreq,
        threshX-High                        INTEGER (-60..-28),                 -- value range FFS
        threshX-Low                         INTEGER (-60..-28),                 -- value range FFS
        measurementBandwidth                MeasurementBandwidth,
        cellReselectionPriority             INTEGER (0..7)                      OPTIONAL,
                                                                                -- value range FFS
        q-OffsetFreq                        INTEGER (-15..15)                   DEFAULT 0,
        interFreqNeighbouringCellList       SEQUENCE (SIZE (1..maxCellInter)) OF SEQUENCE {
            physicalCellIdentity                PhysicalCellIdentity,
            q-OffsetCell                        INTEGER (-15..15)
        }   OPTIONAL,
        interFreqBlacklistedCellList        SEQUENCE (SIZE (1..maxCellBlack)) OF SEQUENCE {
            physicalCellIdentity                PhysicalCellIdentity
        }   OPTIONAL
    },
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

***SystemInformationBlockType5* field descriptions**
threshX-High Parameter "$Thres_{x,high}$" [36.304]. Actual value in dBm = IE value * 2.
threshX-Low Parameter "$Thres_{x,low}$" [36.304]. Actual value in dBm = IE value * 2.
measurementBandwidth Measurement bandwidth common for all neighbouring cells on the frequency.
cellReselectionPriority Absolute priority of the E-UTRA carrier frequency (0 means: highest priority)
q-OffsetFreq Actual value *q-OffsetFreq* = IE value * 2. In dB
interFreqNeighbouringCellList List of inter-frequency neighbouring cells with specific cell re-selection parameters.
q-OffsetCell Actual value *q-OffsetCell* = IE value * 2. In dB
interFreqBlacklistedCellList List of blacklisted inter-frequency neighbouring cells

– SystemInformationBlockType6

The IE *SystemInformationBlockType6* contains information about UTRA frequencies and UTRA neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

Editor's note: In accordance with TS 36.300, cell specific parameters are not included in this SIB.

SystemInformationBlockType6 information element

```
-- ASN1START

SystemInformationBlockType6 ::=     SEQUENCE {
    utra-CarrierFreqList                SEQUENCE (SIZE (1..maxUTRA-Carrier)) OF SEQUENCE {
        utra-CarrierFreq                    UTRA-DL-CarrierFreq,
        utra-CellReselectionPriority        INTEGER (0..7)                  OPTIONAL,
        threshX-High                        INTEGER (-60..-28),                 -- value range FFS
        threshX-Low                         INTEGER (-60..-28),                 -- value range FFS
        q-Rxlevmin                          INTEGER (-58..-13),         -- need and value range FFS
        maxAllowedTxPower                   INTEGER (-50..33),          -- need and value range FFS
        q-Qualmin                           INTEGER (-24..0)            -- need and value range FFS
    }   OPTIONAL,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

***SystemInformationBlockType6* field descriptions**
utra-CellReselectionPriority Absolute priority of the RAT (0 means: highest priority). FFS if priority should be given per frequency
utra-CarrierFreqList List of carrier frequencies
threshX-High Actual value *threshHigh* = IE value * 2 In dBm
threshX-Low Actual value *threshLow* = IE value * 2 In dBm
q-Rxlevmin Actual value = IE value * 2+1 In dBm
maximumAllowedTxPower In dBm
q-Qualmin In dB

– SystemInformationBlockType7

The IE *SystemInformationBlockType7* contains information about GERAN frequencies relevant for cell re-selection. The IE includes cell re-selection parameters for each frequency.

SystemInformationBlockType7 information element

```
-- ASN1START

SystemInformationBlockType7 ::=     SEQUENCE {
    geran-CellReselectionPriority       INTEGER (0..7)                      OPTIONAL,
    geran-NeigbourFreqList              SEQUENCE {
        geran-BCCH-FrequencyList            SEQUENCE (SIZE (1..8)) OF GERAN-DL-CarrierFreqList,
        geran-BCCH-ConfigList               SEQUENCE (SIZE (1..32)) OF GERAN-BCCH-Configuration
    }       OPTIONAL,
    ncc-Permitted                       BIT STRING (SIZE (8))                           OPTIONAL,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

Editor's note: It has been agreed to provide the CellReselectionPriority per GERAN "layer"/ set of frequencies. Signalling details are FFS.

Editor's note RAN2 has agreed not to provide cell specific re-selection parameters for GSM/ GERAN neighbours. To be confirmed by GERAN/ RAN4

***SystemInformationBlockType7* field descriptions**
geran-CellReselectionPriority Absolute priority of the RAT (0 means: highest priority). FFS if priority should be given per frequency
geran-BCCH-FrequencyList Provides the ARFCN values [44.005] of the set of BCCH frequencies of neighbouring GERAN cells. The complete set of ARFCN values is the merged set (the union) of ARFCN values in all of the *GERAN-DL-CarrierFreqList* elements contained. The ARFCN values in the merged set shall be sorted in the increasing order of ARFCN value, except ARFCN = 0, if that is included, which shall be placed as the last element in the set. The resulting GERAN neighbour frequency list is defined as the sorted list of ARFCN values. If the encoding results in a list of more than 32 GERAN neighbour frequencies, only the 32 first frequencies in the sorted list shall be considered. Details are FFS, see following editor"s note.
geran-BCCH-ConfigList Provides a list of GERAN frequency specific parameters for each of the GERAN neighbour frequencies, in the order they appear in the resulting (sorted) GERAN neighbour frequency list in the *geran-NeigbourFreqList* field. Details are FFS, see following editors note.
ncc-Permitted The NCC permitted field is coded as a bit map, i.e. bit N is coded with a "0" if the BCCH carrier with NCC = N-1 is not permitted for monitoring and with a "1" if the BCCH carrier with NCC = N-1 is permitted for monitoring; N = 1,2,..,8.

Editor's note The size of the *geran-BCCH-FrequencyList*, i.e. whether or not it may include 32 entries, is FFS. Furthermore, the details of the mapping between the entries within the geran-BCCH-ConfigList and the entries within the geran-BCCH-FrequencyList is FFS.

– SystemInformationBlockType8

The IE *SystemInformationBlockType8* contains information about CDMA2000 frequencies and CDMA2000 neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

***SystemInformationBlockType8* information element**

```
-- ASN1START

SystemInformationBlockType8 ::=     SEQUENCE {
    cdma2000-SystemTimeInfo             CDMA2000-SystemTimeInfo     OPTIONAL,
    searchWindowSize                    INTEGER (0)                 OPTIONAL,   -- value range FFS
    hrpd-Parameters                     SEQUENCE {
        hrpd-PreRegistrationInfo            HRPD-PreRegistrationInfo,
        hrpd-CellReselectionParameters      SEQUENCE {
            cellReselectionPriority             INTEGER (0..7),
            threshHigh                          INTEGER (0),                    -- value range FFS
            threshLow                           INTEGER (0),                    -- value range FFS
            tReselection                        INTEGER (0),                    -- value range FFS
            hrpd-NeighborCellList               SEQUENCE (SIZE (1..16)) OF SEQUENCE {
                hrpd-NeighborCellInfo               CDMA2000-NeighbourCellInformation
            }
        }       OPTIONAL
    }       OPTIONAL,
    onexrtt-Parameters                  SEQUENCE {
        onexrtt-LongCodeState               BIT STRING (SIZE (42)),
        cellReselectionPriority             INTEGER (0..7),
        threshHigh                          INTEGER (0),                        -- value range FFS
        threshLow                           INTEGER (0),                        -- value range FFS
        tReselection                        INTEGER (0),                        -- value range FFS
        onexrtt-NeighborCellList            SEQUENCE (SIZE (1..16)) OF SEQUENCE {
            onexrtt-NeighborCellInfo            CDMA2000-NeighbourCellInformation
        }
    }       OPTIONAL,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

***SystemInformationBlockType8* field descriptions**
cdma2000-SystemTimeInfo Information on CDMA2000 system time
searchWindowSize The search window size is a CDMA parameter to be used to assist in searching for the neighboring pilots
hrpd-Parameters The cell reselection parameters applicable only to HRPD systems
hrpd-PreRegistrationInfo The HRPD Pre-Registration Information tells the mobile if it should pre-register with the HRDP network and identifies the Pre-registration zone to the UE
hrpd-CellReselectionParameters cell reselection parameters applicable only to HRPD system
cellReselectionPriority Absolute priority of the RAT (0 means: highest priority). FFS if priority should be given per frequency
threshHigh This specifies the high threshold used in reselection towards CDMA2000 HRPD
threshLow This specifies the low threshold used in reselection towards CDMA2000 HRPD
tReselection *The HRPD cell reselection timer value in seconds*
hrpd-NeighborCellList List of HRPD neighbouring cells
hrpd-NeighborCellInfo Describes one HRPD cell
1xrtt-Parameters cell reselection parameters applicable only to 1XRTT system
onexrtt-LongCodeState The state of long code generation registers in 1XRTT system as defined in [C.S0002-A, Section 1.3] at $\lceil t/10 \rceil \times 10 + 320$ ms, where *t* equals to the *cdma-SystemTime*.
cellReselectionPriority Absolute priority of the RAT (0 means: highest priority). FFS if priority should be given per frequency
threshHigh This specifies the high threshold used in reselection towards CDMA2000 1xRTT
threshLow This specifies the low threshold used in reselection towards CDMA2000 1xRTT
tReselection The cdma2000 1x cell reselection timer value in seconds
1xrtt-NeighborCellList List of 1xRTT neighbouring cells
1xrtt-NeighborCellInfo Describes one 1xRTT cell

6.3.2 Radio resource control information elements

– AntennaInformation

The IE *AntennaInformation* is used to specify the antenna configuration to be applied by the UE.

***AntennaInformation* information elements**

```
-- ASN1START

AntennaInformation ::=              SEQUENCE {
    antennaPortsCount                   SEQUENCE {},                                    -- need FFS
    transmissionMode                    SEQUENCE {},                                    -- need FFS
    codebookSubsetRestriction           SEQUENCE {}                                     -- need FFS
}
-- ASN1STOP
```

AntennaInformation field descriptions
antennaPortsCount Reference [RAN1 specification; FFS]
transmissionMode Reference [RAN1 specification; FFS]
codebookSubsetRestriction Reference [RAN1 specification; FFS]

– CQI-Reporting

The IE *CQI-ReportingSIB* and IE *CQI-Reporting* are used to specify the CQI reporting configuration in the system information and in the dedicated signalling, respectively.

CQI-Reporting information elements

```
-- ASN1START

CQI-ReportingSIB ::=                SEQUENCE {
    nomPDSCH-RS-EPRE-Offset             INTEGER (0)                             -- value range FFS
}

CQI-Reporting ::=                   SEQUENCE {
    pucch-Resource                      SEQUENCE {},                        -- size, encoding FFS
    reportingConfigInfo                 SEQUENCE {
        periodicity                         ENUMERATED {ffs},               -- size, encoding FFS
        subFrameOffset                      ENUMERATED {ffs},               -- size, encoding FFS
        cqi-BurstLength                     ENUMERATED {ffs},               -- size, encoding FFS
        cqi-FormatIndicatorPeriodic         ENUMERATED {ffs},               -- size, encoding FFS
        cqi-FormatIndicatorAperiodic        ENUMERATED {ffs}                -- size, encoding FFS
    }       OPTIONAL,                                                           -- Need OC
    nomPDSCH-RS-EPRE-Offset             INTEGER (0)                 OPTIONAL    -- Need OC
}

-- ASN1STOP
```

CQI-Reporting field descriptions
pucch-Resource PUCCH resource (frequency and cyclic shift) to use for CQI reporting [RAN1 specification; FFS]
periodicity Parameter: *Periodicity (N_P)* [RAN1 specification; FFS]
subFrameOffset Parameter: *Subframe offset (N_{OFFSET})* [RAN1 specification; FFS]
cqi-BurstLength Parameter: *CQI burst length* [RAN1 specification; FFS]
cqi-FormatIndicatorPeriodic Parameter: *CQI format indicator(s) for periodic reporting* [RAN1 specification; FFS]
cqi-FormatIndicatorAperiodic Parameter: *CQI format indicator for aperiodic reporting* [RAN1 specification; FFS]
nomPDSCH-RS-EPRE-Offset Parameter: *Nominal PDSCH-to-RS-EPRE-offset* [RAN1 specification; FFS].

– DedicatedRandomAccessParams

The IE *DedicatedRandomAccessParams* is used to specify the dedicated random access parameters.

DedicatedRandomAccessParams information element

```
-- ASN1START

DedicatedRandomAccessParams ::=     SEQUENCE {
    ra-PreambleIndex                    INTEGER (1..64)
}

-- ASN1STOP
```

DedicatedRandomAccessParams field descriptions
ra-PreambleIndex Explicitly signalled Random Access Preamble in [36.321].

– GenericRandomAccessParams

The IE *GenericRandomAccessParams* is used to specify the generic random access parameters.

***GenericRandomAccessParams* information element**

```
-- ASN1START

GenericRandomAccessParams ::=       SEQUENCE {
    preambleInformation                 SEQUENCE {
        numberOfRA-Preambles                INTEGER (1..64) DEFAULT 1,              -- default FFS
        sizeOfRA-PreamblesGroupA            INTEGER (0)     DEFAULT 0       -- range, default FFS
    },
    powerRampingParameters              SEQUENCE {
        powerRampingStep                    INTEGER (0)     DEFAULT 0,      -- range, default FFS
        preambleInitialReceivedTargetPower  INTEGER (0)     DEFAULT 0       -- range, default FFS
    },
    ra-SupervisionInformation           SEQUENCE {
        preambleTransMax                    INTEGER (0)     DEFAULT 0,      -- range, default FFS
        ra-ResponseWindowSize               INTEGER (0)     DEFAULT 0,      -- range, default FFS
        mac-ContentionResolutionTimer       INTEGER (0)     DEFAULT 0       -- range, default FFS
    },
    maxHARQ-Msg3Tx                      INTEGER (0)         DEFAULT 0       -- range, default FFS
}

-- ASN1STOP
```

GenericRandomAccessParams field descriptions
numberOfRA-Preambles Number of non-dedicated random access preambles [36.321]. Default value is [FFS].
sizeOfRA-PreamblesGroupA Size of the random access preambles group A [36.321]. Value in [FFS]. Default value is [FFS].
powerRampingStep Parameter: *POWER_RAMP_STEP* [36.321]. Value in dB. Default value is [FFS].
preambleInitialReceivedTargetPower Parameter: *PREAMBLE_INITIAL_RECEIVED_TARGET_POWER* [36.321]. Value in dBm. Default value is [FFS].
preambleTransMax Parameter: *PREAMBLE_TRANS_MAX* [36.321]. Default value is [FFS].
ra-ResponseWindowSize Duration of the RA response window [RA_WINDOW_BEGIN — RA_WINDOW_END] [36.321]. Value in subframes. Default value is [FFS].
mac-ContentionResolutionTimer Parameter: *Contention Resolution Timer* [36.321]. Value in subframes. Default value is [FFS].
maxHARQ-Msg3Tx Parameter: *max-HARQ-Msg3-Tx* [36.321], used for contention based random access. Default value is [FFS].

– LogicalChannelConfig

The IE *LogicalChannelConfig* is used to configure the logical channel parameters.

***LogicalChannelConfig* information element**

```
-- ASN1START

LogicalChannelConfig ::=            SEQUENCE {
    ul-SpecificParameters               SEQUENCE {
        priority                            INTEGER (0),                            -- range FFS
        prioritizedBitRate                  INTEGER (0),                -- need, type, range FFS
        logicalChannelGroup                 INTEGER (0..3)                          -- need FFS
    }       OPTIONAL                                                                -- Cond UL
}

-- ASN1STOP
```

LogicalChannelConfig field descriptions
priority Logical channel priority in [36.321].
prioritizedBitRate Parameter: *Prioritized Bit Rate* [36.321]. Value in bytes/second.
logicalChannelGroup Mapping of logical channel to logical channel group [36.321]. (Encoding details are FFS)

Conditional presence	Explanation
UL	The IE is mandatory present for UL logical channels; otherwise it is not needed.

Editor's note: Are the logical channels unidirectional (UL/DL)? If so, should separate logical channel configuration IEs be defined for UL and DL logical channels?

– TransportChannelConfiguration

The IE *TransportChannelConfiguration* is used to specify the transport channel configuration for data radio bearers.

***TransportChannelConfiguration* information element**

```
-- ASN1START

TransportChannelConfiguration ::=   SEQUENCE {
    dl-SCH-Configuration                SEQUENCE {
        semiPersistSchedIntervalDL          INTEGER (0)     OPTIONAL            -- type, range FFS
    }       OPTIONAL,
    ul-SCH-Configuration                SEQUENCE {
        maxHARQ-Tx                          INTEGER (0)     OPTIONAL,     -- Cond ConnSU, range FFS
        semiPersistSchedIntervalUL          INTEGER (0)     OPTIONAL,           -- type, range FFS
        periodicBSR-Timer                   INTEGER (0)                     -- need, type, range FFS
    }       OPTIONAL,
    drx-Configuration                   SEQUENCE {
        drx-StartOffset                     INTEGER (0),                        -- type,range FFS
        onDurationTimer                     INTEGER (0)     DEFAULT 0,  -- type,range,default FFS
        drx-InactivityTimer                 INTEGER (0)     DEFAULT 0,  -- type,range,default FFS
        drx-RetransmissionTimer             INTEGER (0)     DEFAULT 0,  -- type,range,default FFS
        longDRX-Cycle                       INTEGER (0)     DEFAULT 0,  -- type,range,default FFS
        shortDRX                            SEQUENCE {
            shortDRX-Cycle                      INTEGER (0) DEFAULT 0,  -- type,range,default FFS
            drxShortCycleTimer                  INTEGER (0) DEFAULT 0   -- type,range,default FFS
        }       OPTIONAL
    }       OPTIONAL,
    timeAlignmentTimer                  INTEGER (0)     DEFAULT 0  -- type,range,default FFS
}

-- ASN1STOP
```

MAC-Configuration field descriptions
maxHARQ-Tx Parameter: *max-HARQ-Tx* [36.321]. If absent in the *RRCConnectionSetup* message, the default value as defined in 9.2.1.1 applies.
semiPersistSchedIntervalDL Semi-persistent scheduling interval in downlink. Value in number of TTI (sub-frames).
semiPersistSchedIntervalUL Semi-persistent scheduling interval in uplink. Value in number of TTI (sub-frames).
periodicBSR-Timer Parameter: *PERIODIC_BSR_TIMER* [36.321]. Value in number of TTI (sub-frames).
drx-StartOffset Parameter: *DRX Start Offset* [36.321]. Value in number of sub-frames. In TDD, this can point to a DL or UL sub-frame
onDurationTimer Parameter: *On Duration Timer* [36.321]. Value in number of PDCCH sub-frames. Default value is [FFS].
drx-InactivityTimer Parameter: *DRX Inactivity Timer* [36.321]. Value in number of PDCCH sub-frames. Default value is [FFS].
drx-RetransmissionTimer Parameter: *DRX Retransmission Timer* [36.321]. Value in number of PDCCH sub-frames. Default value is [FFS].
longDRX-Cycle Long DRX cycle in [36.321]. Value in [FFS]. Default value is [FFS].
shortDRX-Cycle Short DRX cycle in [36.321]. Value in [FFS]. Default value is [FFS].
drxShortCycleTimer Parameter: *DRX Short Cycle Timer* [36.321]. Value in [FFS]. Default value is [FFS].
timeAlignmentTimer Parameter: *Time Alignment Timer* [36.321]. Value in [FFS]. Default value is [FFS].

Conditional presence	Explanation
ConnSU	The IE is mandatory default if the IE is included in *RRCConnectionSetup*; otherwise it is optionally present, continue.

– PDCP-Configuration

The IE *PDCP-Configuration* is used to set the configurable PDCP parameters for data radio bearers.

***PDCP-Configuration* information element**

```
-- ASN1START

PDCP-Configuration ::=              SEQUENCE {
    discardTimer                        INTEGER (0)                         OPTIONAL,  -- range FFS
    rlc-Mode                            CHOICE {
        rlc-AM                              SEQUENCE {
            statusReportRequired                BOOLEAN,
            flushTimer                          ENUMERATED {ffs}
        },
        rlc-UM                              SEQUENCE {
            pdcp-SN-Size                        ENUMERATED {len7bits, len12bits}
        }
    },
    headerCompression                   CHOICE {
        notUsed                             NULL,
        rohc                                SEQUENCE {
            maxCID-UL                           INTEGER (1..16383)              DEFAULT 15,
            maxCID-DL                           INTEGER (1..16383)              DEFAULT 15,
            profiles                            SEQUENCE (SIZE (1..maxROHC-Profile)) OF SEQUENCE {
                profileInstance                     INTEGER (1..65536)
            }
        }
    }
}

-- ASN1STOP
```

PDCP-Configuration field descriptions
pdcp-SN-Size Indicates the length of the PDCP Sequence Number as specified in [8].
maxCID-UL Highest context ID number to be used in the uplink by the UE compressor.
maxCID-DL Highest context ID number that can be used in the downlink by the eNB compressor.
profiles Profiles used by both compressor and decompressor (FFS) in both UE and UTRAN. Profile 0 shall always be supported and may always be used even if it is not listed.
profileInstance Index to a ROHC profile as specified in [8]. If 2 profiles with the same 8 LSB"s are signalled, only the profile corresponding to the highest value should be applied.

– PHICH-Configuration

The IE *PHICH-Configuration* is used to specify the PHICH configuration.

***PHICH-Configuration* information element**

```
-- ASN1START

PHICH-Configuration ::=             SEQUENCE {
    phich-Duration                      ENUMERATED {short, long},
    phich-Resource                      ENUMERATED {ffs}                        -- 2-bit field FFS
}

-- ASN1STOP
```

PHICH-Configuration field descriptions
phich-Duration Parameter: *Duration* [RAN1 specification; FFS]
phich-Resource Parameter: *Resource* [RAN1 specification; FFS]

– PhysicalChConfiguration

The IE *PhysicalChConfiguration* is used to specify the UE specific physical channel configuration.

***PhysicalChConfiguration* information element**

```
-- ASN1START

PhysicalChConfiguration ::=         SEQUENCE {
    ul-ReferenceSignalsPUSCH            UL-ReferenceSignalsPUSCH,                       -- need FFS
    uplinkPowerControl                  UplinkPowerControl,                             -- need FFS
    pucch-Configuration                 PUCCH-Configuration,                            -- need FFS
    pusch-Configuration                 PUSCH-Configuration,                            -- need FFS
    cqi-Reporting                       CQI-Reporting,                                  -- need FFS
    tdd-Configuration                   TDD-Configuration           OPTIONAL,           -- need OC
    antennaInformation                  CHOICE {
        explicit                            AntennaInformation,
        default                             NULL
    } OPTIONAL                                                                          -- need OC
}

-- ASN1STOP
```

PhysicalChConfiguration field descriptions
antennaInformation The default antenna configuration is described in section 9.2.3

– PRACH-Configuration

The IE *PRACH-ConfigurationSIB* and IE *PRACH-Configuration* are used to specify the PRACH configuration in the system information and in the mobility control information, respectively.

PRACH-Configuration information elements

```
-- ASN1START

PRACH-ConfigurationSIB ::=          SEQUENCE {
    rootSequenceIndex                   INTEGER (0..1023),                  -- 10-bit field FFS
    prach-ConfigInfo                    PRACH-ConfigInfo
}

PRACH-Configuration ::=             SEQUENCE {
    rootSequenceIndex                   INTEGER (0..1023),                  -- 10-bit field FFS
    prach-ConfigInfo                    PRACH-ConfigInfo                OPTIONAL    -- Need OC
}

PRACH-ConfigInfo ::=                SEQUENCE {
    prach-ConfigurationIndex            ENUMERATED {ffs},                   -- 6-bit field FFS
    highSpeedFlag                       ENUMERATED {ffs},                   -- 1-bit field FFS
    zeroCorrelationZoneConfig           ENUMERATED {ffs}                    -- 4-bit field FFS
}

-- ASN1STOP
```

***PRACH-Configuration* field descriptions**
rootSequenceIndex Parameter: *Root-sequence-index* [RAN1 specification; FFS]
prach-ConfigurationIndex Parameter: *PRACH configuration* [RAN1 specification; FFS]
highSpeedFlag Parameter: *High-speed flag* [RAN1 specification; FFS]
zeroCorrelationZoneConfig Parameter: *Zero-correlation-zone configuration* [RAN1 specification; FFS]

– PUCCH-Configuration

The IE *PUCCH-ConfigurationSIB* and IE *PUCCH-Configuration* are used to specify the PUCCH configuration in the system information and in the handover case, respectively.

PUCCH-Configuration information elements

```
-- ASN1START

PUCCH-ConfigurationSIB ::=          SEQUENCE {
    pucch-ResourceSize                  ENUMERATED {ffs},               -- need, size, encoding FFS
    deltaShift                          ENUMERATED {ffs},                   -- 2-bit field FFS
    deltaOffset                         ENUMERATED {ffs}                    -- 2-bit field FFS
}

PUCCH-Configuration ::=             SEQUENCE {
    pucch-ResourceSize                  ENUMERATED {ffs}    OPTIONAL,   -- need, size, encoding FFS
    simultaneousAckNackAndCQI           BOOLEAN,
    deltaShift                          ENUMERATED {ffs},                   -- 2-bit field FFS
    deltaOffset                         ENUMERATED {ffs}                    -- 2-bit field FFS
}

-- ASN1STOP
```

PUCCH-Configuration field descriptions
pucch-ResourceSize Parameter: *PUCCH-resource-size* [RAN1 specification; FFS]
simultaneousAckNackAndCQI Parameter: *Simultaneous transmission of Ack/Nack and CQI* [RAN1 specification; FFS]
deltaShift Parameter: *Delta_shift* [RAN1 specification; cf. R1-080035; FFS]
deltaOffset Parameter: *Delta_offset* [RAN1 specification; cf. R1-080035; FFS]

– PUSCH-Configuration

The IE *PUSCH-Configuration* is used to specify the PUSCH configuration

PUSCH-Configuration information element

```
-- ASN1START

PUSCH-Configuration ::=             SEQUENCE {
    parameterM                          ENUMERATED {ffs},                       -- 2-bit field FFS
    hoppingMode                         ENUMERATED {interSubFrame, interIntraSubFrame}
}

-- ASN1STOP
```

PUSCH-Configuration field descriptions
parameterM Parameter: *Parameter M* [RAN1 specification; cf. R1-075086; FFS]
hoppingMode Parameter: *Hopping mode* [RAN1 specification; FFS]

– RadioResourceConfiguration

The IE *RadioResourceConfiguration* is used to setup/modify/release RBs, to setup/modifiy transport channel configurations and to setup/modify physical channels

RadioResourceConfiguration information element

```
-- ASN1START

RadioResourceConfiguration ::=      SEQUENCE {
    srb-ToAddModifyList                 SEQUENCE (SIZE (1..2)) OF SEQUENCE {
        srb-Identity                        INTEGER (1..2),
        rlc-Configuration                   CHOICE {
            explicit                            RLC-Configuration,
            default                             NULL
        }       OPTIONAL,                                                       -- Cond Setup
        logicalChannelConfig                CHOICE {
            explicit                            LogicalChannelConfig,
            default                             NULL
        }       OPTIONAL                                                        -- Cond Setup
    }       OPTIONAL,
    drb-ToAddModifyList                 SEQUENCE (SIZE (1..maxDRB)) OF SEQUENCE {
        eps-BearerIdentity                  INTEGER (1),                        -- range FFS
        drb-Identity                        INTEGER (1),                        -- range FFS
        pdcp-Configuration                  PDCP-Configuration      OPTIONAL,    -- Cond Setup
        rlc-Configuration                   RLC-Configuration       OPTIONAL,    -- Cond Setup
        rlc-ReestablishmentRequest          ENUMERATED {true}       OPTIONAL,    -- Cond Reconf
        rb-MappingInfo                      RB-MappingInfo          OPTIONAL,    -- Cond Setup
        logicalChannelConfig                CHOICE {
            explicit                            LogicalChannelConfig,
            default                             NULL
        }       OPTIONAL                                                        -- Cond Setup
    }       OPTIONAL,
    drb-ToReleaseList                   SEQUENCE (SIZE (1..maxDRB)) OF SEQUENCE {
        drb-Identity                            INTEGER (1)                     -- range FFS
    }       OPTIONAL,
    transportChannelConfig              CHOICE {
```

```
            explicit                        TransportChannelConfiguration,
            default                         NULL
    }       OPTIONAL,                                                       -- Cond Setup
    physicalChConfiguration             PhysicalChConfiguration     OPTIONAL            -- Need OC
}

RB-MappingInfo ::=                  SEQUENCE {
    ul-LogicalChannel-Identity          INTEGER (1),                        -- range FFS
    dl-LogicalChannel-Identity          INTEGER (1)                         -- range FFS
}

-- ASN1STOP
```

***RadioResourceConfiguration* field descriptions**
rlc-Configuration   SRB choice indicates whether the RLC configuration is set to the values signalled explicitly or to the values defined in the default RLC configuration table for SRB1. The default choice is only applicable for SRB1.
transportChannelConfiguration   The default transport channel configuration is specified in 9.2.1.1 and applies only when the IE is included in the RRCConnectionSetup and RRCConnectionReestablishment messages as well as in the RRCConnectionReconfiguration when only SRB1 is (being) established
logicalChannelConfig   The default logical channel configuration is specified in 9.2.1.1 and applies only when the IE is included in the RRCConnectionSetup and RRCConnectionReestablishment messages as well as in the RRCConnectionReconfiguration when SRB1 or SRB2 is (being) established

Conditional presence	Explanation
Setup	The IE is mandatory present if the corresponding SRB/DRB is being setup; otherwise the IE is optionally present, continue.
Reconf	The IE is optionally present if the corresponding DRB is being reconfigured; otherwise the IE is not needed.

– RLC-Configuration

The IE *RLC-Configuration* is used to specify the RLC configuration of SRBs and DRBs.

***RLC-Configuration* information element**

```
-- ASN1START

RLC-Configuration ::=               CHOICE {
    am                                  SEQUENCE {
        ul-AM-RLC                           UL-AM-RLC,
        dl-AM-RLC                           DL-AM-RLC
    },
    um-Bi-Directional                   SEQUENCE {
        ul-UM-RLC                           UL-UM-RLC,
        dl-UM-RLC                           DL-UM-RLC
    },
    um-Uni-Directional-UL               SEQUENCE {
        ul-UM-RLC                           UL-UM-RLC
    },
    um-Uni-Directional-DL               SEQUENCE {
        dl-UM-RLC                           DL-UM-RLC
    }
}

UL-AM-RLC ::=                       SEQUENCE {
    t-PollRetransmit                    T-PollRetransmit,
    pollPDU                             PollPDU,
    pollByte                            PollByte
}

DL-AM-RLC ::=                       SEQUENCE {
    t-Reordering                        T-Reordering,
    t-StatusProhibit                    T-StatusProhibit
}

UL-UM-RLC ::=                       SEQUENCE {
    sn-FieldLength                      SN-FieldLength
```

```
}

DL-UM-RLC ::=                       SEQUENCE {
    sn-FieldLength                      SN-FieldLength,
    t-Reordering                        T-Reordering
}

SN-FieldLength ::=                  ENUMERATED {size5, size10}

T-PollRetransmit ::=                ENUMERATED {
                                        ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,
                                        ms40, ms45, ms50, ms55, ms60, ms65, ms70,
                                        ms75, ms80, ms85, ms90, ms95, ms100, ms105,
                                        ms110, ms115, ms120, ms125, ms130, ms135,
                                        ms140, ms145, ms150, ms155, ms160, ms165,
                                        ms170, ms175, ms180, ms185, ms190, ms195,
                                        ms200, ms205, ms210, ms215, ms220, ms225,
                                        ms230, ms235, ms240, ms245, ms250, ms300,
                                        ms350, ms400, ms450, ms500, spare7,
                                        spare6, spare5, spare4, spare3, spare2,
                                        spare1}

PollPDU ::=                         ENUMERATED {ffs}                        -- value range FFS

PollByte ::=                        ENUMERATED {ffs}                        -- value range FFS

T-Reordering ::=                    ENUMERATED {
                                        ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,
                                        ms40, ms45, ms50, ms55, ms60, ms65, ms70,
                                        ms75, ms80, ms85, ms90, ms95, ms100, ms110,
                                        ms120, ms130, ms140, ms150, ms160, ms170,
                                        ms180, ms190, ms200, spare}

T-StatusProhibit ::=                ENUMERATED {
                                        ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,
                                        ms40, ms45, ms50, ms55, ms60, ms65, ms70,
                                        ms75, ms80, ms85, ms90, ms95, ms100, ms105,
                                        ms110, ms115, ms120, ms125, ms130, ms135,
                                        ms140, ms145, ms150, ms155, ms160, ms165,
                                        ms170, ms175, ms180, ms185, ms190, ms195,
                                        ms200, ms205, ms210, ms215, ms220, ms225,
                                        ms230, ms235, ms240, ms245, ms250, ms300,
                                        ms350, ms400, ms450, ms500, spare7,
                                        spare6, spare5, spare4, spare3, spare2,
                                        spare1}

-- ASN1STOP
```

***RLC-Configuration* field descriptions**
sn-FieldLength Indicates the UM RLC SN field size in bits.
t-PollRetransmit Indicates the value of timer *T_poll_retransmit* [7] in milliseconds, ms0 means 0ms, ms5 means 5ms and so on.
pollPDU Indicates the value of constant *Poll_PDU* [7] in PDUs.
pollByte Indicates the value of constant *Poll_Byte* [7] in bytes.
t-Reordering Indicates the value of timer *T_reordering* [7] in milliseconds, ms0 means 0ms, ms5 means 5ms and so on.
t-StatusProhibit Indicates the value of timer *T_status_prohibit* [7] in milliseconds, ms0 means 0ms, ms5 means 5ms and so on.

– SemiStaticCommonChConfig

The IE *SemiStaticCommonChConfigSIB* and IE *SemiStaticCommonChConfig* are used to specify common channel configurations in the system information and in the mobility control information, respectively, e.g., the random access parameters and the static layer-1 parameters.

***SemiStaticCommonChConfig* information element**

```
-- ASN1START
```

```
SemiStaticCommonChConfigSIB ::=     SEQUENCE {
    genericRandomAccessParams           GenericRandomAccessParams,
    referenceSignalPower                INTEGER (0),                                    -- encoding FFS
    p-a                                 SEQUENCE {}                 OPTIONAL,           -- type FFS
    p-b                                 SEQUENCE {}                 OPTIONAL,           -- type FFS
    prach-Configuration                 PRACH-ConfigurationSIB,
    bcch-Configuration                  BCCH-Configuration,
    pcch-Configuration                  PCCH-Configuration
}

SemiStaticCommonChConfig ::=        SEQUENCE {
    genericRandomAccessParams           GenericRandomAccessParams,
    numberOfTransmitAntennas            ENUMERATED {n1, n2, n4}
                                            OPTIONAL,                   -- Need OC, 2-bit field FFS
    phich-Configuration                 PHICH-Configuration                 OPTIONAL,   -- Need OC
    referenceSignalPower                INTEGER (0),                          -- need, encoding FFS
    prach-Configuration                 PRACH-Configuration
}

BCCH-Configuration ::=              SEQUENCE {
    modificationPeriodCoeff             INTEGER (0)                                     -- range FFS
}

PCCH-Configuration ::=              SEQUENCE {
    defaultPagingCycle                  ENUMERATED {
                                            ms320, ms640, ms1280, ms2560},
    nB                                  ENUMERATED {
                                            fourT, twoT, oneT, halfT, quarterT, oneEightT,
                                            onSixteenthT, oneThirtySecondT}
}
-- ASN1STOP
```

***SemiStaticCommonChConfig* field descriptions**
numberOfTransmitAntennas Parameter: *Number of (cell-specific) antenna-ports* [RAN1 specification; FFS]
referenceSignalPower Parameter: *Reference-signal power* [RAN1 specification; FFS]
p-a Parameter: P_A provides information about the exact power setting of the PDSCH transmission. [RAN1 specification; FFS]
p-b Parameter: P_B offset between Type A and Type B PDSCH resource elements [RAN1 specification; FFS]

BCCH-Configuration
modificationPeriodCoeff Actual modification period= modificatinoPeriodCoeff * defaultPagingCycle

PCCH-Configuration
defaultPagingCycle Default paing cycle, referred to a "T" in TS 36.304 [4]
nB Parameter: *Nb* is used to derive the number of paging groups according to TS 36.304 *[4]*

– SemiStaticSharedChConfig

The IE *SemiStaticSharedChConfig* is used %%

SemiStaticSharedChConfig information element

```
-- ASN1START

SemiStaticSharedChConfig ::=        SEQUENCE {
    ul-ReferenceSignalsPUSCH            UL-ReferenceSignalsPUSCH,
    uplinkPowerControl                  UplinkPowerControlSIB,
    pucch-Configuration                 PUCCH-ConfigurationSIB,
    pusch-Configuration                 PUSCH-Configuration,
    cqi-Reporting                       CQI-ReportingSIB
```

```
}

-- ASN1STOP
```

***SemiStaticSharedChConfig* field descriptions**
%fieldIdentifier%

– TDD-Configuration

The IE *TDD-Configuration* is used to specify the TDD specific physical channel configuration.

TDD-Configuration information element

```
-- ASN1START

TDD-Configuration ::=               SEQUENCE {
    subframeAssignment                  ENUMERATED {
                                            sa0, sa1, sa2, sa3, sa4, sa5, sa6},
    specialSubframePatterns             ENUMERATED {
                                            ssp0, ssp1, ssp2, ssp3, ssp4,ssp5, ssp6, ssp7,
                                            ssp8}                                       -- need FFS
}

-- ASN1STOP
```

***TDD-Configuration* field descriptions**
subframeAssignment Indicates DL/UL subframe configuration where sa0 point to Configuration 0, sa1 to Configuration 1 etc. as specified in the 36.211, table 4.2.2.
specialSubframePatterns Indicates Configuration as in Ref 36.211, table 4.2.1 where ssp0 point to Configuration 0, ssp1 to Configuration 1 etc

– UL-ReferenceSignalsPUSCH

The IE *UL-ReferenceSignalsPUSCH* is used to specify parameters needed for the transmission on PUSCH (or PUCCH).

UL-ReferenceSignalsPUSCH information element

```
-- ASN1START

UL-ReferenceSignalsPUSCH ::=        SEQUENCE {
    groupHoppingEnabled                 BOOLEAN,
    groupAssignmentPUSCH                SEQUENCE {},                            -- 5-bit field FFS
    sequenceHoppingEnabled              BOOLEAN,
    dynamicCyclicShift                  CHOICE {
        dynamicallyAssigned                 NULL,
        semiStaticallyAssigned              CyclicShift
    }
}

CyclicShift ::=                     INTEGER (0)                             -- 3 or 4-bit field FFS

-- ASN1STOP
```

UL-ReferenceSignalsPUSCH field descriptions
groupHoppingEnabled Parameter: Group-hopping-enabled [RAN1 specification; FFS]
groupAssignmentPUSCH Parameter: Group-assignment-PUSCH [RAN1 specification; FFS]
sequenceHoppingEnabled Parameter: Sequence-hopping-enabled [RAN1 specification; FFS]
dynamicCyclicShift Parameters: Dynamic-cyclic-shift [RAN1 specification; FFS]
cyclicShift Parameters: Cyclic-shift [RAN1 specification; FFS]

– UplinkPowerControl

The IE *UplinkPowerControlSIB* and IE *UplinkPowerControl* are used to specify parameters for uplink power control in the system information and in the dedicated signalling, respectively.

UplinkPowerControl information elements

```
-- ASN1START

UplinkPowerControlSIB ::=           SEQUENCE {
    p0-NominalPUSCH                     SEQUENCE {
        persistantScheduling                INTEGER (0),                        -- 8-bit field FFS
        nonPersistantScheduling             INTEGER (0)                         -- 8-bit field FFS
    },
    alpha                               INTEGER (0),                            -- 3-bit field FFS
    deltaMCS-PUSCH                      ENUMERATED {ffs},                       -- 2-bit field FFS
    tpc-StepSizePUSCH                   ENUMERATED {ffs},                       -- 1-bit field FFS
    p0-PUCCH                            INTEGER (0),                            -- 5-bit field FFS
    deltaMCS-PUCCH                      SEQUENCE (SIZE (0..maxMCS-1)) OF            -- size FFS
                                            ENUMERATED {ffs},           -- (N-1) x 2-bit field FFS
    tpc-StepSizePUCCH                   ENUMERATED {ffs}                        -- 2-bit field FFS
}

UplinkPowerControl ::=              SEQUENCE {
    -- Enter IEs here (FFS)
}

-- ASN1STOP
```

UplinkPowerControl field descriptions
p0-NominalPUSCH Parameter: $P_{0,NOMINAL\_PUSCH}$ [RAN1 specification; FFS]
alpha Parameter: α [RAN1 specification; FFS]
deltaMCS-PUSCH Parameter: *Delta_MCS_PUSCH* [RAN1 specification; FFS]
tpc-StepSizePUSCH Parameter: *TPC step size (PUSCH)* [RAN1 specification; FFS]
p0-PUCCH Parameter: $P_{0,PUCCH}$ [RAN1 specification; FFS]
deltaMCS-PUCCH Parameter: Δ_{MCS_PUCCH} [RAN1 specification; FFS]
tpc-StepSizePUCCH Parameter: *TPC step size (PUCCH)* [RAN1 specification; FFS]

6.3.3 Security control information elements

– CipheringAlgorithm

The IE *CipheringAlgorithm* is used %%

CipheringAlgorithm information element

```
-- ASN1START

CipheringAlgorithm ::=              ENUMERATED {
                                        eea0, eea1, eea2,spare13, spare12, spare11, spare10,
                                        spare9, spare8, spare7, spare6, spare5, spare4, spare3,
                                        spare2, spare1}

-- ASN1STOP
```

***CipheringAlgorithm* field descriptions**
%fieldIdentifier%

– IntegrityProtAlgorithm

The IE *IntegrityProtAlgorithm* is used %%

IntegrityProtAlgorithm information element

```
-- ASN1START

IntegrityProtAlgorithm ::=          ENUMERATED {
                                        eia1, eia2, spare14, spare13, apare12, apare11, spare10,
                                        spare9, spare8, spare7, spare6, spare5, spare4, spare3,
                                        spare2, spare1}

-- ASN1STOP
```

***IntegrityProtAlgorithm* field descriptions**
%fieldIdentifier%

– KeyIndicator

The IE *KeyIndicator* is used %%

KeyIndicator information element

```
-- ASN1START

KeyIndicator ::=                    SEQUENCE {
    -- Enter the IEs here.                                                              FFS
}

-- ASN1STOP
```

***KeyIndicator* field descriptions**
%fieldIdentifier%

Editor's note: FFS whether we use a number or a single bit.

– SecurityConfiguration

The IE *SecurityConfiguration* is used to configure AS integrity protection (CP) and AS ciphering (CP and UP).

SecurityConfiguration information element

```
-- ASN1START

SecurityConfiguration ::=           SEQUENCE {
    integrityProtAlgorithm              IntegrityProtAlgorithm          OPTIONAL,   -- Cond SMC
    cipheringAlgorithm                  CipheringAlgorithm              OPTIONAL,   -- Cond SMC
    keyIndicator                        KeyIndicator                    OPTIONAL    -- Cond Handover
}

-- ASN1STOP
```

***SecurityConfiguration* field descriptions**
integrityProtAlgorithm Field description is FFS.
cipheringAlgorithm The same ciphering algorithm is assumed to be used for SRBs and DRBs
keyIndicator Indicates whether the UE should use the keys associated with latest available Kasme (details FFS).

Conditional presence	Explanation
Handover	The IE is mandatory present if the IE *MobilityControlInfo* is present in the message; otherwise the IE is not needed.
SMC	The IE is mandatory present if the IE *SecurityConfiguration* is included in the *SecurityModeCommand* message; otherwise the IE is optional.

6.3.4 Mobility control information elements

– CDMA2000-NeighbourCellInformation

The IE *CDMA2000-NeighbourCellInformation* is used to describe a CDMA2000 1xRTT or a CDMA2000 HRPD neighboring cell.

CDMA2000-NeighbourCellInformation information element

```
-- ASN1START

CDMA2000-NeighbourCellInformation ::= SEQUENCE {
    cdma2000-CarrierInfo                CDMA2000-CarrierInfo            OPTIONAL,       --Need OC
    pnOffset                            CDMA2000-CellIdentity
}

-- ASN1STOP
```

***CDMA2000-NeighborCellInformation* field descriptions**
CDMA2000-CarrierInfo Indicates frequency and band class of the cell.
pnOffset Identifies the CDMA 'Physical cell identity'.

– CDMA2000-SystemTimeInfo

The IE *CDMA2000-SystemTimeInfo* is %%

NOTE: The UE needs the CDMA system time with a certain level of accuracy for performing measurements as well as for communicating with the CDMA network (HRPD or 1xRTT).

Editor's note: Changes of CDMA system time should neither result in system information change notifications nor in a modification of the value tag in SI-1.

CDMA2000-SystemTimeInfo information element

```
-- ASN1START

CDMA2000-SystemTimeInfo ::=          SEQUENCE {
    cdma-EUTRA-Synchronisation           BOOLEAN,
    cdma-SystemTime                      CHOICE {
        cdma-SynchronousSystemTime           BIT STRING (SIZE (39)),
        cdma-AsynchronousSystemTime          BIT STRING (SIZE (49))
    }
}

-- ASN1STOP
```

CDMA2000-SystemTimeInfo field descriptions
cdma-EUTRA-Synchronisation
TRUE indicates that the networks are synchronised i.e. there is no drift in the timing between E-UTRA and CDMA.
cdma-SystemTime
CDMA system time corresponding to the SFN boundary at or after the ending boundary of the SI-window in which *SystemInformationBlockType8* is transmitted. If synchronized to CDMA system time then the size is 39 bits and the unit is 10 ms based on a 1.2288 Mcps chip rate.
cdma-AsynchronousSystemTime
The CDMA system time corresponding to the SFN boundary at or after the ending boundary of the SI-Window in which SystemInformationBlockType8 is transmitted. If not synchronized then the size is 49 bits and the unit is [8 CDMA chips based on 1.2288 Mcps].

– CDMA2000-Type

The IE *CDMA2000-Type* is used to describe the type of CDMA2000 network.

CDMA2000-Type information element

```
-- ASN1START

CDMA2000-Type ::=                    ENUMERATED {type1XRTT, typeHRPD}

-- ASN1STOP
```

CDMA2000-Type field descriptions
cdma2000-Type
Type of CDMA2000 network: 1xRTT or HRPD.

– CellIdentity

The IE *CellIdentity* is used %%

CellIdentity information element

```
-- ASN1START

CellIdentity ::=                     SEQUENCE {
    -- Enter the IEs here.                                                    FFS
}

-- ASN1STOP
```

CellIdentity field descriptions
%fieldIdentifier%

– CellReselectionInfoCommon

The IE *CellReselectionInfoCommon* is used %%

CellReselectionInfoCommon information element

```
-- ASN1START

CellReselectionInfoCommon ::=       SEQUENCE {
    -- Enter the IEs here.                                                          FFS
}

-- ASN1STOP
```

***CellReselectionInfoCommon* field descriptions**
%fieldIdentifier%

– CellReselectionInfoServingCell

The IE *CellReselectionInfoServingCell* is used %%

CellReselectionInfoServingCell information element

```
-- ASN1START

CellReselectionInfoServingCell ::=  SEQUENCE {
    -- Enter the IEs here.                                                          FFS
}

-- ASN1STOP
```

***CellReselectionInfoServingCell* field descriptions**
%fieldIdentifier%

– EUTRA-CarrierFreq

The IE *EUTRA-CarrierFreq* is used %%

EUTRA-CarrierFreq information element

```
-- ASN1START

EUTRA-CarrierFreq ::=               SEQUENCE {
    earfcn-DL                           INTEGER (0..maxEARFCN),
    earfcn-UL                           INTEGER (0..maxEARFCN)              OPTIONAL    -- Cond FDD
}

-- ASN1STOP
```

***EUTRA-CarrierFreq* field descriptions**
earfcn-DL Defined in [36.101]
earfcn-UL Default value determined from TX-RX frequency specification specified in [36.101]

Conditional presence	Explanation
FDD	The IE is mandatory with default value (default duplex distance defined for the concerned band) in case of 'FDD'; otherwise the IE is not needed.

– EUTRA-DL-CarrierFreq

The IE *EUTRA-DL-CarrierFreq* is used %%

***EUTRA-DL-CarrierFreq* information element**

```
-- ASN1START

EUTRA-DL-CarrierFreq ::=                SEQUENCE {
    earfcn-DL                           INTEGER (0..maxEARFCN)
}

-- ASN1STOP
```

***EUTRA-DL-CarrierFreq* field descriptions**
earfcn-DL Defined in [36.101]

– GERAN-BCCH-Configuration

The IE *GERAN-BCCH-Configuration* is used to provide a GERAN BCCH configuration, including frequency specific parameters.

***GERAN-BCCH-Configuration* information element**

```
-- ASN1START

GERAN-BCCH-Configuration ::=        SEQUENCE {
    q-Rxlevmin                          INTEGER (-60..-28),
    threshX-High                        INTEGER (-60..-28),
    threshX-Low                         INTEGER (-60..-28)
}

-- ASN1STOP
```

***GERAN-BCCH-Configuration* field descriptions**
q-Rxlevmin Actual value of *q-Rxlevmin* = IE value * 2. Value in dBm.
threshX-High Actual value of *threshX-High* ("$Thresh_{x,high}$", [36.304])= IE value * 2. Value in dBm.
threshX-Low Actual value of *threshX-Low* ("$Thresh_{x,low}$", [36.304])= IE value * 2. Value in dBm.

– GERAN-DL-CarrierFreq

The IE *GERAN-DL-CarrierFreq* is used %%

***GERAN-DL-CarrierFreq* information element**

```
-- ASN1START

GERAN-DL-CarrierFreq ::=            SEQUENCE {
    bcch-ARFCN                          INTEGER (0..1023),
    bandIndicator                       ENUMERATED {dcs1800, pcs1900}
}

-- ASN1STOP
```

***GERAN-DL-CarrierFreq* field descriptions**
bcch-ARFCN GERAN ARFCN of BCCH carrier
bandIndicator Indicates how to interpret the ARFCN of BCCH carrier

– GERAN-CellIdentity

The IE *GERAN-CellIdentity* is used %%

GERAN-CellIdentity information element

```
-- ASN1START

GERAN-CellIdentity ::=              SEQUENCE {
    -- Enter other IEs here.                                                    FFS
}

-- ASN1STOP
```

***GERAN-CellIdentity* field descriptions**
%fieldIdentifier%

– GERAN-DL-CarrierFreqList

The IE *GERAN-DL-CarrierFreqList* is used to provide a set of GERAN ARFCN values [44.005], which represents a list of GERAN frequencies.

GERAN-DL-CarrierFreqList information element

```
-- ASN1START

GERAN-DL-CarrierFreqList ::=        SEQUENCE {
    startingARFCN                       GERAN-ARFCN-Value,
    bandIndicator                       ENUMERATED {gsm1800, gsm1900},
    followingARFCNs                     CHOICE {
        explicitListOfARFCNs                SEQUENCE (SIZE (0..31)) OF GERAN-ARFCN-Value,
        equallySpacedARFCNs                 SEQUENCE {
            arfcn-Spacing                       INTEGER (1..8),
            numberOfFollowingARFCNs             INTEGER (0..31)
        }
        -- Other options, e.g., bitmap, GERAN Frequency List IE [44.018] are FFS
    }
}

GERAN-ARFCN-Value ::=               INTEGER (0..1023)

-- ASN1STOP
```

***GERAN-DL-CarrierFreqList* field descriptions**
startingARFCN The first ARFCN value, s, in the set.
bandIndicator Indicator to distinguish the GERAN frequency band in case of ARFCN values associated with either GSM 1800 or GSM 1900 carriers. For ARFCN values not associated with one of those bands, the indicator has no meaning.
followingARFCNs Field containing a representation of the remaining ARFCN values in the set.
arfcn-Spacing Space, d, between a set of equally spaced ARFCN values.
numberOfFollowingARFCNs The remaining number, n, of equally spaced ARFCN values in the set. The complete set of (n+1) ARFCN values is defined as: {s, ((s + d) mod 1024), ((s + 2*d) mod 1024) ... ((s + n*d) mod 1024)}.

– HRPD-PreRegistrationInfo information element

```
-- ASN1START

HRPD-PreRegistrationInfo ::=            SEQUENCE {
    hrpd-PreRegistrationAllowed             BOOLEAN,
    hrpd-PreRegistrationZoneId              INTEGER (0) OPTIONAL,   -- cond PreRegistrationAllowed
    hrpd-SecondaryPreRegistrationZoneIdList SEQUENCE (SIZE (1..2)) OF SEQUENCE {
        hrpd-SecondaryPreRegistrationZoneId     INTEGER (0)                 -- value range FFS
    }       OPTIONAL
}

-- ASN1STOP
```

***HRPD-PreRegistrationInfo* field descriptions**
HRPD-PreRegistrationAllowed TRUE indicates that a UE in LTE_IDLE shall perform an HRPD pre-registration if the UE does not have a valid / current pre-registration.
HRPD-PreRegistrationZoneID Used to control when the UE should re-register.
HRPD-SecondaryPreRegistrationZoneIdList Used to control when the UE should re-register.

Conditional presence	Explanation
PreRegitrationAllowed	The IE is mandatory in case the *hrpd-PreRegistrationAllowed* is set to "true"

– IdleModeMobilityControlInfo

The IE *IdleModeMobilityControlInfo* is used %%

***IdleModeMobilityControlInfo* information element**

```
-- ASN1START

IdleModeMobilityControlInfo ::=     SEQUENCE {
    interFreqPriorityInfoList           SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {
        eutra-CarrierFreq                   EUTRA-DL-CarrierFreq,
        cellReselectionPriority             INTEGER (0..7)                      -- value range FFS
    }       OPTIONAL,
    geran-CarrierFreqList               SEQUENCE (SIZE (1..maxGERAN-Carrier)) OF SEQUENCE {
        geran-CarrierFreq                   GERAN-DL-CarrierFreq,
        geran-CellReselectionPriority       INTEGER (0..7)                      -- value range FFS
    }       OPTIONAL,
    utra-CarrierFreqList                SEQUENCE (SIZE (1..maxUTRA-Carrier)) OF SEQUENCE {
        utra-CarrierFreq                    UTRA-DL-CarrierFreq,
        utra-CellReselectionPriority        INTEGER (0..7)                      -- value range FFS
    }       OPTIONAL,
    cellReselectionPriorityExpiryTimer  SEQUENCE {                                  -- FFS
    }       OPTIONAL
}

-- ASN1STOP
```

***IdleModeMobilityControlInfo* field descriptions**
carrierFrequency Field description is FFS. (Could generic descriptions be used to cover multiple cases, i.e.: E-UTRA inter-frequency, GERAN and UTRA?)
cellReselectionPriority Field description is FFS.
cellReselectionPriorityExpiryTimer Upon expiry, the UE discards the inter-frequency and inter-RAT priority information

– InterRAT-Message

The IE *InterRAT-Message* is used to transparently carry message corresponding to specifications from another RAT, e.g., handover command, (Packet) System Information as used in case of GERAN network assisted cell change, HRPD "TCA" for mobility to HRPD.

InterRAT-Message information element

```
-- ASN1START

InterRAT-Message ::=                SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

***InterRAT-Message* field descriptions**
%fieldIdentifier%

– InterRAT-Target

The IE *InterRAT-Target* is used %%

InterRAT-Target information element

```
-- ASN1START

InterRAT-Target ::=                SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

***InterRAT-Target* field descriptions**
%fieldIdentifier%

– MobilityControlInformation

The IE *MobilityControlInformation* includes parameters relevant for network controlled mobility to/within E-UTRA.

Editor's note The UE is not aware if the handover involves a change of eNB, i.e. no UE behaviour is defined specific for the intra-eNB and the inter-eNB cases

Editor's note It is FFS if other system information may be provided in the message used to trigger handover, e.g. Semi-static shared channel configuration information, UE timers and constants

MobilityControlInformation information element

```
-- ASN1START

MobilityControlInformation ::=      SEQUENCE {
    targetCellIdentity                  PhysicalCellIdentity,
    eutra-CarrierFreq                   EUTRA-CarrierFreq                   OPTIONAL,   -- Need OC
    eutra-CarrierBandwidth              EUTRA-CarrierBandwitdh              OPTIONAL,   -- Need OC
    additionalSpectrumEmission          INTEGER (0..31)                     OPTIONAL,   -- Need OC
    semiStaticCommonChConfig            SemiStaticCommonChConfig            OPTIONAL,   -- Need OC
    dedicatedRandomAccessParams         DedicatedRandomAccessParams         OPTIONAL    -- Need FFS
}

EUTRA-CarrierBandwitdh ::=          SEQUENCE {
    dl-Bandwidth                        ENUMERATED {ffs}    OPTIONAL,   -- Need OC, 4-bit field FFS
    ul-Bandwitdh                        ENUMERATED {ffs}    OPTIONAL    -- Need OC, 4-bit field FFS
}
```

```
-- ASN1STOP
```

***MobilityControlInformation* field descriptions**
additionalSpectrumEmission Defined in [36.101]
dl-Bandwidth Parameter: *Downlink bandwidth* [36.101]
ul-Bandwidth Parameter: *Uplink bandwidth* [36.101]

– PhysicalCellIdentity

The IE *PhysicalCellIdentity* is used %%

PhysicalCellIdentity information element

```
-- ASN1START

PhysicalCellIdentity ::=            INTEGER (1..504)                -- range to be confirmed FFS

-- ASN1STOP
```

***PhysicalCellIdentity* field descriptions**
Void

– PLMN-Identity

The IE *PLMN-Identity* covers %%.

PLMN-Identity information element

```
-- ASN1START

PLMN-Identity ::=                   SEQUENCE {
    -- Enter other IEs here.                                                    FFS
}

-- ASN1STOP
```

***PLMN-Identity* field descriptions**
%fieldIdentifier%

– RedirectionInformation

The IE *RedirectionInformation* is used to redirect the UE to another E-UTRA or an inter-RAT carrier frequency.

RedirectionInformation information element

```
-- ASN1START


RedirectionInformation ::=          CHOICE {
    eutra-CarrierFreq                   EUTRA-DL-CarrierFreq,           -- anyting more needed FFS
    interRAT-target                     CHOICE {
        geran                               GERAN-DL-CarrierFreq,
        utra                                UTRA-DL-CarrierFreq,
        cdma2000-HRPD                           CDMA2000-CarrierInfo,
        cdma2000-1xRTT                          CDMA2000-CarrierInfo
    }
```

```
}

-- ASN1STOP
```

***RedirectionInformation* field descriptions**
GERAN-DL-CarrierFreq Indicates frequency and band indicator of the cell.
UTRA-DL-CarrierFreq Indicates frequency of the cell.
CDMA2000-CarrierInfo Indicates frequency and band class of the cell.

– RegisteredMME

The IE *RegisteredMME* is used to identify the MME where the UE was registered.

RegisteredMME information element

```
-- ASN1START

RegisteredMME ::=                   SEQUENCE {
    mcc                                 SEQUENCE {},                -- need, encoding (sep. IE) FFS
    mnc                                 SEQUENCE {},                -- need, encoding (sep. IE) FFS
    mmegi                               SEQUENCE {},                -- need, encoding (sep. IE) FFS
    mmec                                SEQUENCE {}                 -- need, encoding (sep. IE) FFS
}

-- ASN1STOP
```

***RegisteredMME* field descriptions**
mcc Field description is FFS.
mnc Field description is FFS.
mmegi Field description is FFS.
mmec Field description is FFS.

Editor's note: The MCC + MNC define a PLMN. The MMEGI + MMEC define an MME within the PLMN. PLMN + MMEGI + MMEC are the "GUMMEI".

– SelectedPLMN-Identity

The IE *SelectedPLMN-Identity* is used to indicate the UE"s PLMN choice.

SelectedPLMN-Identity information element

```
-- ASN1START

SelectedPLMN-Identity ::=           INTEGER (1..6)

-- ASN1STOP
```

***SelectedPLMN-Identity* field descriptions**
SelectedPLMN-Identity 1 if the 1st PLMN is selected from the plmn-IdentityList included in SIB1, 2 if the 2nd PLMN is selected from the plmn-IdentityList included in SIB1 and so on

– TrackingAreaCode

The IE *TrackingAreaCode* is %%

TrackingAreaCode information element

```
-- ASN1START

TrackingAreaCode ::=                SEQUENCE {
    -- Enter other IEs here.                                                    FFS
}

-- ASN1STOP
```

***TrackingAreaCode* field descriptions**
%fieldIdentifier%

– UTRA-DL-CarrierFreq

The IE *UTRA-CarrierFreq* is used %%

UTRA-DL-CarrierFreq information element

```
-- ASN1START

UTRA-DL-CarrierFreq ::=             SEQUENCE {
    uarfcn-DL                           INTEGER (0..16383)
}

-- ASN1STOP
```

***UTRA-DL-CarrierFreq* field descriptions**
uarfcn-DL If FDD: the IE contains the downlink frequency (Nd) If TDD: the IE contains the (Nt)

– UTRA-CellIdentity

The IE *UTRA-CellIdentity* is %%

UTRA-CellIdentity information element

```
-- ASN1START

UTRA-CellIdentity ::=               SEQUENCE {
    primaryScramblingCode               INTEGER (0..511)
}

-- ASN1STOP
```

***UTRA-CellIdentity* field descriptions**
primaryScramblingCode Primary scrambling code of the UTRA cell

6.3.5 Measurement information elements

– CDMA2000-CarrierInfo

The IE *CDMA2000-CarrierInfo* used to provide the CDMA2000 carrier information.

***CDMA2000-CarrierInfo* information element**

```
-- ASN1START

CDMA2000-CarrierInfo ::=            SEQUENCE {
    bandClass                           INTEGER,                                    -- FFS
    frequency                           INTEGER                                     -- FFS
}

-- ASN1STOP
```

***CDMA2000-CarrierInfo* field descriptions**
bandClass Identifies the CDMA2000 Frequency Band in which the CDMA2000 Carrier can be found.
frequency Identifies the carrier frequency within a CDMA2000 Band.

– CDMA2000-CellIdentity

The IE *CDMA2000-CellIdentity* identifies the PNOffset that represents the "Physical cell identity" in CDMA2000.

***CDMA2000-CellIdentity* information element**

```
-- ASN1START

CDMA2000-CellIdentity ::=           INTEGER (1..maxPNOffset)                        -- FFS

-- ASN1STOP
```

***CDMA2000-CellIdentity* field descriptions**
Void

– MeasGapConfig

The IE *MeasGapConfig* specifies the measurement gap configuration and controls activation/ deactivation of measurement gaps.

***MeasGapConfig* information element**

```
-- ASN1START

MeasGapConfig ::=                   SEQUENCE {
    gapActivation                       CHOICE {
        activate                            SEQUENCE {
            gapPattern                          INTEGER (0),                    --value range FFS
            startSFN                            INTEGER,                                -- FFS
            startSubframeNumber                 INTEGER                                 -- FFS
        },
        deactivate                          NULL
    }
}

-- ASN1STOP
```

***MeasGapConfig* field descriptions**
gapActivation Used to activate/ deactivate the measurement gap pattern.
gapPattern Reference to a measurement gap pattern defined in [25.133].
startSFN Specifies the SFN when the measurement gap pattern starts. Need and details are FFS.
startSubframeNumber Specifies the subframe number when the measurement gap pattern starts. Need and details are FFS.

– MeasId

The IE *MeasId* is used to identify a measurement configuration, i.e., linking of a measurement object and a reporting configuration.

***MeasId* information element**

```
-- ASN1START

MeasId ::=                          INTEGER (1..maxMeasId)

-- ASN1STOP
```

***MeasId* field descriptions**
Void

– MeasObjectCDMA2000

The IE *MeasObjectCDMA2000* specifies information applicable for inter-RAT CDMA2000 neighbouring cells.

Editor"s note: Use of cell individual offset is FFS.

***MeasObjectCDMA2000* information element**

```
-- ASN1START

MeasObjectCDMA2000 ::=              SEQUENCE {
    cdma2000-Type                       CDMA2000-Type,
    cdma2000-CarrierInfo                CDMA2000-CarrierInfo                OPTIONAL,   -- Need OP
    cdma2000-SearchWindowSize           INTEGER (1..16)                     OPTIONAL,-- Need OC; FFS
    offsetFreq                          INTEGER (-15..15)                   DEFAULT 0,  -- range FFS
    cellsToRemoveList                   SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
        cellIndex                           INTEGER (1..maxCellMeas)                        -- FFS
    }       OPTIONAL,                                                                   -- Need OP
    cellsToAddModifyList                SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
        cellIndex                           INTEGER (1..maxCellMeas),                       -- FFS
        cdma2000-CellIdentity               CDMA2000-CellIdentity
    }       OPTIONAL                                                                    -- Need OP
}

-- ASN1STOP
```

MeasObjectCDMA2000 field descriptions
cdma2000-Type The type of CDMA2000 network.
cdma2000-CarrierInfo Identifies CDMA2000 carrier frequency for which this configuration is valid.
cdma2000-SearchWindowSize Provides the search window size to be used by the UE for the neighbouring pilot.
offsetFreq Offset value applicable to the carrier frequency. Value in dB.
cellsToRemoveList List of cells to remove from the neighbouring cell list.
cellsToAddModifyList List of cells to add/ modify in the neighbouring cell list.
cellIndex Entry index in the neighbouring cell list.
cdma2000-CellIdentity CDMA2000 Physical cell identity of a cell in neighbouring cell list expressed as PNOffset.

– MeasObjectEUTRA

The IE *MeasObjectEUTRA* specifies information applicable for intra-frequency or inter-frequency E-UTRA neighbouring cells.

MeasObjectEUTRA information element

```
-- ASN1START

MeasObjectEUTRA ::=                 SEQUENCE {
    eutra-CarrierInfo                   SEQUENCE {},                                        -- FFS
    measurementBandwidth                    MeasurementBandwidth            OPTIONAL,   -- Need FFS
    offsetFreq                              INTEGER (-15..15)       DEFAULT 0,  -- value range FFS
        -- Neighbour cell list
        cellsToRemoveList                   NeighCellsToRemoveList          OPTIONAL,   -- Need OP
        cellsToAddModifyList                NeighCellsToAddModifyList       OPTIONAL,   -- Need OP
        -- Black list
        blackListedCellsToRemoveList        BlackListedCellsToRemoveList    OPTIONAL,   -- Need OP
        blackListedCellsToAddModifyList     BlackListedCellsToAddModifyList OPTIONAL    -- Need OP
}

NeighCellsToRemoveList ::=          SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas)
}

NeighCellsToAddModifyList ::=       SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas),
    physicalCellIdentity                PhysicalCellIdentity,
    cellIndividualOffset                INTEGER (-15..15)                       -- value range FFS
}

BlackListedCellsToRemoveList ::=    SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    blackListedCellIndex                INTEGER (1..maxCellMeas)                -- value range FFS
}

BlackListedCellsToAddModifyList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    blackListedCellIndex                INTEGER (1..maxCellMeas),               -- value range FFS
    blackListedPhysicalCellIdentity     PhysicalCellIdentity
}

-- ASN1STOP
```

MeasObjectEUTRA field descriptions
eutra-CarrierInfo Identifies E-UTRA carrier frequency for which this configuration is valid.
measurementBandwidth Measurement bandwidth common for all neighbouring cells on the frequency. The need for this IE is FFS (the original intention was that the IE would be mandatory for frequencies other than the serving one and optional for the serving frequency with absence indicating a default value)
offsetFreq Offset value applicable to the carrier frequency. Value in dB.
cellsToRemoveList List of cells to remove from the neighbouring cell list.
cellsToAddModifyList List of cells to add/ modify in the neighbouring cell list.
cellIndex Entry index in the neighbouring cell list.
physicalCellIdentity Physical cell identity of a cell in neighbouring cell list.
cellIndividualOffset Cell individual offset applicable to a specific neighbouring cell.
blackListedCellsToRemoveList List of cells to remove from the black list of cells.
blackListedCellsToAddModifyList List of cells to add/ modify in the black list of cells.
blackListedCellIndex Entry index in the black list of cells.
blackListedPhysicalCellIdentity Physical cell identity of a cell in the black list.

– MeasObjectGERAN

The IE *MeasObjectGERAN* specifies information applicable for inter-RAT GERAN neighbouring frequencies.

MeasObjectGERAN information element

```
-- ASN1START

MeasObjectGERAN ::=                 SEQUENCE {
    geran-MeasFrequencyList             SEQUENCE (SIZE (1..8)) OF GERAN-DL-CarrierFreqList,
    offsetFreq                          INTEGER (-15..15)           DEFAULT 0,  -- value range FFS
    ncc-Permitted                       BIT STRING(SIZE (8))        OPTIONAL
}

-- ASN1STOP
```

MeasObjectGERAN field descriptions
geran-MeasFrequencyList Provides the ARFCN values [44.005] of the GERAN frequencies constituting the measurement object. The complete set of ARFCN values is the merged set (the union) of ARFCN values in all of the *GERAN-DL-CarrierFreqList* elements contained. The ARFCN values in the merged set shall be sorted in the increasing order of ARFCN value, except ARFCN = 0, if that is included, which shall be placed as the last element in the set. The resulting GERAN neighbour frequency list is defined as the sorted list of ARFCN values. If the encoding results in a list of more than 32 GERAN neighbour frequencies, only the 32 first frequencies in the sorted list shall be considered.
offsetFreq Offset value applicable to the GERAN carrier frequencies. Value in dB.
ncc-Permitted The NCC permitted field is coded as a bit map, i.e. bit N is coded with a "0" if the BCCH carrier with NCC = N-1 is not permitted for monitoring and with a "1" if the BCCH carrier with NCC = N-1 is permitted for monitoring; N = 1,2,..,8.

– MeasObjectId

The IE *MeasObjectId* used to identify a measurement object configuration.

MeasObjectId information element

```
-- ASN1START

MeasObjectId ::=                    INTEGER (1..maxObjectId)

-- ASN1STOP
```

***MeasObjectId* field descriptions**
Void

– MeasObjectUTRA

The IE *MeasObjectUTRA* specifies information applicable for inter-RAT UTRA neighbouring cells.

Editor's note: Use of cell individual offset and how FDD/ TDD and the UTRAN cell identity (primary scrambling code) are specified are FFS.

MeasObjectUTRA information element

```
-- ASN1START

MeasObjectUTRA ::=                  SEQUENCE {
    utra-CarrierFreq                    UTRA-DL-CarrierFreq,                                    -- FFS
    offsetFreq                          INTEGER (-15..15)           DEFAULT 0,  -- value range FFS
    cellsToRemoveList                   SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
        cellIndex                           INTEGER (1..maxCellMeas)                            -- FFS
    }       OPTIONAL,                                                                       -- Need OP
    cellsToAddModifyList                SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
        cellIndex                           INTEGER (1..maxCellMeas),                           -- FFS
        utra-CellIdentity                   UTRA-CellIdentity                                   -- FFS
    }       OPTIONAL                                                                        -- Need OP
}

-- ASN1STOP
```

***MeasObjectUTRA* field descriptions**
utra-CarrierFreq Identifies UTRA carrier frequency for which this configuration is valid.
offsetFreq Offset value applicable to the UTRA carrier frequency. Value in dB.
cellsToRemoveList List of cells to remove from the neighbouring cell list.
cellsToAddModifyList List of cells to add/ modify in the neighbouring cell list.
cellIndex Entry index in the neighbouring cell list.
utra-CellIdentity UTRA cell identity of a cell in neighbouring cell list.

– MeasuredResults

The IE *MeasuredResults* covers measured results for intra-frequency, inter-frequency and inter- RAT mobility.

Editor's note: It has been agreed to identify intra- and inter-frequency neighbours by their physical layer identity

MeasuredResults information element

```
-- ASN1START
```

```
MeasuredResults ::=                 SEQUENCE {
    measId                              MeasId,
    measResultServing                   SEQUENCE {}                         OPTIONAL,   -- Need OP
                                                                                        -- FFS if MP
    mobilityMeasResults                 CHOICE {
        measResultListEUTRA                 MeasResultListEUTRA,
        measResultListUTRA                  MeasResultListUTRA,
        measResultListGERAN                 MeasResultListGERAN,
        measResultsCDMA2000             MeasResultsCDMA2000
    }
}

MeasResultListEUTRA ::=             SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
    physicalCellIdentity                PhysicalCellIdentity,
    measResultEUTRA                     SEQUENCE {}                                     -- FFS
}

MeasResultListUTRA ::=              SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
    utra-CellIdentity                   UTRA-CellIdentity,
    measResultUTRA                      SEQUENCE {}                                     -- FFS
}

MeasResultListGERAN ::=             SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
    geran-CarrierInfo                   SEQUENCE {},                                    -- FFS
    geran-CellIdentity                  GERAN-CellIdentity,
    measResultGERAN                     SEQUENCE {}                                     -- FFS
}

MeasResultsCDMA2000 ::=             SEQUENCE {
    preRegistrationStatus               BOOLEAN,
    measResultListCDMA2000              SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
        cdma2000-CellIdentity               CDMA2000-CellIdentity,
        measResultCDMA2000                  SEQUENCE {}                             -- FFS
    }
}

-- ASN1STOP
```

***MeasuredResults* field descriptions**
measId
Identifies the measurement identity for which the reporting is being performed.
measResultServing
Measured result of the serving cell. FFS if mandatory or optional.
measResultListEUTRA
List of measured results for the maximum number of reported best cells for an E-UTRA measurement identity.
measResultEUTRA
Measured result of an E-UTRA cell.
measResultListUTRA
List of measured results for the maximum number of reported best cells for a UTRA measurement identity.
measResultUTRA
Measured result of a UTRA cell.
measResultListGERAN
List of measured results for the maximum number of reported best cells or frequencies for a GERAN measurement identity.
measResultGERAN
Measured result of a GERAN cell or frequency.
measResultsCDMA2000
Contains the HRPD pre-registration status and the list of CDMA2000 measurements.
preRegistrationStatus
Set to TRUE if the UE is currently pre-registered with CDMA2000 HRPD
measResultListCDMA2000
List of measured results for the maximum number of reported best cells for a CDMA2000 measurement identity.
measResultCDMA2000
Measured result of a CDMA2000 cell.

– Measurementbandwidth

The IE *MeasBandwidth* used to indicate measurement bandwidth defined by the parameter Transmission Bandwidth Configuration "N_{RB}" [36.104]. The values mbw6, mbw15, mbw25, mbw50, mbw75, mbw100 indicate 6, 15, 25, 50, 75 and 100 resource blocks respectively.

MeasurementBandwidth information element

```
-- ASN1START

MeasurementBandwidth ::=                ENUMERATED {mbw6, mbw15, mbw25, mbw50, mbw75, mbw100}

-- ASN1STOP
```

***MeasurementBandwidth* field descriptions**
Void

– MeasurementConfiguration

The IE *MeasurementConfiguration* specifies measurements to be performed by the UE, and covers intra-frequency, inter-frequency and inter-RAT mobility as well as configuration of measurement gaps.

Editor's note: It has been agreed that the signalling shall support the addition, modification and removal (i.e. delta configuration) of individual measurement objects, reporting configurations and measurement identities.

Editor's note: It has been agreed to introduce a mechanism by which E-UTRAN can request the UE to report the CGI corresponding to an E-UTRA L1 identity (FFS for inter RAT) reported by the UE. The UE is only required to report the GCI if it is provided with sufficient 'inactive time'. Further details are FFS.

MeasurementConfiguration information element

```
-- ASN1START

MeasurementConfiguration ::=        SEQUENCE {
    -- Measurement objects
    measObjectToRemoveList              MeasObjectToRemoveList              OPTIONAL,   -- Need OP
    measObjectToAddModifyList           MeasObjectToAddModifyList           OPTIONAL,   -- Need OP
    -- Reporting configurations
    reportConfigToRemoveList            ReportConfigToRemoveList            OPTIONAL,   -- Need OP
    reportConfigToAddModifyList         ReportConfigToAddModifyList         OPTIONAL,   -- Need OP
    -- Measurement identities
    measIdToRemoveList                  MeasIdToRemoveList                  OPTIONAL,   -- Need OP
    measIdToAddModifyList               MeasIdToAddModifyList               OPTIONAL,   -- Need OP
    -- Other parameters
    quantityConfig                      QuantityConfig                      OPTIONAL,   -- Need OC
    measGapConfig                       MeasGapConfig                       OPTIONAL,   -- Need OC
    s-Measure                           INTEGER (0)                         OPTIONAL, -- Need OC;FFS
    hrpd-PreRegistrationInfo            HRPD-PreRegistrationInfo            OPTIONAL,   -- Need OP
    mbsfn-NeighbourCellConfig           SEQUENCE {}                      OPTIONAL -- 2-bit field FFS
}

MeasIdToRemoveList ::=              SEQUENCE (SIZE (1..maxMeasId)) OF SEQUENCE {
    measId                              MeasId
}

MeasIdToAddModifyList ::=           SEQUENCE (SIZE (1..maxMeasId)) OF SEQUENCE {
    measId                              MeasId,
    measObjectId                        MeasObjectId,
    reportConfigId                      ReportConfigId
}

MeasObjectToRemoveList ::=          SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {
    measObjectId                        MeasObjectId
}

MeasObjectToAddModifyList ::=       SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {
    measObjectId                        MeasObjectId,
```

```
    measObject                          CHOICE {
        measObjectEUTRA                     MeasObjectEUTRA,
        measObjectUTRA                      MeasObjectUTRA,
        measObjectGERAN                     MeasObjectGERAN,
        measObjectCDMA2000                  MeasObjectCDMA2000
    }
}

ReportConfigToRemoveList ::=        SEQUENCE (SIZE (1..maxReportConfigId)) OF SEQUENCE {
    reportConfigId                      ReportConfigId
}

ReportConfigToAddModifyList ::=     SEQUENCE (SIZE (1..maxReportConfigId)) OF SEQUENCE {
    reportConfigId                      ReportConfigId,
    reportConfig                        CHOICE {
        reportConfigEUTRA                   ReportConfigEUTRA,
        reportConfigInterRAT                ReportConfigInterRAT,
        reportConfigPeriodical              ReportConfigPeriodical
    }
}

-- ASN1STOP
```

***MeasurementConfiguration* field descriptions**
measObjectToRemoveList List of measurement objects to remove.
measObjectToAddModifyList List of measurement objects to add/ modify.
measObjectId Used to identify a measurement object configuration.
measObject Specifies measurement object configurations for E-UTRA, UTRA, GERAN, or CDMA2000 measurements.
reportConfigToRemoveList List of measurement reporting configurations to remove.
reportConfigToAddModifyList List of measurement reporting configurations to add/ modify.
reportConfigId Used to identify a measurement reporting configuration.
reportConfig Specifies measurement reporting configurations for E-UTRA, UTRA, GERAN, or CDMA2000 measurements.
measIdToRemoveList List of measurement identities to remove.
measIdToAddModifyList List of measurement identities to add/ modify.
measId Used to link a measurement object to a reporting configuration.
quantityConfig Specifies measurement quantities for UTRA, GERAN, or CDMA2000 and L3 filtering coefficients for E-UTRA, UTRA or GERAN measurements.
measGapConfig Used to configure measurement gap pattern and control activation/ deactivation of measurement gaps.
s-Measure Serving cell quality threshold controlling whether or not the UE is required to perform measurements. Value in dBm. The definition of this parameter and the applicability to intra-frequency, inter-frequency and inter-RAT are FFS.
mbsfn-NeighbourCellConfig Parameter: *Neighbour-cell configuration* [RAN1 spec; cf. RAN2-59: R2-073598; FFS]

– QuantityConfig

The IE *QuantityConfig* specifies the measurement quantities and filtering coefficients.

***QuantityConfig* information element**

```
-- ASN1START

QuantityConfig ::=                  SEQUENCE {
    quantityConfigEUTRA                 QuantityConfigEUTRA                 OPTIONAL,   -- Need OC
    quantityConfigUTRA                  QuantityConfigUTRA                  OPTIONAL,   -- Need OC
```

```
    quantityConfigGERAN                 QuantityConfigGERAN                 OPTIONAL,   -- Need OC
    quantityConfigCDMA2000              QuantityConfigCDMA2000              OPTIONAL    -- Need OC
}

QuantityConfigEUTRA ::=             SEQUENCE {
    filterCoefficient                   SEQUENCE {}                                     -- FFS
}

QuantityConfigUTRA ::=              SEQUENCE {
    measQuantityUTRA                    SEQUENCE {},                                    -- FFS
    filterCoefficient                   SEQUENCE {}                                     -- FFS
}

QuantityConfigGERAN ::=             SEQUENCE {
    measQuantityGERAN                   SEQUENCE {},                                    -- FFS
    filterCoefficient                   SEQUENCE {}                                     -- FFS
}

QuantityConfigCDMA2000 ::=          SEQUENCE {
    measQuantityCDMA2000                SEQUENCE {}                                     -- FFS
}

-- ASN1STOP
```

***QuantityConfig* field descriptions**
quantityConfigEUTRA Specifies filter configurations for E-UTRA measurements.
quantityConfigUTRA Specifies quantity configurations for UTRA measurements.
measQuantityUTRA Measurement quantity used for UTRA measurements.
quantityConfigGERAN Specifies quantity configurations for GERAN measurements.
measQuantityGERAN Measurement quantity used for GERAN measurements.
quantityConfigCDMA2000 Specifies quantity configurations for CDMA2000 measurements.
measQuantityCDMA2000 Measurement quantity used for CDMA2000 measurements.
filterCoefficient Specifies the filtering coefficient.

– ReportConfigEUTRA

The IE *ReportConfigEUTRA* specifies criteria for triggering of an E-UTRA measurement reporting event. The E-UTRA measurement reporting events are labelled A*N* with *N* equal to 1, 2 and so on.

Event A1: Serving becomes better than absolute threshold;

Event A2: Serving becomes worse than absolute threshold;

Event A3: Neighbour becomes amount of offset better than serving;

Event A4: Neighbour becomes better than absolute threshold;

Event A5: Serving becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2.

***ReportConfigEUTRA* information element**

```
-- ASN1START

ReportConfigEUTRA ::=               SEQUENCE {
    eventId                             CHOICE {
        eventA1                             SEQUENCE {
            a1-Threshold                        INTEGER (0)                 -- value range FFS
        },
        eventA2                             SEQUENCE {
            a2-Threshold                        INTEGER (0)                 -- value range FFS
```

```
        },
        eventA3                             SEQUENCE {
            a3-Offset                           INTEGER (0)
                                        -- value range FFS but will include positive and negative values
        },
        eventA4                             SEQUENCE {
            a4-Threshold                        INTEGER (0)                     -- value range FFS
        },
        eventA5                             SEQUENCE {
            a5-Threshold1                       INTEGER (0),                    -- value range FFS
            a5-Threshold2                       INTEGER (0)                     -- value range FFS
        }
    },
    triggerQuantity                     ENUMERATED {rsrp, rsrq},
    hysteresis                          INTEGER (0),                            -- value range FFS
    timeToTrigger                       INTEGER (0),                            -- value range FFS
    reportQuantity                      ENUMERATED {sameAsTriggerQuantity, both},
    maxReportCells                      INTEGER (1..maxCellReport),
    reportInterval                      SEQUENCE {}                         OPTIONAL,   -- Need OP
    reportAmount                        SEQUENCE {}                         OPTIONAL    -- Need OP
}

-- ASN1STOP
```

***ReportConfigEUTRA* field descriptions**
eventId Choice of E-UTRA event triggered reporting criteria.
triggerQuantity The quantities used to evaluate the triggering condition for the event**.** The values rsrp and rsrq correspond to Reference Signal Received Power (RSRP) and Reference Signal Received Quality (RSRQ) [36.214].
hysteresis Hysteresis parameter for entering/ leaving measurement report triggering condition. Value in dB.
timeToTrigger Time during which specific criteria for the event needs to be met in order to trigger a measurement report. Value in seconds.
reportQuantity The quantities to be included in the measurement report**.** The value both means that both the rsrp and rsrq quantities are to be included in the measurement report
maxReportCells Max number of cells to include in the measurement report.
reportInterval If included, the event triggers the UE to perform periodical reporting with the indicated interval. Value in seconds.
reportAmount Number of reports in case of periodical reporting triggered by event (if limited).

– ReportConfigId

The IE *ReportConfigId* is used to identify a measurement reporting configuration.

ReportConfigId information element

```
-- ASN1START

ReportConfigId ::=                  INTEGER (1..maxReportConfigId)

-- ASN1STOP
```

***ReportConfigId* field descriptions**
Void

– ReportConfigInterRAT

The IE *ReportConfigInterRAT* specifies criteria for triggering of an inter-RAT measurement reporting event. The inter-RAT measurement reporting events are labelled B*N* with *N* equal to 1, 2 and so on.

Event B1: Neighbour becomes better than absolute threshold;

Event B2: Serving becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2.

ReportConfigInterRAT information element

```
-- ASN1START

ReportConfigInterRAT ::=            SEQUENCE {
    eventId                             CHOICE {
        eventB1                             SEQUENCE {
            b1-Threshold                        INTEGER (0)                 -- value range FFS
        },
        eventB2                             SEQUENCE {
            b2-Threshold1                       INTEGER (0),                -- value range FFS
            b2-Threshold2                       INTEGER (0)                 -- value range FFS
        }
    },
    timeToTrigger                       INTEGER (0),                            -- value range FFS
    maxReportCells                      INTEGER (1..maxCellReport),
    reportQuantity                      SEQUENCE {}                         OPTIONAL,-- Need OP; FFS
    reportInterval                      SEQUENCE {}                         OPTIONAL,   -- Need OP
    reportAmount                        SEQUENCE {}                         OPTIONAL    -- Need OP
}

-- ASN1STOP
```

***ReportConfigInterRAT* field descriptions**
eventId   Choice of inter-RAT event triggered reporting criteria.
timeToTrigger   Time during which specific criteria for the event needs to be met in order to trigger a measurement report.
maxReportCells   Max number of cells to include in the measurement report.
reportQuantity   Need is FFS.
reportInterval   If included, the event triggers the UE to perform periodical reporting with the indicated interval.
reportAmount   Number of reports in case of periodical reporting triggered by event (if limited).

– ReportConfigPeriodical

The IE *ReportConfigPeriodical* specifies criteria for periodical measurement reporting.

ReportConfigPeriodical information element

```
-- ASN1START

ReportConfigPeriodical ::=          SEQUENCE {
    maxReportCells                      INTEGER (1..maxCellReport),
    reportQuantity                      SEQUENCE {}                         OPTIONAL,-- Need OP; FFS
    reportInterval                      SEQUENCE {},
    reportAmount                        SEQUENCE {}
}

-- ASN1STOP
```

ReportConfigPeriodical field descriptions
maxReportCells Max number of cells to include in the measurement report.
reportQuantity Need is FFS.
reportInterval The UE performs periodical reporting with the indicated interval.
reportAmount Number of reports.

6.3.6 Other information elements

– C-RNTI

The IE *C-RNTI* is used %%

C-RNTI information element

```
-- ASN1START

C-RNTI ::=                          SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

C-RNTI field descriptions
%fieldIdentifier%

– EstablishmentCause

The IE *EstablishmentCause* is used %%

EstablishmentCause information element

```
-- ASN1START

EstablishmentCause ::=              ENUMERATED {
                                        emergency, highPriorityAccess, mt-Access, mo-Signalling,
                                        mo-Data, spare3, spare2, spare1}

-- ASN1STOP
```

EstablishmentCause field descriptions
EstablishmentCause W.r.t. the cause valu names: highPriorityAcces concerns AC11..AC15, "mt" stands for "Mobile Terminated" and "mo" for "Mobile Originated"

– IMSI

The IE *IMSI* is used %%

IMSI information element

```
-- ASN1START

IMSI ::=                            SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

***IMSI* field descriptions**
%fieldIdentifier%

– InitialUE-Identity

The IE *InitialUE-Identity* is used to identify the UE in the contention based access at RRC connection establishment.

***InitialUE-Identity* information element**

```
-- ASN1START

InitialUE-Identity ::=              CHOICE {
    s-TMSI                              S-TMSI,
    randomValue                         BIT STRING (SIZE (40))
}

-- ASN1STOP
```

***InitialUE-Identity* field descriptions**
s-TMSI Field description is FFS.
randomValue Integer value in the range 0 to 2**40 – 1.

– NAS-DedicatedInformation

The IE *NAS-DedicatedInformation* is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this information.

***NAS-DedicatedInformation* information element**

```
-- ASN1START

NAS-DedicatedInformation ::=        SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

***NAS-DedicatedInformation* field descriptions**
%fieldIdentifier%

– PagingCause

The IE *PagingCause* is used %%

***PagingCause* information element**

```
-- ASN1START

PagingCause ::=                     ENUMERATED {
                                        -- Enter paging cause values here.   FFS
                                        causeValue}

-- ASN1STOP
```

PagingCause field descriptions
pagingCause   Field description is FFS.

– PagingUE-Identity

The IE *PagingUE-Identity* is used %%

***PagingUE-Identity* information element**

```
-- ASN1START

PagingUE-Identity ::=               CHOICE {
    s-TMSI                              S-TMSI,
    imsi                                IMSI
    -- SA2 indicated that support of IMEI and TMSI, possibly with LAC/LAI, is FFS
}

-- ASN1STOP
```

PagingUE-Identity field descriptions
s-TMSI   Field description is FFS.
imsi   Field description is FFS.
tmsi   Field description is FFS.

– RAT-Type

The IE *RAT-Type* is used to indicate the type of radio access technology (RAT), including E-UTRA.

***RAT-Type* information element**

```
-- ASN1START

RAT-Type ::=                        ENUMERATED {
                                        eutra, utran, geran}

-- ASN1STOP
```

RAT-Type field descriptions
Void

– ReestabUE-Identity

The IE *ReestabUE-Identity* is used to identify the UE in the contention based access at RRC connection re-establishment.

***ReestabUE-Identity* information element**

```
-- ASN1START

ReestabUE-Identity ::=              SEQUENCE {
    c-RNTI                              C-RNTI,
    physCellIdentity                    PhysicalCellIdentity,
    shortMAC-I                          BIT STRING (SIZE (16))              -- field size FFS
}

-- ASN1STOP
```

ReestabUE-Identity field descriptions
shortMAC-I Field description is FFS.

– RRC-TransactionIdentifier

The IE *RRC-TransactionIdentifier* is used, together with the message type, for the identification of an RRC procedure (transaction).

RRC-TransactionIdentifier information element

```
-- ASN1START

RRC-TransactionIdentifier ::=       INTEGER (0..3)

-- ASN1STOP
```

RRC-TransactionIdentifier field descriptions
Void

– S-TMSI

The IE *S-TMSI* is used %%

S-TMSI information element

```
-- ASN1START

S-TMSI ::=                          SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

S-TMSI field descriptions
%fieldIdentifier%

– TMSI

The IE *TMSI* is used %%

TMSI information element

```
-- ASN1START

TMSI ::=                            SEQUENCE {
    -- Enter the IEs here.                                                  FFS
}

-- ASN1STOP
```

TMSI field descriptions
%fieldIdentifier%

– UE-EUTRA-Capability

The IE *UE-EUTRA-Capability* is used %%

UE-EUTRA-Capability information element

```
-- ASN1START

UE-EUTRA-Capability ::=             SEQUENCE {
    accessStratumRelease                AccessStratumRelease,
    ue-Category                         INTEGER (1..16),                        -- value range FFS
    pdcp-Parameters                     PDCP-Parameters,
    rlc-Parameters                      RLC-Parameters,
    phyLayerParameters                  PhyLayerParameters,
    rf-Parameters                       RF-Parameters,
    measurementParameters               MeasurementParameters,
    interRAT-Parameters                 SEQUENCE {
        utraFDD                             IRAT-UTRA-FDD-Parameters                OPTIONAL,
        utraTDD128                          IRAT-UTRA-TDD128-Parameters             OPTIONAL,
        utraTDD384                          IRAT-UTRA-TDD384-Parameters             OPTIONAL,
        utraTDD768                          IRAT-UTRA-TDD768-Parameters             OPTIONAL,
        geran                               IRAT-GERAN-Parameters                   OPTIONAL,
        cdma2000-HRPD                       IRAT-CDMA2000-HRPD-Parameters           OPTIONAL,
        cdma2000-1xRTT                      IRAT-CDMA2000-1xRTT-Parameters          OPTIONAL
    }
}

AccessStratumRelease ::=            ENUMERATED {
                                        rel8, spare7, spare6, spare5, spare4, spare3,
                                        spare2, spare1}

PDCP-Parameters ::=                 SEQUENCE {
    supportedROHCprofiles               SEQUENCE {
        profile0x0000                       BOOLEAN,
        profile0x0001                       BOOLEAN,
        profile0x0002                       BOOLEAN,
        profile0x0003                       BOOLEAN,
        profile0x0004                       BOOLEAN,
        profile0x0006                       BOOLEAN,
        profile0x0101                       BOOLEAN,
        profile0x0103                       BOOLEAN,
        profile0x0104                       BOOLEAN
    },
    maxNumberROHC-ContextSessions       INTEGER (1..2)                          -- value range FFS
}

RLC-Parameters ::=                  SEQUENCE {
    maxTotalL2BufferSize                ENUMERATED {size1, size2}               -- value range FFS
}

PhyLayerParameters ::=              SEQUENCE {
    ul-TxDiversitySupported             BOOLEAN,
    ue-SpecificRefSigsSupported         BOOLEAN,
    halfDuplexFDDSupported              BOOLEAN
}

RF-Parameters ::=                   SEQUENCE {
    supportedEUTRA-BandList             SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        eutra-Band                          INTEGER (1..64),
        halfDuplex                          BOOLEAN
    }
}

MeasurementParameters ::=           SEQUENCE {
    eutra-BandList                      SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        interFreqEUTRA-BandList             SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            interFreqNeedFor-Gaps               BOOLEAN
        },
        interRAT-BandList                   SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            interRAT-NeedFor-Gaps               BOOLEAN
        }       OPTIONAL
    }
}

IRAT-UTRA-FDD-Parameters ::=        SEQUENCE {
    supportedUTRA-FDD-BandList          SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        utra-FDD-Band                       ENUMERATED {
```

```
                                            bandI, bandII, bandIII, bandIV, bandV, bandVI,
                                            bandVII, bandVIII, bandIX, bandX, bandXI,
                                            bandXII, bandXIII, bandXIV, bandXV, bandXVI}
    }
}

IRAT-UTRA-TDD128-Parameters ::=     SEQUENCE {
    supportedUTRA-TDD128BandList        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        utra-TDD128Band                     ENUMERATED {
                                                a, b, c, d, e, f, g, h, i, j, k, l, m, n,
                                                o, p}
    }
}

IRAT-UTRA-TDD384-Parameters ::=     SEQUENCE {
    supportedUTRA-TDD384BandList        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        utra-TDD384Band                     ENUMERATED {
                                                a, b, c, d, e, f, g, h, i, j, k, l, m, n,
                                                o, p}
    }
}

IRAT-UTRA-TDD768-Parameters ::=     SEQUENCE {
    supportedUTRA-TDD768BandList        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        utra-TDD768Band                     ENUMERATED {
                                                a, b, c, d, e, f, g, h, i, j, k, l, m, n,
                                                o, p}
    }
}

IRAT-GERAN-Parameters ::=           SEQUENCE {
    supportedGERAN-BandList             SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        geran-Band                          ENUMERATED {
                                                gsm450, gsm480, gsm850, gsm900P, gsm900E, gsm1800,
                                                gsm1900, spare9, spare8, spare7, spare6, spare5,
                                                spare4, spare3, spare2, spare1}
    },
    interRAT-PS-HO-ToGERAN              BOOLEAN
}

IRAT-CDMA2000-HRPD-Parameters ::=   SEQUENCE {
    supportedHRPD-BandList              SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        cdma2000-HRPD-Band                  ENUMERATED {
                                                band1, band2, spare6, spare5, spare4, spare3,
                                                spare2, spare1}                 -- value range FFS
    },
    cdma2000-HRPD-TxConfig              ENUMERATED {single, dual},
    cdma2000-HRPD-RxConfig              ENUMERATED {single, dual}
}

IRAT-CDMA2000-1xRTT-Parameters ::=  SEQUENCE {
    supported1xRTT-BandList             SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
        cdma2000-1xRTT-Band                 ENUMERATED {
                                                band1, band2, spare6, spare5, spare4, spare3,
                                                spare2, spare1}                 -- value range FFS
    },
    cdma2000-1xRTT-TxConfig     ENUMERATED {single, dual},
    cdma2000-1xRTT-RxConfig     ENUMERATED {single, dual}
}

-- ASN1STOP
```

Editor's note: The extension mechanisms for this IE need to be considered.

Editor's note: The following GSM band seem to be missing: GSM 710, GSM 750, GSM 810, GSM 900R.

UE-EUTRA-Capability field descriptions
accessStratumRelease Set to rel8 in this version of the specification.
ue-Category UE category as defined in [5]. Set to values 1 to 5 in this version of the specification.
eutra-Band E-UTRA band as defined in [36.101].
halfDuplex If *halfDuplex* is set to true, only half duplex operation is supported for the band, otherwise full duplex operation is supported.

eutra-BandList
One entry corresponding to each supported E-UTRA band listed in the same order as in *supportedEUTRA-BandList*.
interFreqEUTRA-BandList
One entry corresponding to each supported E-UTRA band listed in the same order as in *supportedEUTRA-BandList*.
interFreqNeedForDL-Gaps
Indicates need for DL measurement gaps when operating on the E-UTRA band given by the entry in *eutraBandList* and measuring on the E-UTRA band given by the entry in *interFreqEUTRA-BandList*.
interFreqNeedForUL-Gaps
Indicates need for UL measurement gaps when operating on the E-UTRA band given by the entry in *eutraBandList* and measuring on the E-UTRA band given by the entry in *interFreqEUTRA-BandList*.
interRAT-BandList
One entry corresponding to each supported band of another RAT listed in the same order as in the *interRAT-Parameters*.
interRATNeedForDL-Gaps
Indicates need for DL measurement gaps when operating on the E-UTRA band given by the entry in *eutraBandList* and measuring on the inter-RAT band given by the entry in the *interRAT-Parameters*.
interRATNeedForUL-Gaps
Indicates need for UL measurement gaps when operating on the E-UTRA band given by the entry in *eutraBandList* and measuring on the inter-RAT band given by the entry in the *interRAT-Parameters*.
utra-FDD-Band
E-UTRA band as defined in [25.101].
utra-TDD128Band
E-UTRA band as defined in [25.102].
utra-TDD384Band
E-UTRA band as defined in [25.102].
utra-TDD768Band
E-UTRA band as defined in [25.102].
geran-Band
GERAN band as defined in [45.005].
cdma2000-HRPD-Band
CDMA2000 HRPD band as defined in [ref].
cdma2000-1xRTT-Band
CDMA2000 1xRTT band as defined in [ref].

Editor's note: The IE *UE-EUTRA-Capability* does not include AS security capability information, since these are assumed to be the same as the NAS-security capabilities. Consequently it is also assumed that AS need not provide "man-in-the-middle" protection for the security capabilities, i.e., it is assumed that NAS provides this functionality.

– UE-RadioAccessCapRequest

The IE *UE-RadioAccessCapRequest* lists the RATs for which the UE is requested to transfer the UE radio access capabilities i.e. E-UTRA and/or other RATs, e.g., UTRA, GERAN or CDMA2000.

***UE-RadioAccessCapRequest* information element**

```
-- ASN1START

UE-RadioAccessCapRequest ::=        SEQUENCE (SIZE (1..maxRAT-Capabilities)) OF RAT-Type

-- ASN1STOP
```

UE-RadioAccessCapRequest field descriptions
%fieldIdentifier%

– UE-RelatedInforamtion

The IE *UE-RelatedInforamtion* is used to convey miscellaneous UE related information.

***UE-RelatedInforamtion* information element**

```
-- ASN1START

UE-RelatedInforamtion ::=           SEQUENCE {
    newUE-Identity                      C-RNTI                          OPTIONAL    -- Cond Handover
}

-- ASN1STOP
```

UE-RelatedInforamtion field descriptions
newUE-Identity Field description and need is FFS.

Conditional presence	Explanation
Handover	This IE should be mandatory present in case of handover, i.e., if the IE *MobilityControlInformation* is included, otherwise it is optional, continue (FFS).

– UE-TimersAndConstants

The IE *UE-TimersAndConstants* contains %%

***UE-TimersAndConstants* information element**

```
-- ASN1START

UE-TimersAndConstants ::=           SEQUENCE {
    -- Enter the IEs here.                                                          FFS
}

-- ASN1STOP
```

UE-TimersAndConstants field descriptions
%fieldIdentifier%

6.4 RRC multiplicity and type constraints values

– Multiplicity and type constraints definitions

A brief descriptive text to be added here (FFS).

```
-- ASN1START

maxAC                       INTEGER ::= 1   --                                          FFS
maxBands                    INTEGER ::= 1   -- Maximum number of bands listed in EUTRA UE caps  FFS
maxCellBlack                INTEGER ::= 1   -- Maximum number of blacklisted cells      FFS
maxCellInter                INTEGER ::= 1   -- Maximum number of neighbouring inter-frequency
                                            -- cells listed in SIB type 5             FFS
maxCellIntra                INTEGER ::= 1   -- Maximum number of neighbouring intra-frequency
```

```
                                          -- cells listed in SIB type 4                        FFS
maxCellMeas                 INTEGER ::= 1 -- Maximum number of neighbouring cells within a
                                          -- measurement object                               FFS
maxCellReport               INTEGER ::= 1 -- Maximum number of reported cells                  FFS
maxCellUTRA                 INTEGER ::= 1 -- Maximum number of neighbouring UTRA cells         FFS
maxDRB                      INTEGER ::= 1 -- Maximum number of Data Radio Bearers              FFS
maxEARFCN                   INTEGER ::= 1 -- Maximum value of EUTRA carrier fequency           FFS
maxFreq                     INTEGER ::= 1 -- Maximum number of EUTRA carrier frequencies       FFS
maxGERAN-Carrier            INTEGER ::= 1 -- Maximum number of GERAN carrier fequencies        FFS
maxMCS-1                    INTEGER ::= 1 -- Maximim number of PUCCH formats (MCS)             FFS
maxMeasId                   INTEGER ::= 1 --                                                   FFS
maxObjectId                 INTEGER ::= 1 --                                                   FFS
maxPageRec                  INTEGER ::= 1 --                                                   FFS
maxPNOffset                 INTEGER ::= 1 -- Maximum number of CDMA2000 PNOffsets              FFS
maxRAT-Capabilities         INTEGER ::= 1 -- Maximum number of interworking RATs (incl EUTRA)  FFS
maxReportConfigId           INTEGER ::= 1 --                                                   FFS
maxROHC-Profile             INTEGER ::= 16 -- Maximum number of profiles supported by ROHC on  FFS
                                          -- a given RB.
maxSIB                      INTEGER ::= 1 -- Maximum number of SIBs                            FFS
maxSI-Message               INTEGER ::= 1 -- Maximum number of SI messages                     FFS
maxUTRA-Carrier             INTEGER ::= 1 -- Maximum number of UTRA carrier fequencies         FFS

-- ASN1STOP
```

Editor's note: A table with parameter descriptions should be considered as an alternative to the inline comments above. If there are more than a few words of comment, the code above gets rather messy.

– End of EUTRA-RRC-Definitions

```
-- ASN1START

END

-- ASN1STOP
```

7 Variables and constants

7.1 UE variables

Editor's note: To facilitate the specification of the UE behavioural requirements, UE variables are represented using ASN.1. Nevertheless, it is up to UE implementation how to store the variables.

– EUTRA-UE-Variables

This ASN.1 segment is the start of the E-UTRA UE variable definitions.

```
-- ASN1START

EUTRA-UE-Variables DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    CDMA2000-SystemTimeInfo,
    MeasIdToAddModifyList,
    MeasObjectToAddModifyList,
    PhysicalCellIdentity,
    QuantityConfig,
    ReportConfigToAddModifyList,
    maxCellReport
FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

– VarMeasurementConfiguration

The UE variable *VarMeasurementConfiguration* includes the accumulated configuration of the measurements to be performed by the UE, covering intra-frequency, inter-frequency and inter-RAT mobility related measurements as well as the measurement gap configuration.

***VarMeasurementConfiguration* UE variable**

```
-- ASN1START

VarMeasurementConfiguration ::=     SEQUENCE {
    -- Measurement identities
    measIdList                          MeasIdToAddModifyList               OPTIONAL,   -- Need OP
    -- Measurement objects
    measObjectList                      MeasObjectToAddModifyList           OPTIONAL,   -- Need OP
    -- Reporting configurations
    reportConfigList                    ReportConfigToAddModifyList         OPTIONAL,   -- Need OP
    -- Other parameters
    quantityConfig                      QuantityConfig                      OPTIONAL,   -- Need OC
    s-Measure                           INTEGER (0)                         OPTIONAL, -- Need OC;FFS
    cdma2000-SystemTimeInfo             CDMA2000-SystemTimeInfo             OPTIONAL,   -- Need OC
    mbsfn-NeighbourCellConfig           SEQUENCE {}                    OPTIONAL -- 2-bit field FFS
}

-- ASN1STOP
```

– VarEventsTriggered

The UE variable *VarEventsTriggered* includes information about the events for which the triggering conditions have been met.

***VarEventsTriggered* UE variable**

```
-- ASN1START

VarEventsTriggered ::=              SEQUENCE (SIZE (1..maxEventsTriggered)) OF SEQUENCE {
    -- List of events that have been triggered
    eventId                             EvendId,
    periodicalReportingOngoing              BOOLEAN,
    cellsToReportList                   SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
        cellIdentity                        PhysicalCellIdentity
    },
    numberOfReportsSent                 INTEGER
}

EvendId ::=             ENUMERATED {eventA1, eventA2, eventA3, eventA4, eventA5, eventB1, eventB2 }

-- ASN1STOP
```

– Multiplicity and type constraints definitions

This section included multiplicity and type constraints applicable (only) for UE variables.

```
-- ASN1START

maxEventsTriggered          INTEGER ::= 1   -- Maximum number measurement events triggered      FFS

-- ASN1STOP
```

– End of EUTRA-UE-Variables

```
-- ASN1START

END

-- ASN1STOP
```

7.2 Counters

Counter	Reset	Incremented	When reaching max value

7.3 Timers

Timer	Start	Stop	At expiry
T300	Transmission of *RRCConnectionRequest* (possibly following T302 expiry)	Reception of *RRCConnectionSetup* or *RRCConnectionReject* message as well as cell re-selection	Go to RRC_IDLE
T302	Reception of *RRCConnectionReject* including the IE "Wait time"	Upon cell re-selection	Transmit a new RRCConnectionRequest message. Start T300
T303	Unsuccessful access barring check while UE is not performing an emergency call	Upon entering RRC_CONNECTED, upon cell re-selection and upon receiving SIB type 2 including a value of the *AccessProbabilityFactor* or the IE *AccessClassBarringTime* different from the stored value	None
T304	Reception of *RRCConnectionReconfiguration* message including the *MobilityControl Information*	Criterion for successful handover completion is met	Consider handover to have failed and perform re-establishment on the "best cell" (details FFS) Start T311
T310	Upon detecting physical layer problems	Upon recovery from physical layer problems, upon triggering the handover procedure and upon T312 expiry	Start T311 Stop T312, if running
T311	Upon T304 expiry, upon T310 expiry and upon T312 expiry	Reception of RRCConnectionReestablishment or *RRCConnectionReestablishmentReject* message. Selection of a cell using another RAT as well as when selected E-UTRA cell becomes unsuitable.	Enter RRC_IDLE
T312	Upon receiving a Random Access problem indication from MAC	Upon receiving an indication from MAC about Random Access problem recovery and upon T310 expiry	Start T311 Stop T310, if running
T320	Upon receiving IE Cell re-selection priority expiry timer	Upon entering RRC_CONNECTED	Specified in [4], i.e. discard the Inter-frequency and inter-RAT priority information

7.4 Constants

Constant	Usage

8 Protocol data unit abstract syntax (with ASN.1)

Including general aspects on the message transfer syntax (structure of encoded RRC messages, use of ECN – if any, messages encoded otherwise)

9 Specified and default radio configurations

Specified and default configurations are configurations of which the details are specified in the standard. Specified configurations are fixed while default configurations can be modified using dedicated signalling.

9.1 Specified configurations

9.1.1 Logical channel configurations

9.1.1.1 BCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration	TM		

NOTE 1 RRC will perform padding, if required due to the granularity of the TF signalling

9.1.1.2 CCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration		Normal MAC headers are ised	
Logical channel configuration			
priority	FFS	Highest priority	
prioritizedBitRate	FFS		
logicalChannelGroup			

NOTE 2 Integrity protection is not used for the *RRCConnectionReestablishment* message

9.1.1.3 PCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration	TM		

NOTE 3 RRC will perform padding, if required due to the granularity of the TF signalling

9.1.2 SRB configurations

9.1.2.1 SRB1

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
rb-MappingInfo *ul-LogicalChannel-Identity* *dl-LogicalChannel-Identity*	 1 1	These are specified values i.e. default values concern parameters for which a value may be signalled	

9.1.2.2 SRB2

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
rb-MappingInfo *ul-LogicalChannel-Identity* *dl-LogicalChannel-Identity*	 2 2	These are specified values i.e. default values concern parameters for which a value may be signalled	

9.2 Default radio configurations

9.2.1 SRB configurations

9.2.1.1 SRB1

Parameters

Name	Value	Semantics description	Ver
RLC configuration CHOICE	am		
ul-RLC-Config *>t-PollRetransmit* *>pollPDU* *>pollByte*	 FFS FFS FFS		
dl-RLC-Config *>t-Reordering* *>t-StatusProhibit*	 FFS FFS		
Logical channel configuration			
priority	FFS	Highest priority	
prioritizedBitRate	Infinity		
logicalChannelGroup			
Transport channel configuration			
maxNumberOfUL-Transm	FFS	FFS	
semiPersistSchedIntervalDL	N/A (Absent)		
semiPersistSchedIntervalUL	N/A (Absent)		
periodicBSR-Timer	N/A (Absent)		
drx-Configuration	N/A (Absent)		
Physical layer configuration parameters	FFS		

9.2.1.2 SRB2

Parameters

Name	Value	Semantics description	Ver
RLC configuration CHOICE	am		

Name	Value	Semantics description	Ver
ul-RLC-Config *>t-PollRetransmit* *>pollPDU* *>pollByte*	 FFS FFS FFS		
dl-RLC-Config *>t-Reordering* *>t-StatusProhibit*	 FFS FFS		
Logical channel configuration			
priority	FFS		
prioritizedBitRate	Infinity		
logicalChannelGroup			
Transport channel configuration	N/A (Absent)		
Physical layer configuration parameters	N/A (Absent)		

9.2.2 Default transport channel configuration

Parameters

9.2.3 Default physical channel configuration

Parameters

Name	Value	Semantics description	Ver
antennaInformation	FFS	For transmissionMode a default value has been agreed corresponding to transmit diversity. Further details are FFS	

10 Radio information related interactions between network nodes

10.1 General

This section specifies RRC messages that are transferred between network nodes. These RRC messages may be transferred to or from the UE via another Radio Access Technology. Consequently, these messages have similar characteristics as the RRC messages that are transferred across the E-UTRA radio interface, i.e. the same transfer syntax and protocol extension mechanisms apply.

10.2 RRC messages transferred across network nodes

This section specifies RRC messages that are sent either across the X2- or the S1-interface, either to or from the eNB, i.e. a single "logical channel" is used for all RRC messages transferred across network nodes. The information could originate from or be destined for another RAT.

– EUTRA-InterNodeDefinitions

This ASN.1 segment is the start of the E-UTRA inter-node PDU definitions.

```
-- ASN1START

EUTRA-InterNodeDefinitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
```

```
    CellIdentity,
    RRCConnectionReconfiguration,
    UECapabilityInformation
FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

– InterNode-Message

The *InterNode-Message* class is the set of RRC messages that may be sent across the X2 or the S1 interface.

```
-- ASN1START

InterNode-Message ::= SEQUENCE {
    message                 InterNode-MessageType
}

InterNode-MessageType ::= CHOICE {
    c1                      CHOICE {
        interRAT-Message                        InterRAT-Message,
        handoverCommand                         HandoverCommand,
        handoverPreparationInformation          HandoverPreparationInformation,
        ueRadioAccessCapabilityInformation      UERadioAccessCapabilityInformation
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

Editor: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

10.2.1 INTER RAT MESSAGE

Inter-RAT message, e.g. a handover command

Transfer characteristics: tbs

***InterRAT-Message* message**

```
-- ASN1START

InterRAT-Message ::=                SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            interRAT-Message-r8                 InterRAT-Message-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

InterRAT-Message-r8-IEs ::=         SEQUENCE {
    interRAT-Message                    OCTET STRING,
    ...
}

-- ASN1STOP
```

Editor: The extension mechanisms in this message are FFS.

***InterRAT-Message* field descriptions**
interRAT-Message
E.g., the source eNB sends the handover command generated by the target RAN generates the entire RRC to the UE.

10.2.2 HANDOVER COMMAND

E-UTRA RRC handover command

Transfer characteristics: tbs

***HandoverCommand* message**

```
-- ASN1START

HandoverCommand ::=                 SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            handoverCommand-r8                  HandoverCommand-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

HandoverCommand-r8-IEs ::=          SEQUENCE {
    handoverCommandMessage              OCTET STRING (CONTAINING RRCConnectionReconfiguration),
    ...
}

-- ASN1STOP
```

Editor: The extension mechanisms in this message are FFS.

***HandoverCommand* field descriptions**
handoverCommandMessage
Target eNB generates the entire *RRCConnectionReconfiguration* message as signalled to the UE.

10.2.3 HANDOVER PREPARATION INFORMATION

E-UTRA RRC information used by the target eNB during handover preparation, excluding UE capability information

Transfer characteristics: tbs

***HandoverPreparationInformation* message**

```
-- ASN1START

HandoverPreparationInformation ::=  SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            handoverPreparationInformation-r8   HandoverPreparationInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

HandoverPreparationInformation-r8-IEs ::= SEQUENCE {
    as-Configuration                    AS-Configuration                    OPTIONAL,
    rrm-Configuration                   RRM-Configuration                   OPTIONAL,
    ue-RadioAccessCapabilityInfo        OCTET STRING (CONTAINING UECapabilityInformation),
    ...
}

-- ASN1STOP
```

Editor: The extension mechanisms in this message are FFS.

HandoverPreparationInformation field descriptions
as-Configuration Radio resource configuration excluding physical layer information. Applicable in case of intra-E-UTRA handover.
rrm-Configuration FFS if applicable for Inter-RAT HO
ue-RadioAccessCapabilityInfo Including E-UTRA, GERAN and UTRA radio access capabilities (separated).

10.2.4 UE RADIO ACCESS CAPABILITY INFORMATION

UE radio access capability transfer, covering both upload & download

Transfer characteristics: tbs

***UERadioAccessCapabilityInformation* message**

```
-- ASN1START

UERadioAccessCapabilityInformation ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            ueRadioAccessCapabilityInformation-r8
                                                UERadioAccessCapabilityInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

UERadioAccessCapabilityInformation-r8-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfo        OCTET STRING (CONTAINING UECapabilityInformation),
    ...
}

-- ASN1STOP
```

Editor: The extension mechanisms in this message are FFS.

UERadioAccessCapabilityInformation field descriptions
ue-RadioAccessCapabilityInfo Including E-UTRA, GERAN and UTRA radio access capabilities (separated).

10.3 IE definition

– AS-Configuration

The *AS-Configuration* IE contains information about RRC configuration information in the source cell which can be utilized by target cell after the handover is successfully performed or during the RRC connection re-establishment.

***AS-Configuration* information element**

```
-- ASN1START

AS-Configuration ::=                SEQUENCE {
    -- Enter the IEs here.                                                          FFS
    ...
}

-- ASN1STOP
```

AS-Configuration field descriptions

– RRM-Configuration

The *RRM-Configuration* IE contains information about UE specific RRM information before the handover which can be utilized by target eNB after the handover is successfully performed.

RRM-Configuration information element

```
-- ASN1START

RRM-Configuration ::=       SEQUENCE {
    ue-InactiveTime             ENUMERATED {
                                    v1sec, v2sec, v3sec, v5sec, v7sec, v10sec, v15sec, v20sec,
                                    v25sec, v30sec, v40sec, v50sec, v1min, v1min20sec, v1min40sec,
                                    v2min, v2min30sec, v3min, v3min30sec, v4min, v5min, v6min,
                                    v7min, v8min, v9min, v10min, v12min, v14min, v17min, v20min,
                                    v24min, v28min, v33min, v38min, v44min, v50min, v1hr,
                                    v1hr30min, v2hr, v2hr30min, v3hr, v3hr30min, v4hr, v5hr, v6hr,
                                    v8hr, v10hr, v13hr, v16hr, v20hr, v1day, v1day12hr, v2day,
                                    v2day12hr, v3day, v4day, v5day, v7day, v10day, v14day, v19day,
                                    v24day, v30day, morethan30day}      OPTIONAL,
    ue-HistoryInformation       UE-HistoryInformation               OPTIONAL,
    ...
}

-- ASN1STOP
```

RRM-Configuration field descriptions
ue-InactiveTimer Duration while UE has not received or transmitted any user data. Thus the timer is still running in case e.g., UE measures the neighbour cells for the HO purpose.
ue-HistoryInformation The list of cells where UE recently visited before the handover

– UE-HistoryInformation

The *UE-HistoryInformation* IE contains information about the cells where UE has been visited before the handover performs

UE-HistoryInformation information element

```
-- ASN1START

UE-HistoryInformation ::=           SEQUENCE (SIZE (1..maxVisitedCells)) OF SEQUENCE {
    lastVistedCellID                    CellIdentity,
    cellType                            ENUMERATED {pico, micro, macro},
    timeUE-StayedInCell                 INTEGER (0),                    -- type and value range FFS
    ...
}

-- ASN1STOP
```

UE-HistoryInformation field descriptions
lastVisitedCellID Cell Identity
cellType The type of the cells where UE recently visited before the handover
timeUE-StayedInCell The duration while the UE stayed in the cell in second.

10.4 RRC multiplicity and type constraints values

– Multiplicity and type constraints definitions

This section includes multiplicity and type constraints applicable (only) to interactions between network nodes

```
-- ASN1START

maxVisitedCells             INTEGER ::= 10  -- Maximum number of UTRA carrier fequencies        FFS

-- ASN1STOP
```

– End of EUTRA-InterNodeDefinitions

```
-- ASN1START

END

-- ASN1STOP
```

11 Performance requirements (FFS)

This may cover requirements regarding the duration to execute the procedures described in this specification

Editor's note: These requirements could be specified elsewhere, e.g. in a specification dedicated to performance requirements. Hence the need of this section is FFS

11.1 UE capability related constraints

The following table lists constraints regarding the UE capabilities that E-UTRAN is assumed to take into account.

Parameter	Description	Value
#DRBs	The number of DRBs that a UE of categories 1- 5 shall support	8
#RLC-AM	The number of RLC AM entities that a UE of categories 1- 5 shall support (depends on the RLC mode of SRB2)	9 or 10
#Events	The number of instances of a measurement that the UE is required to support	FFS

Editor's note: It has been agreed to define a limitation, the details are FFS

11.2 Processing delay requirements (FFS)

Annex A (informative): Guidelines on use of ASN.1

Editors note No agreements have been reached concerning the extension of RRC PDUs so far. Any statements in this section about the protocol extension mechanism should be considered as FFS.

A.1 Introduction

The following clauses contain guidelines for the specification of RRC protocol data units (PDUs) with ASN.1.

A.2 Principles to ensure compatibility

It shall be possible to inter-work different versions of the RRC protocol.

The protocol shall specify mechanisms such that new PDU types can be introduced without causing unexpected behaviour or damage.

The protocol shall specify mechanisms such that PDU extensions are allowed in a compatible way. Those may include:

- Mechanisms that allow the encoder to selectively include PDU extensions, which are known and can be decoded in the decoder;
- Mechanisms that allow the decoder to skip unknown PDU extensions and complete the decoding of the known parts of the PDU.

In case the protocol allows the transfer of spare values or extension of the value set, the behaviour of the receiving entity not comprehending these values shall be specified.

A.3 PDU specification

A.3.1 General principles

A.3.1.1 ASN.1 sections

The RRC PDU contents shall be formally and completely described using abstract syntax notation (ASN.1) [X.680, X.681 (02/2002)].

The complete ASN.1 code is divided into a number of ASN.1 sections in the specifications. In order to facilitate the extraction of the complete ASN.1 code from the specification, each ASN.1 section shall begin with a text paragraph consisting entirely of an *ASN.1 start tag*, which consists of a double hyphen followed by a single space and the text string "ASN1START" (in all upper case letters). Each ASN.1 section shall end with a text paragraph consisting entirely of an *ASN.1 stop tag*, which consists of a double hyphen followed by a single space and the text "ASN1STOP" (in all upper case letters):

```
-- ASN1START

-- ASN1STOP
```

The text paragraphs containing the ASN.1 start and stop tags shall not contain any ASN.1 code significant for the complete description of the RRC PDU contents. The complete ASN.1 code may be extracted by copying all the text paragraphs between an ASN.1 start tag and the following ASN.1 stop tag in the order they appear, throughout the specification.

NOTE: A typical procedure for extraction of the complete ASN.1 code consists of a first step where the entire RRC PDU contents description (ultimately the entire specification) is saved into a plain text (ASCII) file format, followed by a second step where the actual extraction takes place, based on the occurrence of the ASN.1 start and stop tags.

A.3.1.2 ASN.1 identifier naming conventions

The naming of identifiers (i.e., the ASN.1 field and type identifiers) should be based on the following guidelines:

- Message (PDU) identifiers should be ordinary mixed case without hyphenation. These identifiers, *e.g.*, the *RRCConnectionModificationCommand*, should be used for reference in the procedure text. Abbreviated forms of these identifiers should not be used.

- Type identifiers other than PDU identifiers should be ordinary mixed case, with hyphenation used to set off acronyms only where an adjacent letter is a capital, *e.g.*, *EstablishmentCause*, *SelectedPLMN* (not *Selected-PLMN*, since the 'd' in 'Selected' is lowercase), *InitialUE-Identity* and *MeasuredSFN-SFN-TimeDifference*.

- Field identifiers shall start with a lowercase letter and use mixed case thereafter, *e.g.*, *establishmentCause*. If a field identifier begins with an acronym (which would normally be in upper case), the entire acronym is lowercase (*plmn-Identity*, not *pLMN-Identity*). The acronym is set off with a hyphen (*ue-Identity*, not *ueIdentity*), in order to facilitate a consistent search pattern with corresponding type identifiers.

- Identifiers that are likely to be keywords of some language, especially widely used languages, such as C++ or Java, should be avoided to the extent possible.

- Identifiers, other than PDU identifiers, longer than 25 characters should be avoided where possible. Abbreviations may be used. Examples of typical abbreviations are given in table A.3.1.2.1-1 below.

- *For future extension:* where versions of an ASN.1 field or type need to be distinguished by release, a suffix of the form "-rX" is used, *e.g.*, *Foo-r9* for the Rel-9 version of the ASN.1 type *Foo*. If an ASN.1 field or type provides only the extension of a corresponding earlier field or type (cf., sub-clause A.ffs), a suffix of the form "-vXYZext" is used, e.g., *AnElement-v10b0ext* for the extension of the ASN.1 type *AnElement* introduced in the version 10.11.0 of the specification. Digits *0...9, 10, 11, etc.* are used to represent the first digit of the version number. Lower case letters *a, b, c, etc.* are used to represent the second (and third) digit of the version number if they are greater than 9.

Table A.3.1.2-1: Examples of typical abbreviations used in ASN.1 identifiers

Abbreviation	Abbreviated word
Conf	Confirmation
Config	Configuration
DL	Downlink
Freq	Frequency
Id	Identity
Ind	Indication
Info	Information
Meas	Measurement
Param(s)	Parameter(s)
Persist	Persistent
Reestab	Reestablishment
Req	Request
Sched	Scheduling
Thresh	Threshold
Transm	Transmission
UL	Uplink

NOTE: The table A.3.1.2.1-1 is not exhaustive. Additional abbreviations may be used in ASN.1 identifiers when needed.

A.3.1.3 Text references using ASN.1 identifiers

A text reference into the RRC PDU contents description from other parts of the specification is made using the ASN.1 field or type identifier of the referenced element. The ASN.1 field and type identifiers used in text references should be

in the *italic font style*. The "do not check spelling and grammar" attribute in Word should be set. Quotation marks (i.e., " ") should not be used around the ASN.1 field or type identifier.

A reference to an RRC PDU type should be made using the corresponding ASN.1 type identifier followed by the word "message", e.g., a reference to the *RRCConnectionRelease* message.

A reference to a specific part of an RRC PDU, or to a specific part of any other ASN.1 type, should be made using the corresponding ASN.1 field identifier followed by the word "field", e.g., a reference to the *prioritizedBitRate* field in the example below.

```
-- /example/ ASN1START

LogicalChannelConfig ::=            SEQUENCE {
    ul-SpecificParameters               SEQUENCE {
        priority                            Priority,
        prioritizedBitRate                  PrioritizedBitRate,
        logicalChannelGroup                 INTEGER (0..3)
    }       OPTIONAL
}

-- ASN1STOP
```

NOTE: All the ASN.1 start tags in the ASN.1 sections, used as examples in this annex to the specification, are deliberately distorted, in order not to include them when the ASN.1 description of the RRC PDU contents is extracted from the specification.

A reference to a specific type of information element should be made using the corresponding ASN.1 type identifier preceded by the acronym "IE", e.g., a reference to the IE *LogicalChannelConfig* in the example above.

References to a specific type of information element should only be used when those are generic, i.e., without regard to the particular context wherein the specific type of information element is used. If the reference is related to a particular context, e.g., an RRC PDU type (message) wherein the information element is used, the corresponding field identifier in that context should be used in the text reference.

A.3.2 High-level message structure

Within each logical channel type, the associated RRC PDU (message) types are alternatives within a CHOICE, as shown in the example below.

```
-- /example/ ASN1START

DL-DCCH-Message ::= SEQUENCE {
    message                 DL-DCCH-MessageType
}

DL-DCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        dlInformationTransfer                   DLInformationTransfer,
        handoverFromEUTRAPreparationRequest     HandoverFromEUTRAPreparationRequest,
        mobilityFromEUTRACommand                MobilityFromEUTRACommand,
        rrcConnectionReconfiguration            RRCConnectionReconfiguration,
        rrcConnectionRelease                    RRCConnectionRelease,
        securityModeCommand                     SecurityModeCommand,
        ueCapabilityEnquiry                     UECapabilityEnquiry,
        spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

A nested two-level CHOICE structure is used, where the alternative PDU types are alternatives within the inner level *c1* CHOICE.

Spare alternatives (i.e., *spare1* in this case) may be included within the *c1* CHOICE to facilitate future extension. The number of such spare alternatives should not extend the total number of alternatives beyond an integer-power-of-two number of alternatives (i.e., eight in this case).

Further extension of the number of alternative PDU types is facilitated using the *messageClassExtension* alternative in the outer level CHOICE.

A.3.3 Message definition

Each PDU (message) type is specified in an ASN.1 section similar to the one shown in the example below.

```
-- /example/ ASN1START

RRCConnectionReconfiguration ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionReconfiguration-r8     RRCConnectionReconfiguration-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReconfiguration-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}

-- ASN1STOP
```

Hooks for *critical* and *non-critical* extension should normally be included in the PDU type specification. How these hooks are used is further described in sub-clause A.4.

Critical extensions are characterised by a redefinition of the PDU contents and need to be governed by a mechanism for protocol version agreement between the encoder and the decoder of the PDU, such that the encoder is prevented from sending a critically extended version of the PDU type, which is not comprehended by the decoder.

Critical extension of a PDU type is facilitated by a two-level CHOICE structure, where the alternative PDU contents are alternatives within the inner level *c1* CHOICE. Spare alternatives (i.e., *spare3* down to *spare1* in this case) may be included within the *c1* CHOICE. The number of spare alternatives to be included in the original PDU specification should be decided case by case, based on the expected rate of critical extension in the future releases of the protocol.

Further critical extension, when the spare alternatives from the original specifications are used up, is facilitated using the *criticalExtensions* in the outer level CHOICE.

In PDU types where critical extension is not expected in the future releases of the protocol, the inner level *c1* CHOICE and the spare alternatives may be excluded, as shown in the example below.

```
-- /example/ ASN1START

RRCConnectionReconfigurationComplete ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReconfigurationComplete-r8
                                            RRCConnectionReconfigurationComplete-r8-IEs,
        criticalExtensions                  SEQUENCE {}
    }
}

RRCConnectionReconfigurationComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here. --                                                   -- Cond condTag
    ...
}

-- ASN1STOP
```

Non-critical extensions are characterised by the addition of new information to the original specification of the PDU type. If not comprehended, a non-critical extension may be skipped by the decoder, whilst the decoder is still able to complete the decoding of the comprehended parts of the PDU contents.

Non-critical extensions are facilitated by use of the ASN.1 extension marker "...". The original specification of a PDU type should normally include the extension marker at the end of the sequence of information elements contained.

The ASN.1 section specifying the contents of a PDU type shall be followed by a *field description* table where a further description of, e.g., the semantic properties of the information elements may be included. The general format of this table is shown in the example below.

***%PDU-TypeIdentifier%* field descriptions**
%field identifier% Field description.
%field identifier% Field description.

The field description table has one column. The header row shall contain the ASN.1 type identifier of the PDU type.

The following rows are used to provide field descriptions. Each row shall include a first paragraph with a *field identifier* (in ***bold and italic*** font style) referring to the part of the PDU to which it applies. The following paragraphs at the same row may include (in regular font style), e.g., semantic description, references to other specifications and/or specification of value units, which are relevant for the particular part of the PDU.

The parts of the PDU contents that do not require a field description shall be omitted from the field description table.

If the field description table is empty, the header row shall be followed by a single row with the word "Void" (in ***bold and italic*** font style) in a single paragraph replacing the field identifier.

Optionally, if the PDU contents include elements of conditional presence, the field description table may be followed by a conditional presence table, specifying the conditions for including the corresponding element in the PDU.

Conditional presence	Explanation
%condTag%	Specification of conditional presence.

A.3.4 Information elements

A.4 Extension of the PDU specifications

Annex B (informative): Change history

Editor's note: The last digit of the version is stepped for intermediate versions not yet endorsed by RAN WG2, i.e. the changes compared to a previous version could be significant. The middle digit in the version is stepped only after RAN2 endorsement.

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
28 June 2007	CC-2 RAN2#58 bis	TD-02 R2-072616			Included/ changes: ▪ RRC CC-2 TD-02 TP on RRC messages and procedures-CC1upd ▪ E-UTRA RRC TP on High level parameters for some RRC functional areas (R2-072616) ▪ Consistent use of terminology (E-UTRA, RRC connection)	0.0.1	0.0.2
2 July 2007	RAN2#58 bis	R2-072975			Same as version0.0.2, that was agreed during RAN2#58bis, but now without change marks	0.0.2	0.1.0
2 July 2007		R2-072977 R2-072978			Included/ changes: ▪ E-UTRA RRC TP on System information procedure ▪ E-UTRA RRC TP on System Information Blocks	0.1.0	0.1.1
2 July 2007					Included/ changes: ▪ RAN2#58bis agreements on System information scheduling ▪ RAN2#58bis agreements on System information change notification ▪ RAN2#58bis agreements on Cell barring info ▪ Editorial corrections e.g. additional abbreviations	0.1.1	0.1.2
8 August 2007					Included/ changes: ▪ RAN2#58bis agreements on integrity protection allocation ▪ Editorial corrections e.g. additional references, renaming of RRC CONNECTION CHANGE message	0.1.2	0.1.3
13 August 2007					Included/ changes: ▪ RAN2#58bis agreements on RRC connection establishment according to text proposal agreed during e-mail review	0.1.3	0.1.4
24 August 2007					Included/ changes: ▪ Note clarifying that the use of pre-configuration upon RRC connection establishment is not precluded	0.1.4	0.2.0
24 August 2007					Included/ changes: ▪ RAN2#59 agreements to support Cell change order to GERAN including NACC ▪ RAN2#59 agreements on message parameters e.g. on handover, radio link failure, broadcast (some resulting from RAN1 liaisons), DRX	0.2.0	0.2.1
5 September 2007					Included/ changes: ▪ Editorial corrections (references)	0.2.1	0.3.0
16 October 2007		R2-074012 R2-074014 R2-074015 R2-074016 R2-074508			Included/ changes ▪ TP Capturing current status on measurements ▪ TP Capturing current status on mobility ▪ TP Capturing current status on security ▪ TP Progressing the PDUs ▪ TP Capturing current status on inter RAT mobility	0.3.0	0.3.1
22 October 2007					Included/ change (agreements RAN2#59bis) ▪ RRC concatenation of system information ▪ BCCH change notification using paging for UEs in idle and using periodic BCCH monitoring for UEs in connected ▪ Three intra-frequency measurement events and associated parameters ▪ Only dedicated measurement control for UEs in connected, using the RRC connection reconfiguration message ▪ Clarification regarding the measurement configuration upon handover ▪ Security activation upon transition from idle to connected ▪ Removal of FFS on synchronous handover ▪ No individual GSM/ GERAN neighbours will be indicated. All individual UTRAN neighbours will be indicated ▪ A message for inter RAT mobility from E-UTRA	0.3.1	0.3.2

					▪ NAS transfer is performed after connection establishment ▪ Clarification regarding the use of the three SRBs ▪ Introduction of UE capability transfer (removal of FFS)		
29 October 2007					Main changes (based on comments e-mail review) ▪ Clarification is added that for detected cells, UTRAN indicates the carrier frequency ▪ Additional clarification regarding handling of timers and indication to upper layers in a number of failure cases ▪ RRC connection reconfiguration request is re-named to RRC connection re-establishment request ▪ FFS added for the handling of the inter frequency measurements upon inter frequency handover ▪ Upon connection failure, upper layers are informed prior to moving to idle ▪ FFS added regarding which message is used to request & transfer UE radio access capabilities	0.3.2	0.3.3
9 November 2007	RAN2#60	R2-074969			Same as version 0.3.3, but now without change marks	0.3.3	0.4.0
13 November 2007					▪ Main changes (agreements from RAN2#60)Access class barring (persistence value common for AC0-9, originating only option) ▪ Handover complete message e.g. contention resolution, security ▪ Radio link failure messages and their contents ▪ System information change notification ▪ Configuration and activation of measurement gaps ▪ Inter-frequency and inter-RAT measurement events ▪ Handling of inter-frequency measurements upon inter-frequency handover ▪ Procedure interactions, general model and initial security activation	0.4.0	0.4.1
19 November 2007					Main changes (based on comments received during e-mail review) ▪ Descriptive section on RRC connection control ▪ Correction regarding Handling of inter-frequency measurements upon inter-frequency handover ▪ Retry of connection (re-)establishment upon detecting contention ▪ Correction regarding initial ciphering activation ▪ Removal of redundant security parameters	0.4.1	0.4.2
21 November 2007					Main changes (based on comments received during e-mail review) ▪ An FFS was added regarding the need to specify the UE behaviour for 3 failure cases (i.e. in 5.2.4.4, 5.2.5.3 and 5.3.2.2)	0.4.2	0.5.0
22 November 2007					Same as 0.5.0	0.5.0	1.0.0

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
12/2007	RP-38	RP-070920	-		Approved at TSG-RAN #38 and placed under Change Control	1.0.0	8.0.0
03/2008	RP-39	RP-080163	0001	4	CR to 36.331 with Miscellaneous corrections	8.0.0	8.1.0
03/2008	RP-39	RP-080164	0002	2	CR to 36.331 to convert RRC to agreed ASN.1 format	8.0.0	8.1.0
05/2008	RP-40	RP-080361	0003	1	CR to 36.331 on Miscellaneous clarifications/ corrections	8.1.0	8.2.0

History

Document history		
V8.2.0	November 2008	Publication