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Foreword

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Contents

Foreword

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

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1 Scope

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

2 References

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

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

[1] 3GPP Homepage: www.3GPP.org.

[2] spare

[3] TS 25.101: "UE Radio transmission and reception (FDD)".

[4] TS 25.104: "BTS Radio transmission and reception (FDD)".

[5] TS 25.102: "UE Radio transmission and reception (TDD)".

[6] TS 25.105: "BTS Radio transmission and reception (TDD)".

[7] TS 25.103: "RF parameters in support of RRM".

[8] TS 25.141: "Base station conformance testing (FDD)".

[9] TS 25.142: "Base station conformance testing (TDD)".

[10] TS 25.113: "Base station EMC".

[11] TRS 25.942: "RF System scenarios".

[12] TR 25.922: "RRM Strategies".

[13] TS 25.215: "Physical Layer Measurements (FDD)".

[14] TS 25.225: "Physical Layer Measurements (TDD)".

[15] TS 25.302: "Services provided by Physical Layer".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

The main general definitions strictly related to the Transmission and Reception characteristics but important also for the present document can be found in [3] for UE FDD, in [4] for BS FDD, in [5] for UE TDD, in [6] for BS TDD.

3.2 Symbols

For the purposes of the present document, the following symbol applies:

[…] Values included in square bracket must be considered for further studies, because it means that a decision about that value was not taken.

3.3 Abbreviations

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

ACPR	Adjacent Channel Power Ratio
BER	Bit Error Rate
BLER	Block Error Rate
BS	Base Station
CW	Continuous wave (unmodulated signal)
DL	Down link (forward link)
EIRP	Equivalent Isotropic Radiated Power
FDD	Frequency Division Duplexing
FER	Frame Error Ratio
PPM	Parts Per Million
RRM	Radio Resource Management
RSSI	Received Signal Strength Indicator
SIR	Signal to Interference ratio
TDD	Time Division Duplexing
TPC	Transmit Power Control
UE	User Equipment
UL	Up link (reverse link)
UTRA	UMTS Terrestrial Radio Access

4 Idle Mode Tasks

4.1 Introduction

NOTE: The paging period and the repetition rate of relevant system information blocks needs to be defined.

4.2 RF Cell Selection Scenario

NOTE: Some performance requirements in agreed scenarios are added into this subclause. More scenarios will be added later.

4.2.1 Requirements for Cell Selection Single carrier Single cell case

4.2.1.1 Cell Selection delay

The UE shall be capable of selecting a suitable cell within [5] seconds from switch on in the test case defined in following subclause in Table 4-1. The cell selection delay is defined as a time the UE needs for sending RRC Connection Request for Location Registration to UTRAN after the power has been switched on with a valid USIM and PIN is disabled.

4.2.1.2 Test Parameters

The stored information of the last registered PLMN is utilized in this test. The stored information includes UTRA RF CHANNEL NUMBER. The active cell in the test does not contain any neighbour cells in its measurement control information.

Table 4-1

Parameter	Unit	Cell 1
UTRA RF Channel Number		Channel 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
OCNS_Ec/Ior	dB	-0.941
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/3.84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN
Qmin	dB	[ ]
UE_TXPWR_MAX_RACH	dBm	[ ]

4.2.1.3 Performance Requirements

Cell selection shall be correct in more than [X %] of the cases. Cell selection is correct if within [5] seconds the UE camps on the cell.

4.2.2 Requirements for Cell Selection multi carrier multi cell case

4.2.2.1 Cell selection delay

The UE shall be capable of selecting a suitable cell within [5 + x] seconds from switch on in the test case defined in following subclause in Table 4-2. The cell selection delay is defined as a time the UE needs for sending RRC Connection Request for Location Registration message to UTRAN after the power has been switched on with a valid USIM and PIN is disabled.

4.2.2.2 Test Parameters

The stored information of the last registered PLMN is utilized in this test. The stored information includes one of the UTRA RF CHANNEL NUMBERs used in the test. All the cells in the test are given in the measurement control information of each cell, which are on the RF carrier stored to the UE.

NOTE: Here pilot pollution case with different power levels for cells could be included.

Table 4-2

Parameter	**Unit**	**Cell 1**	**Cell 2**	**Cell 3**	**Cell 4**	**Cell 5**	**Cell 6**
UTRA RF Channel Number		Channel 1	Channel 1	Channel 1	Channel 2	Channel 2	Channel 2
CPICH_Ec/Ior	dB	-10	-10	-10	-10	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12	-12	-12	-12	-12
SCH_Ec/Ior	dB	-12	-12	-12	--12	-12	-12
PICH_Ec/Ior	dB	-15	-15	-15	-15	-15	-15
OCNS_Ec/Ior	dB	-0.941	-0.941	-0.941	-0.941	-0.941-	-0.941
$\hat{I}_{or}/I_{oc}$	dB	5.3	2.3	-1.7	6.3	14.3	2.3
I_{oc}	dBm/3.84 MHz	-70			-70		
CPICH_Ec/Io	dB	-13	-16	-20	-19	-11	-23
Propagation Condition		AWGN			AWGN		
Qmin	dB	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
UE_TXPWR_MAX_RACH	dBm	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

4.2.2.3 Performance Requirements

Cell selection shall be correct in more than [X%] of the cases. Cell selection is correct if within [5+x] seconds the UE camps on the cell, which fulfils the cell selection criteria.

4.3 RF Cell Re-Selection Scenario

NOTE: One performance requirement in agreed scenario is added into this subclause. More scenarios will be added later.

4.3.1 Requirements for Cell Re-Selection single carrier multi cell case

4.3.1.1 Cell re-selection delay

When the UE is camped on one of the cells, the UE shall be capable of re-selecting a new cell in the test case defined in the following subclause in within [5] seconds from it becoming a cell to be re-selected according the cell re-selection criteria. The cells, which are possible to be re-reselected during the test are belonging to different location areas. The cell re-selection delay is then defined as a time from when CPICH_Ec/Io is changed on cell 1 and 2 to the moment in time when the UE starts sending the RRC Connection request for Location Update message to the UTRAN.

4.3.1.2 Test Parameters

One of the 6 cells in Table 4-3 is serving cell and all others are given in the measurement control information of the serving cell. 2 of the cells are possible for cell re-selection and 4 of the cells are steady interfering cells.

Table 4-3

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/Ior	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
I_{oc}	dBm/3.84 MHz	–70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	

Time T1 is X seconds and T2 is Y seconds.

NOTE: T1 and T2 need to be defined so that cell re-selection reaction time is taken into account.

4.3.1.3 Performance Requirements

Cell re-selection shall be correct in more than [X %] of the cases. Cell re-selection is correct if within [5] seconds the UE re-reselects a new cell, which fulfils the cell re-selection criteria.

4.3.1.4 Cell List Size

[The UE shall be capable of recording at least [6] of the strongest cells according to the cell re-selection criteria. The number of the strongest cells recorded inside the UE shall be at least [6].]

4.3.1.5 Maximum number of cells to be monitored

For re-selection purposes, the UE shall be capable of monitoring at least up to 32 neighbouring cells given in the measurement control information. The exact number of cells to be monitored will be determined by the measurement control information broadcast in the serving cell.

4.3.2 Requirements for Cell Re-Selection multi carrier multi cell case

4.3.2.1 Cell re-selection delay

When the UE is camped on one of the cells, the UE shall be capable of re-selecting a new cell in the test case defined in the following subclause in within [Tres] seconds from it becoming a cell to be re-selected according the cell re-selection criteria. The cells, which are possible to be re-reselected during the test are transmitting on different frequencies and are belonging to different location areas. The cell re-selection delay is then defined as a time from when CPICH_Ec/Io is changed on cell 1 and 2 to the moment in time when the UE starts sending the RRC Connection request for Location Update message to the UTRAN.

4.3.2.2 Test Parameters

6 cells are given in the measurement control information of the serving cell, 3 on each of the two frequencies. One of the 6 cells in 4.4 is the serving cell, totally 2 of the cells are possible for cell re-selection and 4 of the cells are interfering cells.

Table 4-4

Parameter	**Unit**	**Cell 1**		**Cell 2**		**Cell 3**		**Cell 4**		**Cell 5**		**Cell 6**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/Ior	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
I_{oc}	dBm/3.84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-20		-20		-20		-20	
Propagation Condition		AWGN											
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Qintersearch	dB dB	[2] [5] [-8]		[2] [5] [-8]		[2] [5] [-8]		[2] [5] [-8]		[2] [5] [-8]		[2] [5] [-8]	

Time T1 is X seconds and T2 is Y seconds.

4.3.2.3 Performance Requirements

Cell re-selection shall be correct in more than [90%] of the cases. Cell re-selection is correct if within Nt seconds the UE re-reselects a new cell, which fulfils the cell re-selection criteria and stays steady on that cell until the channel conditions are changed again.

4.3.3 Requirements for UTRAN to GSM Cell Re-Selection

NOTE 1: These requirements are depending on supported UE capabilities.

NOTE 2: Requirements for GSM to UTRAN Cell Re-Selection are defined in the GSM specifications.

4.3.4 Cell re-selection delay

When the UE is camped on UTRAN cell, the UE shall be capable of re-selecting a GSM cell in the test case defined in the following subclause in within [TBD] seconds from it becoming a cell to be re-selected according the cell re-selection criteria for UTRAN to GSM. The cells, which are possible to be re-reselected during the test, belong to different location areas. The cell re-selection delay is then defined as a time from when radio conditions are changed to the moment in time when the UE starts sending the RR Channel Request message for location update to GSM.

4.3.5 Test Parameters

Tbd.

5 RRC Connection mobility

5.1 Handover

5.1.1 Introduction

The handover process should be implemented in both the UE and UTRAN. The UE measurements and which radio links the UE shall use is controlled by UTRAN with RRC signalling.

Measurements are specified in TS25.215 and UE behaviour in response to UTRAN RRC messages is described in TS25.331.

5.1.2 Handover 3G to 3G

5.1.2.1 FDD Soft/Softer Handover

The soft handover procedure is initiated from UTRAN with an active set update message.

5.1.2.1.1 Maximum number of cells to be reported

The UE shall be capable of reporting the requested measurement quantity of at least [6] cells given in a measurement control message(s).

5.1.2.1.2 Measurement reporting delay

The measurement reporting delay is defined as the time from when a report is triggered at the physical layer according to the event or periodic mechanism set to trigger the measurement report, until the UE starts to transmit the measurement report over the Uu interface.

5.1.2.1.3 Test parameters

The DL reference measurement channel 12.2 kbps as specified in Annex A, Subclause A.3.1 of TS25.101 shall be used but with power control turned on [see 25.101].Correct reporting of neighbours and CPICH_Ec/Io and timing measurement accuracies in AWGN propagation condition.

This test will derive that the terminal makes correct reporting of an event and that the measurement accuracy of the CFN-SFN observed timed difference between Cell 1 and Cell 2 is within defined limits. Cell 1 is current active cell. The power level of Cell 1 is kept constant and the power level of Cell 2 is changed using ($\hat{I}_{or}/I_{oc}$), as illustrated in figure 5-1. Hysteresis, Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and 1B shall be used, SFN has to be decoded for neighbour cells. CPICH Ec/I0 and the CFN-SFN observed timed difference has to reported together with Event 1A reporting. New measurement control information, which defines neighbour cells etc., is always sent during time period Time 1. The number of neighbour cells in the measurement control information is 24.

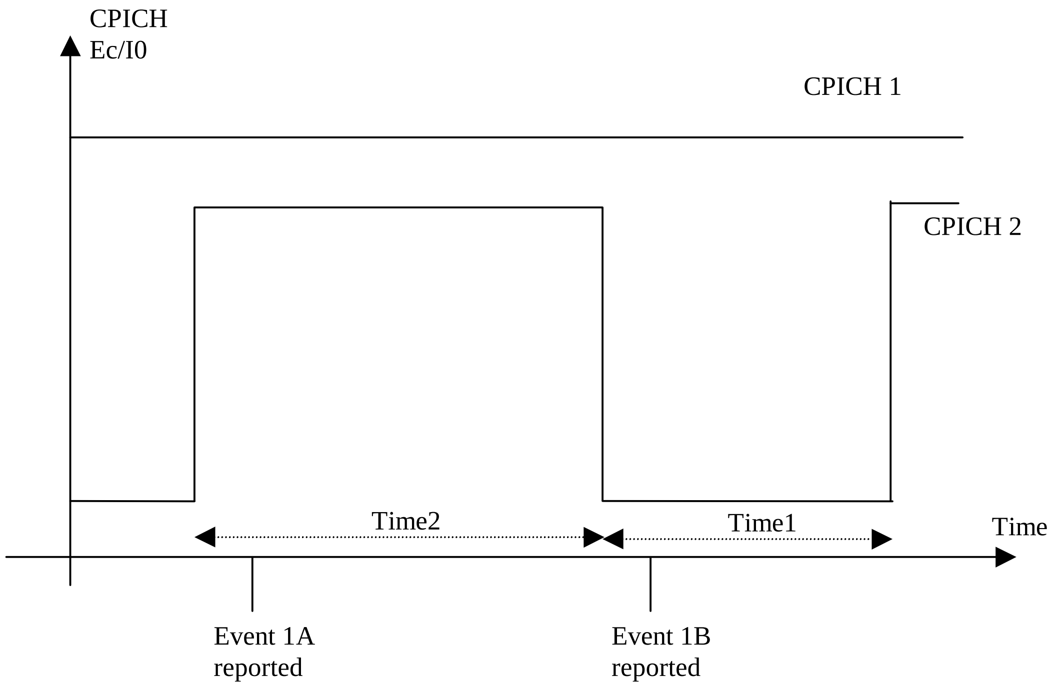

Figure 5-1: Illustration of parameters for soft handover measurement reporting test case

Table 5-1: Test parameters for handover measurement reporting delay

Parameter	**Unit**	**Cell 1**		**Cell 2**	
		Time 1	**Time 2**	**Time 1**	**Time 2**
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	-17		-17	
OCNS		-1.049		-1.049	
$\hat{I}_{or}/I_{oc}$	dB	0	6.97	-Infinity	5.97
I_{oc}	dBm/3.84 MHz	-70			
CPICH_Ec/Io	dB	-13	-13	-Infinity	-14
Threshold	dB	3			
Hysteresis	dB	0			
Time to Trigger	msec	0			
Propagation Condition	AWGN				

Time period Time 1 is X seconds. Time period Time 2 is Y seconds.

5.1.2.1.3.1.1 Minimum Requirements

The measurement reporting delay shall be less then 0.8 seconds in [90]% of the cases.

Reported CPICH Ec/Io of Cell 2 in Event 1A shall have an accuracy of ± [1.5] dB in [90]% of the 1A reports.

Reported CFN-SFN observed time difference shall have an accuracy of ±[Y] chips in [90]% of the reports.

5.1.2.1.3.2 Event triggered reporting of multiple neighbours in AWGN propagation condition

This test will derive that the terminal makes correct reporting of an event and that the measurement accuracy of the reported values is within the specified limits. In figure 5-2 an illustration of the test case is shown. In the test 4 cells are present. Cell 1 and 2 are within the active set, as illustrated in figure 5-2. The $\hat{I}_{or}/I_{oc}$ level of Cell 1 and 2 is kept at a constant level according to table 5-3 and the power level of cell 3 and 4 is changed over time by changing ($\hat{I}_{or}/I_{oc}$) according to table 5-4 Hysteresis, Threshold and Time to Trigger values are given in the tables below and they are signalled from the test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1C and 1B shall be used. CPICH Ec/Io and CFN-SFN observed time difference shall be reported together with Event 1C. New measurement control information, which defines neighbour cells etc., is continuously sent. The number of neighbour cells in the measurement control information is 32.

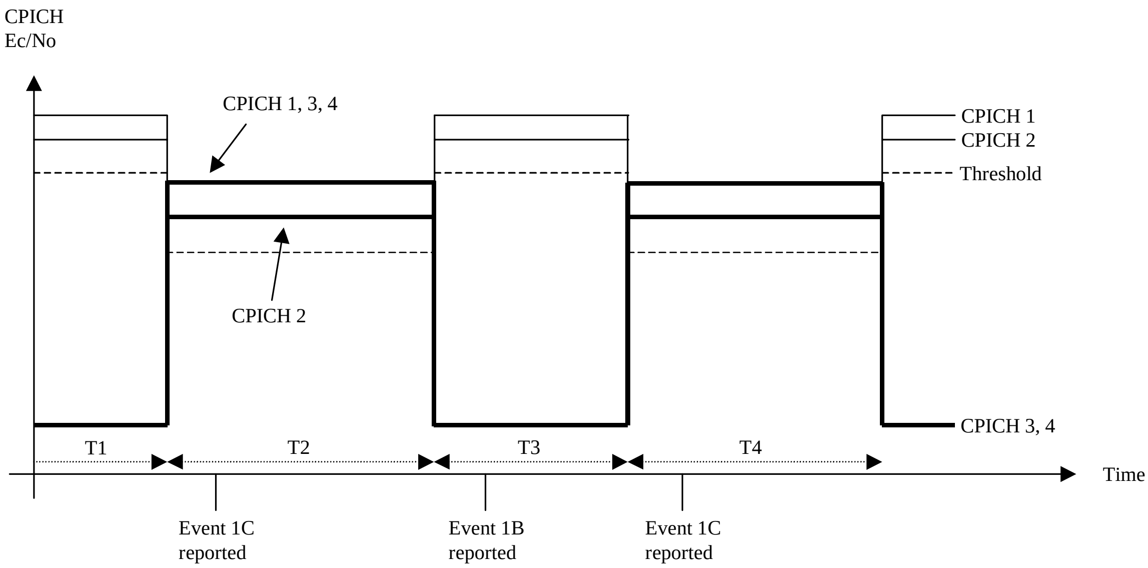

Figure 5.2: Illustration of the test case

In table 5-2 the test case is described in detail for each time interval T1 to T4 and Minimum Requirements are given for each time interval.

Table 5-2

Time	Value	Cell 1 to 2	Cell 3 to 4
T1	> 20 s	Included in the active set, keeping a constant Îor/Ioc level over the test.	Not visible, e.g. the UE has never had synchronisation to them before.
T2	10 s		Will test the time for initial synchronisation when neighbour 3 and 4 suddenly becomes strong. Cell 3 and 4 becomes stronger than one of the cell in the active set (cell 2) and therefore event 1C shall be triggered. Together with the event a report containing measured CPICH Ec/Io for all cells shall be sent together with the CFN-SFN observed time difference for cell 3 and 4. Minimum Requirements Event 1C shall be reported within [800] ms in [90] % of the cases. Reported CPICH Ec/Io of Cell 1 shall have an accuracy of ± [TBD] dB in [90] %. Reported CFN-SFN observed time difference for Cell 1 shall have an accuracy of ±[Y] chips in [90] % of the reports. Reported CPICH Ec/Io of Cell 2 shall have an accuracy of ± [TBD] dB in [90]%. Reported CFN-SFN observed time difference for Cell 2 shall have an accuracy of ±[Y] chips in [90]% of the reports. Reported CPICH Ec/Io of Cell 3 shall have an accuracy of ± [TBD] dB in [90] %. Reported CFN-SFN observed time difference for Cell 3 shall have an accuracy of ±[TBD] chips in [90] % of the reports. Reported CPICH Ec/Io of Cell 4 shall have an accuracy of ± [TBD] dB in [90] %. Reported CFN-SFN observed time difference for Cell 4 shall have an accuracy of ±[Y] chips in [90]% of the reports.
T3	15 s		Neighbour 3 and 4 suddenly disappears. Event 1B shall be trigerred. Together with the event a report containing measured CPICH Ec/Io for all remaing cells shall be sent. Minimum Requirements. Event 1B shall be reported within [150] ms in [90] % of the cases. Reported CPICH Ec/Io of Cell 1 shall have an accuracy of ± [TBD] dB in [90] %. Reported CPICH Ec/Io of Cell 2 shall have an accuracy of ± [TBD] dB in [90] %.

Time	Value	Cell 1 to 2	Cell 3 to 4
T4	10 s		Neighbour 4 to 6 suddenly appears again after being gone for T3 s. Event 1C shall be triggered. Together with the event a report containing measured Ec/Io for all cells shall be sent together with the CFN-SFN observed time difference for cell 3 and 4. Minimum Requirements. Event 1C shall be reported within [150] ms in [90] % of the cases. Reported CPICH Ec/Io of Cell 1 shall have an accuracy of ± [TBD] dB in [90] %. Reported CPICH Ec/Io of Cell 2 shall have an accuracy of ± [TBD] dB in [90] %. Reported CPICH Ec/Io of Cell 3 shall have an accuracy of ± [TBD] dB in [90] %. Reported CFN-SFN observed time difference for Cell 3 shall have an accuracy of ±[TBD] chips in [90] % of the reports. Reported CPICH Ec/Io of Cell 4 shall have an accuracy of ± [TBD] dB in [90] %. Reported CFN-SFN observed time difference for Cell 4 shall have an accuracy of ±[Y] chips in [90] % of the reports.

Table 5.3

Parameter	Unit	Cell 1				Cell 2			
		T1	T2	T3	T4	T1	T2	T3	T4
CPICH_Ec/Ior	dB	-10				-10			
PCCPCH_Ec/Ior	dB	-12				-12			
SCH_Ec/Ior	dB	-12				-12			
PICH_Ec/Ior	dB	-15				-15			
DPCH_Ec/Ior	dB	-17				-17			
OCNS_Ec/Ior	dB	-1,049				-1,049			
$\hat{I}_{or}/I_{oc}$	dB	18,5				17			
I_{oc}	dBm/3.84 MHz	-85							
CPICH_Ec/Io	dB	-12,4	-15,5	-12,4	-15,5	-13,9	-17,0	-13,9	-17,0
Threshold	dB	3							
Hysteresis	dB	0							
Time to Trigger	msec	0							
Propagation Condition	AWGN								

Table 5-4

Parameter	Unit	Cell 3				Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4
CPICH_Ec/Ior	dB	-10				-10			
PCCPCH_Ec/Ior	dB	-12				-12			
SCH_Ec/Ior	dB	-15				-15			
PICH_Ec/Ior	dB	-15				-15			
DPCH_Ec/Ior	dB	N/A				N/A			
OCNS	dB	-0,941				-0,941			
$\hat{I}_{or}/I_{oc}$	dB	-Inf	18,5	-Inf	18,5	-Inf	17,5	-Inf	17,5
I_{oc}	dBm/3.84 MHz	-85							
CPICH_Ec/Io	dB	-Inf	-15,5	-Inf	-15,5	-Inf	-16,5	-Inf	-16,5
Threshold	dB	3							
Hysteresis	dB	0							
Time to Trigger	msec	0							
Propagation Condition	AWGN								

5.1.2.1.3.3 Correct reporting of neighbours in Fading propagation condition

This test will derive that the terminal makes correct reporting of an event. Cell 1 is current active cell. The power level of Cell 1 is kept constant and the power level of Cell 2 is changed using ($\hat{I}_{or}/I_{oc}$). Hysteresis, Threshold and Time to Trigger values are given in the table below and they are signaled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A shall be used. Only the event number is reported in this case. New measurement control information, which defines neighbor cells etc., is sent always during time period Time 1. The number of neighbor cells in the measurement control information is 24.

Table 5-5: Test parameters for correct reporting of neighbours

Parameter	Unit	Cell 1		Cell 2	
		Time 1	Time 2	Time 1	Time 2
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	TBD		TBD	
OCNS		[To Be Calculated]		[To Be Calculated]	
$\hat{I}_{or}/I_{oc}$	DB	0	6.97	-Infinity	5.97
I_{oc}	DBm/3.84 MHz	-70			
CPICH_Ec/Io	DB	-13	-13	-Infinity	-14
Threshold	DB	3			
Hysteresis	DB	0			
Time to Trigger	Msec	0			
Propagation Condition	2-tap Rayleigh fading, 0 dB, -10 dB, 50km/h				

Time period Time 1 is X seconds. Time period Time 2 is Y seconds.

5.1.2.1.3.3.1 Minimum Requirement

The measurement reporting delay shall be less then XX seconds in YY%.

5.1.2.1.3.4 CPICH_Ec/Io measurement accuracy and incorrect reporting of neighbours in AWGN propagation condition

The test case will derive the terminal's measurement accuracy of CPICH_Ec/Io and false detection resistance. The terminal measurement accuracy of CPICH_Ec/Io is derived using the periodical reporting of active cell's measured CPICH_Ec/Io. The terminal's false detection resistance is derived by recording the amount of erroneous reports. Both Cell 1 and Cell 2 powers ($\hat{I}_{or}/I_{oc}$) are constant during the test case. Cell 2 is near to reporting range. Hysteresis, Threshold, Time to Trigger values and reporting period for active cell are given in the table below and they are signaled from test device. In the measurement control information it is indicated to the UE that the CPICH_Ec/Io level of the active set cell has to reported periodically (and reporting period) and event-triggered reporting (1A) will also be used. The number of neighbour cells in the measurement control information is 24.

Table 5-6: Test parameters for CPICH_Ec/Io measurement accuracy and incorrect reporting of neighbours

Parameter	**Unit**	**Cell 1**	**Cell 2**
CPICH_Ec/Ior	DB	-10	-10
PCCPCH_Ec/Ior	DB	-12	-12
SCH_Ec/Ior	DB	-12	-12
PICH_Ec/Ior	DB	-15	-15
DPCH_Ec/Ior	DB	TBD	TBD
OCNS		[To Be Calculated]	[To Be Calculated]
$\hat{I}_{or}/I_{oc}$	DB	1.68	-3.32
I_{oc}	DBm/3.84 MHz	-70	
CPICH_Ec/Io	DB	-13	-18
Threshold	DB	3	
Hysteresis	DB	0	
Time to Trigger	Msec	0	
Reporting period	Msec	TBD	
Propagation Condition	AWGN		

5.1.2.1.3.4.1 Minimum Requirements

Event triggered report rate shall not exceed X reports in Y seconds.

In the periodical reporting the reported CPICH_Ec/Io for Cell 1 shall have an accuracy of ± [TBD] dB in [90] % of the reports.

5.1.2.1.4 Active set dimension

The active set is defined as set of radio links simultaneously involved in a specific communication service between an User Equipment and a UTRAN access point. The UE shall be capable of supporting at least [6] radio links in the active set.

5.1.2.1.5 Active set update delay

The active set update delay start is defined as the time from when the UE receives the active set update message from UTRAN, or at the time stated through the activation time when to perform the active set update. The activation time stop is defined as the time when the UE successfully only uses the set of radio links stated in that message for power control. The active set update delay is defined as the time between the active set update start and the active set stop.

The active set update delay for different number of added cells is stated in the table below. There is different requirement on the active set update delay depending on if the cell has been within the monitored set of cells for the last [FFS] [s] or not.

[Editor's Note: the requirement of an active set update of at least [1] second after the reception of the UTRAN acknowledgement as proposed in R4-99712, shall be considered as a starting point for the setting of this requirement].

Table 5-7

Number of new cells present in the active set update message	Maximum active set update delay [ms]	
	Cells within monitored set	Cells outside monitored set
1		
2		
3		
4		
5		
6		
…		

If an active set update includes a combination of cells included and not included in the monitored set the maximum active set update delay is the sum of respective maximum delays.

5.1.2.1.6 BS Functionality in Site Selection Diversity Transmission (SSDT) Mode

Site Selection Diversity Transmission (SSDT) is an optional feature of BS. This requirement for SSDT mode ensures that BS correctly reacts to Layer 1 feedback signaling messages from UE.

5.1.2.1.7 Minimum Requirements

For the conditions specified, the BS shall transmit or not transmit the downlink DPDCH channel.

Table 5-8: Parameters for SSDT mode test

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Cell ID of BS under test	-	A	A	A	A
SSDT Quality threshold, $Q_{th,}$ set in BS	DB	-5			
Uplink: $\frac{DPCH\_E_c}{I_o}$	DB	Q_{th} + 10	Q_{th} + 10	Q_{th} - 3	Q_{th} – 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Cell ID transmitted by UE	-	A	B	A	B
Transmission Of downlink DPCCH	-	Yes	Yes	yes	Yes
Transmission Of downlink DPDCH	-	Yes	No	yes	Yes

The above test should be for repeated for each of the three code sets “long”, “medium” and “short” Cell ID code sets. The UE emulator can check the power ratio of downlink DPDCH/DPCCH in order to confirm whether BS transmitted the DPDCH.

5.1.2.2 FDD Hard Handover

The hard handover procedure is initiated from UTRAN with an handover command message. The hard handover procedure may cause the UE to change its frequency. Compressed mode according to the UE Capability may be used to be able to make any measurements on other frequencies.

5.1.2.2.1 Requirements

5.1.2.2.1.1 Maximum number of cells/frequencies to be monitored on other frequencies

The UE shall be capable of measuring the requested measurement quantity of at least [FFS] cells on a maximum of [FFS] frequencies, different from the frequency currently used by the UE.

The cells and frequencies are given to the UE in a measurement control message(s), and the measurement slots available with compressed mode is given through physical channel reconfiguration parameters.

5.1.2.2.1.2 Measurement reporting delay

The measurement reporting delay is defined as the time from when a report is triggered at the physical layer according to the event or periodic mechanism set to trigger the measurement report, until the UE starts to transmit the measurement report over the Uu interface.

5.1.2.2.1.2.1 Test Parameters for DL compressed mode

The DL reference measurement channel 12.2 kbps shall be used, with power control turned on [see 25.101]. Test parameters for DL compressed mode are given in Annex ?? of TS25.101.

5.1.2.2.1.2.2 CPICH_Ec/Io measurement accuracy and correct reporting of neighbours in AWGN propagation condition.

This test will derive that the terminal makes correct reporting of an event. Cell 1 is current active cell, Cell 2 is a neighbour cell on the used frequency and Cell 3 is a neighbour cell on the un-used frequency. The power level of Cell 1 and Cell 3 are kept constant and the power level of Cell 2 is changed using ($\hat{I}_{or}/I_{oc}$),as illustrated in Figure5-2. Hysteresis, Absolute threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A, 1B and 2C shall be used. The CPICH Ec/I0 of the best cell on the un-used frequency has to reported together with Event 2C reporting. New measurement control information, which defines neighbour cells etc., is always sent before compressed mode pattern starts. The number of neighbour cells in the measurement control information is 24. The X number of neighbours are on the un-used frequency. The BLER of the current active link is also measured.

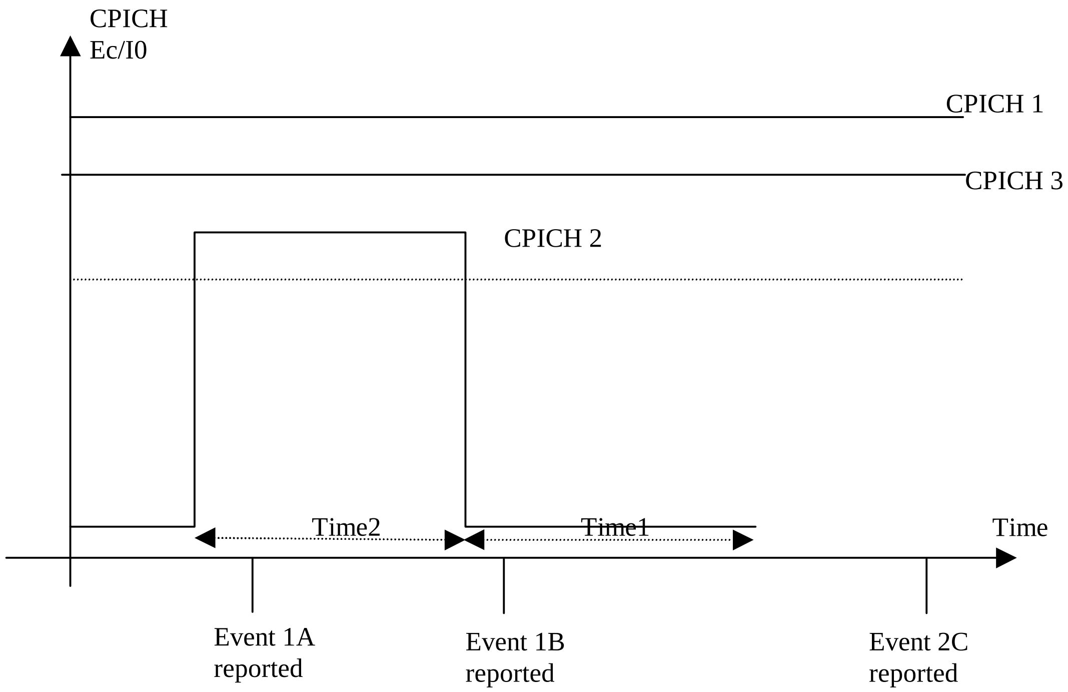

Figure 5-3: Illustration of parameters for handover measurement reporting test case

Table-5-9: Test parameters for CPICH_Ec/Io measurement accuracy and correct reporting of neighbours

Parameter	**Unit**	**Cell 1**		**Cell 2**		**Cell 3**	
		Time 1	**Time 2**	**Time 1**	**Time 2**	**Time 1**	**Time 2**
UTRA RF Channel Number		Channel 1		Channel 1		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	TBD		TBD		TBD	
OCNS		[To Be Calculated]		[To Be Calculated]		[To Be Calculated]	
$\hat{I}_{or}/I_{oc}$	dB	0	4.39	-Infinity	2.39	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70				-70	
CPICH_Ec/Io	dB	-13	-13	-Infinity	-15	-14	-14
Absolute Threshold (Ec/No)	dB	-18					
Hysteresis	dB	0					
Time to Trigger	msec	0					
Propagation Condition	AWGN						

Time period Time 1 is X seconds. Time period Time 2 is Y seconds.

5.1.2.2.1.2.2 Minimum Requirements

The measurement reporting delay shall be less than [5] seconds in [90] % of the cases.

Reported CPICH Ec/Io of Cell 3 in Event 2C shall have an accuracy of to ±[TBD] dB of the 2C reports.

The BLER of the DCH shall not exceed [TBD] value.

5.1.2.2.1.3 Correct reporting of neighbours in Fading propagation condition

This test will derive that the terminal makes correct reporting of an event . Cell 1 is current active cell and Cell 2 is a neighbour cell on the un-used frequency. The power level of Cell 1 and Cell 2 are kept constant and the power level of. Hysteresis, Absolute threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting 2C shall be used. Only events, which occur, are reported in this case. New measurement control information, which defines neighbour cells etc., is always sent before compressed mode pattern starts. The number of neighbour cells in the measurement control information is 24. The X number of neighbours are on the un-used frequency. The BLER of the current active link is also measured.

Table 5-10: Test parameters for Correct reporting of neighbours

Parameter	**Unit**	**Cell 1**		**Cell 2**	
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	TBD		TBD	
OCNS		[To Be Calculated]		[To Be Calculated]	
$\hat{I}_{or}/I_{oc}$	dB	0	0	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70		-70	
CPICH_Ec/Io	dB	-13	-13	-14	-14
Absolute Threshold (Ec/No)	dB	-18			
Hysteresis	dB	0			
Time to Trigger	msec	0			
Propagation Condition	2-tap Rayleigh fading, 0 dB, -10 dB, 50km/h				

5.1.2.2.1.3.1 Minimum Requirements

The measurement reporting delay shall be less then Y seconds in [90] % of the cases.

The BLER of the DCH shall not exceed [TBD] value.

5.1.2.2.1.4 Hard Handover Delay

The hard handover delay is defined as the time from when the UE receives the handover command message from UTRAN, until the UE successfully uses the entire set of radio links stated in that message for power control.

The hard handover delay is stated in the table below. There is different requirement on the hard handover delay depending on if the cell has been within the monitored set of cells for the last [FFS] [s] or not.

Table 5-11

Number of new cells present in the handover command message	Maximum active set update delay [ms]	
	Cells within monitored set	Cells outside monitored set
1-6…		

5.1.2.3 FDD/TDD Handover

The handover procedure is initiated from UTRAN with an handover command message. The handover procedure may cause the UE to change its frequency. Compressed mode according to the UE Capability may be used to be able to make any measurements on other frequencies.

5.1.2.3.1 Requirements

5.1.2.3.1.1 Maximum number of cells/frequencies to be monitored on other frequencies

The UE shall be capable of measuring the requested measurement quantity of at least [FFS] cells on a maximum of [FFS] frequencies, different from the frequency currently used by the UE.

The cells and frequencies are given to the UE in a measurement control message(s), and the measurement slots available with compressed mode is given through physical channel reconfiguration parameters.

5.1.2.3.1.2 Measurement reporting delay

The measurement reporting delay is defined as the time from when a report is triggered at the physical layer according to the event or periodic mechanism set to trigger the measurement report, until the UE starts to transmit the measurement report over the Uu interface.

5.1.2.3.1.2.1 Test parameters for DL compressed mode

The DL reference measurement channel 12.2 kbps shall be used, with power control turned on [see 25.101]. Test parameters for DL compressed mode are given in Annex A.4 of TS25.101.

5.1.2.3.1.2.2 Correct reporting of TDD neighbours in AWGN propagation condition

This test will derive that the terminal makes correct reporting of an event. Cell 1 is current active cell, Cell 2 is a TDD cell. The power level of P-CCPCH RSCP of cell 2 and the CPICH Ec/Io of cell 1 is changed. Hysteresis, Absolute threshold and Time to Trigger values are given in the table below and they are signalled from test device. New measurement control information, which defines neighbour cells etc., is always sent before compressed mode pattern starts. The number of neighbour cells in the measurement control information is FFS.

Table 5-12

Parameter	**Unit**	**Cell 1**		**Cell 2**			
Timeslot Number		n.a.		0		8	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 2			
CPICH_Ec/Ior	dB	[]	[]	n.a.		n.a.	
PCCPCH_Ec/Ior	dB	[]	[]	-3	-3		
SCH_Ec/Ior	dB	[]	[]	-9	-9	-9	-9
SCH_t_{offset}		n.a.	n.a.	15	15	15	15
PICH_Ec/Ior		[]	[]			-3	-3
DCH_Ec/Ior	dB	[]	[]	[]	[]	[]	[]
OCNS	dB	[]	[]	-4.28	-4.28	-4.28	-4.28
$\hat{I}_{or}/I_{oc}$	dB	[]	[]	[]	[]	[]	[]
I_{oc}	dBm/3.84 MHz	-70		-70			
CPICH_Ec/Io		[]		n.a.			
PCCPCH_RSCP	dB	n.a.	n.a.	[]	[]	[]	[]
Absolute Threshold (SIR)	dB	[]					
Hysteresis	dB	[]					
Time to Trigger	msec	[]					
Propagation Condition		AWGN		AWGN			

5.1.2.3.1.2.3 Minimum Requirements

The measurement reporting delay shall be less then [5] seconds in [90]% of the cases.

All the reported entities shall be within the requirements, as defined in clause 10.

Editor's note: Reported quantities are not defined in the test.

The BLER of the DCH shall not exceed [TBD] value.

5.1.2.3.1.3 Handover Delay

The handover delay is defined as the time from when the UE receives the handover command message from UTRAN, until the UE successfully uses the entire set of radio links stated in that message for power control.

The handover delay is stated in the table below. There is different requirement on the handover delay depending on if the cell has been within the monitored set of cells for the last [FFS] [s] or not.

Table 5-13

Number of new cells present in the handover command message	Maximum update delay [ms]	
	Cells within monitored set	Cells outside monitored set
1-6…		

5.1.3 Handover 3G to 2G

In the early days of UMTS deployment it can be anticipated that the service area will not be as contiguous and extensive as existing second generation systems. It is also anticipated that UMTS network will be an overlay on the 2nd generation network and utilise the latter, in the minimum case, as a fall back to ensure continuity of service and maintain a good QoS as perceived by the user.

5.1.3.1 Handover to GSM

This subclause presents some of the important aspects of GSM handover required to be performed by the UE. For the full specifications reference should be made the GSM recommendations.

The underlying requirement is to ensure continuity of service to the UMTS user. The handover requirements for 3G to GSM should be comparable to GSM to GSM handover requirements.

The MS (GSM terminology) shall be able to monitor up to [32] carriers.

The MS shall be able synchronize to [6] carriers.

The MS shall be able to report back to the network on the [6] strongest cells with correctly identified BSIC.

The MS shall be able to perform this task at levels down to the reference sensitivity level or reference interference levels as specified in GSM 05.05.

The MS shall demodulate the SCH on the BCCH carrier of each surrounding cell and decode the BSIC as often as possible, and as a minimum at least once every [10 seconds].

5.1.3.1.1 Requirements

5.1.3.1.2 RF Parameters

5.2 Radio Link Management

5.2.1 Link adaptation

5.2.1.1 Definition of the function

Radio link adaptation is the ability of the UE to select the suitable transport format combination from the assigned transport format combination set, in order to maintain inner loop power control, in the case of reaching its maximum transmit power. This is necessary for supporting the highest bit-rate as possible when enough transmit power is not available.

5.2.1.2 Link adaptation delay minimum requirement

In this subclause, the UE maximum transmit power is defined as the UE maximum output power, which is defined by the UE power class.

When the UE output power is approaching the UE maximum transmit power and the inner loop power control can no longer be maintained for coverage reasons, the UE shall adapt to the transport format combination corresponding to the next lower bit-rate. Before doing that, the UE output power measured over at least [t1] ms shall be [margin1] dB within the maximum (margin1 is FFS).

As soon as the UE output power is [margin1] dB below the UE maximum transmit power and the UE has enough data to send, it shall continuously estimate whether the output power needed for a switch to the transport format combination corresponding to the next higher bit-rate does not exceed [margin1] dB below the maximum. Before the UE switches to the next higher rate transport format it shall have enough power to support that up-switch for at least [t2] ms.

The minimum delay requirements t1 and t2 shall be zero or a multiple of 10 ms. (Whether t1, t2 and margin1 should be configurable is FFS).

5.2.1.3 Link adaptation maximum delay requirement

As soon as the UE has detected the switching feasibility, it shall start to use the transport format combination corresponding to the new bit-rate selected within 10 ms.

6 RRC Connection Control

6.1 Requirements for RRC Re-establishment

6.1.1 RRC Re-establishment delay

When the UE is in Cell_DCH state, the UE shall be capable of sending a RRC CONNECTION RE-ESTABLISHMENT CONNECT message within $T_{RE\text{-}ESTABLISH}$ seconds from when the CPHY-Out-Of-Synch primitive indicates lost synchronisation. The RRC Re-establishment delay requirement ($T_{RE\text{-}ESTABLISH\text{-}REQ}$) is defined as the time between the moment when erroneous CRCs are applied, to when the UE starts to send preambles on the PRACH. This is illustrated in Figure 6.1, where the RRC Re-establishment delay ($T_{RE\text{-}ESTABLISH\text{-}REQ}$) is the time between T_{start} and T_{stop}. T_{PRIM} is the time it takes for the CPHY-Out-Of-Synch primitive to detect lost synchronisation and $T_{RE\text{-}ESTABLISH}$ is the time to perform higher layer functionality.

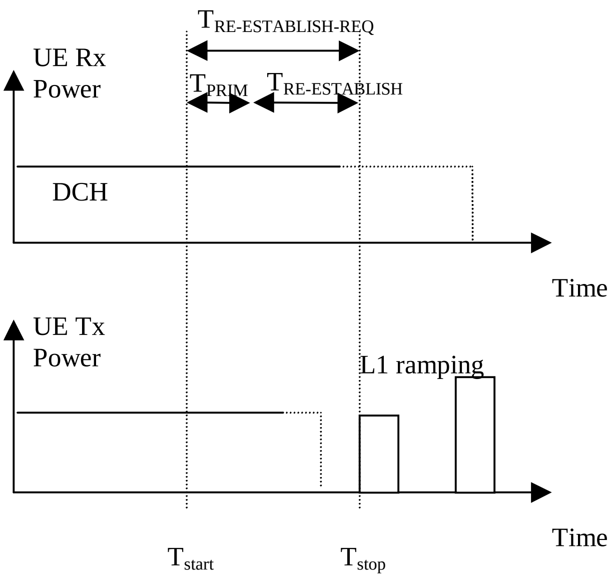

Figure 6.1: RRC Connection Re-establishment Requirement

6.1.2 Test Parameters

This test shall include 6 cells, one serving, one target and four steady interferes. The UE shall be in connected mode with a DL reference measurement channel 12.2 kbps dedicated traffic channel ongoing to one cell (serving cell). Measurement control information shall be signalled from the test device at least 5 seconds before T_{start}. At T_{start} faulty CRCs are applied on all transport blocks on all transport channels. T_{stop} is defined as the time when the UE starts to send preambles on PRACH to the target cell.

Unless explicitly stated the test parameters should be similar to the test parameters for Cell Reselection, time T1, subclause 4.3.1.2. System information shall be provided in the same manner as for the test for cell re-selection, subclause 4.3.1.2.

The following additional parameters are needed:

Table 6-1

Parameter	Unit	Value
DPCH_Ec/Ior	dB	–16.6
N313	Frames	20
N315	Frames	20
T313	seconds	0 and 3

6.1.2.1 Test 1 – Target Cell known by UE

All six cells in the test shall be given in the measurement control information to the UE before the test is started.

6.1.2.2 Test 2 – Target cell not known by UE

All cells except the target cell shall be in the measurement control information to the UE before the test is started.

6.1.2.3 Performance Requirements

RRC Re-establishment is correct if within $T_{RE\text{-}ESTABLISH\text{-}REQ}$ seconds the UE tries to re-establish the RRC connection with the target cell. $T_{RE\text{-}ESTABLISH\text{-}REQ}$ is defined in Table 6.2.

Table 6.2: Requirements for RRC Re-establishment

	Test 1	Test 2
Intra Frequency, T313=0	$T_{RE\text{-}ESTABLISH\text{-}REQ}$ = 1000 ms	$T_{RE\text{-}ESTABLISH\text{-}REQ}$ = 3200 ms
Intra Frequency, T313=3	$T_{RE\text{-}ESTABLISH\text{-}REQ}$ = 4000 ms	$T_{RE\text{-}ESTABLISH\text{-}REQ}$ = 6200 ms

6.2 Radio Access Bearer Control

[Editor’s Note: Radio Access Bearer Control Procedures are a series of mechanisms used to control the UE and system resources. Some of these procedures cause Physical Channel Reconfiguration and Transport Channel Reconfiguration. This subclause specifies time delay requirements on Physical Channel Reconfiguration and Transport Channel configuration in different reconfiguration cases.]

7 Timing characterisitics

7.1 Synchronisation Performance

7.1.1 Search of other Cells

Search for other cells is used to check whether the UE correctly searches and measures other BS(s) during the specified operation.

7.1.1.1 Minimum requirement

TBD

Table 7-1: Test Parameters for the Search of other Cells

Parameter	Unit	Channel 1		Channel 2	
		Time 1	Time 2	Time 1	Time 2
$PCCPCH\ \frac{E_c}{I_{or}}$	dB				
$\hat{I}_{or}/I_{oc}$	dB				
I_{oc}	dBm/3.84 MHz	-60			
$PCCPCH\ \frac{E_c}{I_o}$	dB				

7.2 spare

7.3 UE Transmit Timing

7.3.1 Initial transmission timing, Maximum timing adjustment size and Maximum timing adjustment rate

The UE shall have capability to follow the frame timing change of the connected Node B. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, and maximum adjustment rate are defined in the following requirements.

7.3.1.1 Minimum requirement

For parameters specified in Table , UE initial transmission timing error shall be less than or equal to ±1.5 Chip. The reference point for the UE initial transmit timing control requirement shall be the first significant path of the corresponding downlink DPCCH/DPDCH frame.

The UE shall be capable of changing the transmission timing according the received downlink DPCCH/DPDCH frame. The maximum amount of the timing change in one adjustment shall be 1/4 Chip.

The maximum adjustment rate shall be 1/4 chip per 280ms. In particular, within any given 280 ms period, the UE transmit timing shall not change in excess of +-1/4 chip from the timing at the beginning of this 280ms period.

Table 7-2: Test parameters for Transmission timing requirement

Parameter	Unit	Cell 1 and 2 level
DPCH_Ec/ Ior	dB	-17
$\hat{I}_{or,}$ Cell 1	dBm/3.84 MHz	-96
$\hat{I}_{or,}$ Cell 2	dBm/3.84 MHz	-97
Information data rate	Kbps	12.2
TFCI	-	On
Propagation condition	AWGN	

a) Cell 2 starts transmission 5 seconds after call has been initiated. UE shall maintain it's original timing properties.

b) Cell 1 stop transmission 5 seconds after cell 2 has started transmission. UE shall adjust transmission timing with a maximum change of 1/4 chip per adjustment, and maximum timing adjustment rate of 1/4 chip per 280 ms.

7.4 Reception Timing

The reception timing of the MS is determined during the specified operation.

7.4.1 Minimum requirement

TBD

7.5 Signalling requirements

7.5.1 Signalling response delay

For all messages requiring a RRC response to be sent to UTRAN, the UE shall send that response with a maximum signalling response delay specified in this subclause. This delay consists of several delay parts. The first part is a general processing delay in order to create the response. The second part is dependent on some specific actions the UE shall perform according to that particular message.

The signalling response delay is defined as the time from when the UE receives the RRC message from UTRAN, until the UE successfully has performed actions according to the RRC message and the UE tries to transmit the RRC response message over the Uu interface.

7.5.2 Test Parameters

For all the tests the TTI for the DCCH shall be set to 80 ms.

NOTE: There should be one test of reconfiguring TFS and TFCS without changing the physical layer. A similar test could then also be made where a new dedicated physical channel activation is included.

7.5.3 Performance requirements

This signalling response delay shall not exceed the sum of general processing delay and all action delays related to the specific RRC message.

General processing delay shall not exceed 100 ms in 90 % of the cases with 95 % confidence.

Delay parts related to actions are listed in the table below.

Delay part caused by a specific action	***Maximum delay for this action [ms]***
Establishment of new dedicated channel	***140***
Establishment of all radio bearer(s) in one RRC message	***50***
Re-configuration of all radio bearer(s) in one RRC message	***50***
Release of all radio bearer(s) in one RRC message	***10***
…	

NOTE: For all actions not listed the requirement on delay is zero.

7.5.4 Signalling processing

If several consecutive RRC messages are sent to the UE, the UE shall be able to process the messages in parallel with the receiving of the next messages. The UE shall also perform actions according to the RRC messages and if applicable send answers to the messages in parallel (for those messages where procedure interaction is allowed according to TS 25.331) with receiving new messages.

7.5.5 Test parameters

For all the tests the TTI for the transport channel carrying DCCH shall be 80 ms.

Messages shall be sent to the UE at a rate of 10 messages per second.

The rest of the parameters are TBD.

7.5.6 Performance requirements

The UE shall be able to respond according to the test in 9.4.1 in 90 % of the cases with 95 % confidence.

8 Measurements Performance Requirements

One of the key services provided by the physical layer is the measurement of various quantities which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The complete list of measurements is specified in TSG RAN WG2 S25.302 "Services Provided by Physical Layer". The physical layer measurements for FDD are described and defined in TSG RAN WG1 TS25.215 “Physical layer – Measurements (FDD)”. In this clause for FDD, per each measurement the relevant requirements on performance in terms of accuracy are reported.

Unless explicitly stated:

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12.2 kbps as defined in TS 25.101 annex A, subclause A.3.1. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in TS 25.101 annex C.
- All requirements are defined when UE is in a CELL_DCH or CELL_FACH stage. The difference between modes are the reporting delay. Some of the measurements are not requested to be reported in both stages.
- Cell 1 is the active cell.
- Single task reporting.
- Power control is active.

8.1 Measurements Performance for UE

Test conditions are specified in subclauses 10.1.1, 10.1.4 and 10.1.7.

8.1.1 COMMON PILOT MEASUREMENTS

These measurement consider *CPICH RSCP* and *CPICH Ec/Io* measurements.

8.1.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. The table 8-1 and notes 1-4 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 8-1

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	Note 4	Note 4
Range 1:Io *Range 2: Io*	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

NOTE 1: *CPICH_RSCP1,2* ≥ -114 dBm.

NOTE 2: | *CPICH_RSCP1 – CPICH_RSCP2* |≤ 20 dB.

NOTE 3: | *Io – CPICH_Ec/Ior*| ≤ 20 dB.

NOTE 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*. *Io –13.7 dB= Ioc*.

8.1.1.2 Inter frequency test parameters

In this case both cells are in different frequency and compressed mode is applied. The gap length is 7 [14 slots is FSS]. The table 8-2 and notes 1-5 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 8-2

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15

Parameter	Unit	Cell 1	Cell 2
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	Note 5	Note 5
Range 1:Io *Range 2: Io*	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

NOTE 1: *CPICH_RSCP1,2* ≥ -114 dBm.

NOTE 2: | *CPICH_RSCP1 – CPICH_RSCP2* | ≤ 20 dB.

NOTE 3: | *Channel 1_Io –Channel 2_Io*| ≤ 20 dB.

NOTE 4: | *Io – CPICH_Ec/Ior*| ≤ 20 dB.

NOTE 5: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*. *Io –10.6 dB = Ioc*.

8.1.2 CPICH RSCP

NOTE: This measurement is for handover evaluation, DL open loop power control, UL open loop power control and for the calculation of pathloss.

8.1.2.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH stage is [150 ms] and for CELL_FACH stage [600 ms].

8.1.2.1.1 Absolute accuracy requirement

The absolute accuracy of CPICH RSCP is defined as measured one code power after de-spreading. In this test only Cell 1 in table 8-1 is present.

Table 8-3: Range 1

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_RSCP	dB	± 6	± 9

Table 8-4: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_RSCP	dB	± 8	± 11

8.1.2.1.2 Relative accuracy requirement

The relative accuracy of CPICH RSCP is defined as measured code powers from active cell and one or more cells after de-spreading. The reported value is relative to active cell value. In this test Cell 1 and 2 in table 1 are present.

Table 8-5: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_RSCP	dB	± 3	± 3

8.1.2.2 Inter frequency measurement relative accuracy requirement

The measurement period for CELL_DCH stage is [240 ms], and for CELL_FACH stage [960 ms].

The relative accuracy of CPICH RSCP in inter frequency case is defined as measured code powers after de-spreading from active cell and one or more cells received from two or more RF–carriers. The reported values are relative to active cell value. In this test parameters in table 8-2 is used. In this test cells 1and 2 are present.

Table 8-6: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_RSCP	dB	± 6	± 6

8.1.3 CPICH Ec/Io

NOTE: This measurement is for Cell selection/re-selection and for handover evaluation.

8.1.3.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH stage is [150 ms], and for CELL_FACH stage [600 ms].

8.1.3.1.1 Absolute accuracy requirement

The absolute accuracy of CPICH Ec/Io is defined as measured energy per chip divided by power density in the band from one cell. In this test only Cell 1 in table 8-1 is present.

Table 8-7: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_Ec/Io	dB	± 4	± 4

8.1.3.1.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io is defined as measured energy per chip divided by power density in the band received from active cell and one more cells. The reported value is relative to active cell value. In this test Cells 1 and 2 in table 8-1 are present.

Table 8-8: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_Ec/Io	dB	± 3	± 3

8.1.3.2 Inter frequency measurement relative accuracy requirement

The measurement period for CELL_DCH stage is [240 ms], and for CELL_FACH stage [960 ms].

The relative accuracy of CPICH Ec/Io in the inter frequency case is defined as measured energy per chip divided by power density in the band. The reported valus are relative to active cell value. In this test the parameters in table 8-2 is used. In this test cells 1and 2 are present.

Table 8-9: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
CPICH_Ec/Io	dB	± 6	± 6

8.1.4 DEDICATED CHANNEL MEASUREMENTS

These measurement consider SIR, which is based on dedicated channel. The power ratio between DPDCH bits and DPCCH bits is 1. The relative power of PO1, PO2 and PO3 for TPC, TCFI and Pilot fields are same. The number of dedicated pilot bits is 8. Dedicated channel measurements are always intra frequency type.

8.1.4.1 Test parameters

Table 8-10

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-12	-12
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	Note 5	Note 5
Range 1:Io *Range 2: Io*	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

NOTE 1: *DPCH_Ec/Ior* ≥-114 dBm.

NOTE 2: | *DPCH_Ec/Ior1 – DPCH_Ec/Ior2* |≤ 20 dB.

NOTE 3: | *Io – CPICH_Ec/Ior*| ≤ 20 dB.

NOTE 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*. *Io –13.7 dB = Ioc.*

8.1.5 SIR

NOTE: The purpose of this measurement is for DL inner/outer loop power control, DL open loop power control.

8.1.5.1 Absolute accuracy requirement

The basic measurement period is in CELL_DCH stage is [100 ms].

The SIR absolute accuracy is defined as RSCP divided by ISCP after RL combination. In this test only Cell 1 in table 8-10 is present.

Table 8-11: Range 1

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
DPCCH_SIR	dB	± [ ]	± [ ]

Table 8-12: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
DPCCH_SIR	dB	± [ ]	± [ ]

8.1.6 UTRA Carrier RSSI

NOTE: The purpose of measurement is for Inter-frequency handover evaluation.

8.1.6.1 Test parameters for requirement

The table 13 and notes 1,2 define the limits of signal strengths, where the requirement is applicable.

Table 8-13

Parameter	**Unit**	**Cell 1**	**Cell 2**
UTRA RF Channei number	-	Channel 1	Channel 2
Îor/Ioc	dB	-1	-1
Ioc	dBm/ 3.84 MHz	Note 3	Note 3
Range 1: Io *Range 2: Io*	dBm/ 3.84 MHz	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

NOTE 1: For relative accuracy requirement | *Channel 1_Io –Channel 2_Io* | < *20 dB*.

NOTE 2: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*. *Io –4.13 dB = Ioc.*

8.1.6.2 Absolute accuracy requirement

The measurement period is in CELL_DCH stage [150 ms], and CELL_FACH stage [600 ms].

Absolute accuracy case only one carrier is applied (Cell 1).

Table 8-14: Range 1

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
Io	dBm	± 4	± 7

Table 8-15: Range 2

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
Io	dBm	± 6	± 9

8.1.6.3 Relative accuracy requirement

The measurement period in CELL_DCH stage is [240 ms], and in CELL_FACH stage [960 ms].

Relative accuracy requirement is defined as active cell frequency UTRAN RSSI compared to measured other frequency UTRAN RSSI level. In relative accuracy test case both carriers in table 8-16 are used.

Table 8-16: Range 1

Parameter	Value	Accuracy	
		Normal condition	Extreme condition
Io	dBm	± 7	± 11

8.1.7 GSM carrier RSSI

NOTE: The measurement is for Inter radio access technology (RAT) handover.

For terminals supporting this capability.

The accuracy requirement is specified in GSM 05.08.

[The GSM reporting period is 480 ms. In case of parallel measurements, the reporting period of each single neighbour can be a multiple of 480 ms, and the reporting period of each neighbour can be irregular.]

8.1.8 Transport channel BLER

NOTE: This measurement is for outer loop power control.

8.1.8.1 BLER measurement requirement

Transport channel BLER value shall be calculated from a sliding window containing [20] CRC errors.

8.1.9 UE transmitted power

Relative Accuracy.

The measurement period in CELL_DCH stage is [ ].

8.1.10 CFN-SFN observed time difference

Requirement	+/-0.5 chips period

The measurement period in CELL_DCH stage is [150 ms].

8.1.11 SFN-SFN observed time difference

Requirement	+/-0.5 chips period for both type 1 and type 2.

The measurement period in CELL_DCH stage is [150 ms], and in CELL_FACH stage [600 ms].

8.1.12 UE Rx-Tx time difference

Requirement	+/-1.5 chips period.

The measurement period in CELL_DCH stage is [ms]

8.1.12.1 Observed time difference to GSM cell

For terminal supporting this capability.

Requirement	+- 20 chips.

8.1.13 PRIMARY COMMON CONTROL PHYSICAL CHANNEL MEASUREMENTS

These measurements consider *P-CCPCH RSCP* measurements. Only necessary for UEs supporting TDD.

8.1.13.1 Inter frequency test parameters

In this case the cells are on different frequencies. The table 10-x and notes 1-4 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 8-17

Parameter	**Unit**	**Cell 1**
UTRA RF Channel number		Channel 1
Timeslot		k
P-CCPCH Ec/Ior	dB	-3
OCNS	dB	[]
Îor/Ioc	DB	[ ]
Ioc	dBm/ 3.84 MHz	Note 4
Range 1:Io *Range 2: Io*	dBm	-94 ... –70 -94... –50
Propagation condition	-	AWGN

NOTE 1: *P-CCPCH_RSCP* ≥ -102 dBm.

NOTE 3: | *Io – P-CCPCH_Ec/Ior*| ≤ [20] dB.

NOTE 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

8.1.14 P-CCPCH RSCP

8.1.14.1 Absolute accuracy requirements

The absolute accuracy of P-CCPCH RSCP is defined as measured one code power after de-spreading.

Table 8-18: Range 1

Parameter	Value	Accuracy	
		Normal conditions	Extreme conditions
P-CCPCH_RSCP	dB	± 6	± 9

Table 8-19: Range 2

Parameter	Value	Accuracy	
		Normal conditions	Extreme conditions
P-CCPCH_RSCP	dB	± 8	± 11

8.2 Measurements Performance for UTRAN

8.2.1 RSSI

The measurement period shall be [100] ms.

8.2.1.1 Absolute accuracy requirement

Table 8-20

Parameter	Accuracy	Range
Io	± 4 dB	For levels <= -74 dBm

8.2.1.2 Relative accuracy requirement

Table 8-21

Parameter	Accuracy	Range
Io	± [0.5] dB	For changes <= ±5.0dB for levels <= –74dBm

8.2.2 SIR

The measurement period shall be [100] ms.

8.2.2.1 Accuracy requirement

Table 8-22

Parameter	Accuracy	Range
SIR	± 3 dB	For -7<SIR<7 dB when RSSI > -105 dBm

8.2.3 Transmitted carrier power

The measurement period shall be [100] ms.

8.2.3.1 Relative accuracy requirement

Table 8-23

Parameter	Accuracy	Range
Ptot	± 5% units	For 5% ≤ Transmitted carrier power ≤95%

8.2.4 Transmitted code power

The measurement period shall be [100] ms.

8.2.4.1 Absolute accuracy requirement

Table 8-24

Parameter	Accuracy	Range
Pcode	± 3 dB	Over the full range

8.2.4.2 Relative accuracy requirement

Table 8-25

Parameter	Accuracy	Range
Io	± 2 dB	Over the full range

8.2.5 Transport channel BLER

The measurement period shall be equal to the [TTI] of the transport channel.

8.2.5.1 Accuracy requirement

Table 8-26

Parameter	Accuracy	Range
BLER		

8.2.6 Physical channel BER

The measurement period shall be equal to the [TTI] of the transport channel.

8.2.6.1 Accuracy requirement

Table 8-27

Parameter	Accuracy	Range
BER	+/- 10% of the absolute BER value.	

8.2.7 Round trip time

The measurement period shall b e[100] ms.

8.2.7.1 Absolute accuracy requirement

Table 8-28

Parameter	Accuracy	Range
RTT	+/- 0.5 chip	[876, …, 2923.75] chips

8.2.8 Transport Channel BER

The measurement period shall be equal to the [TTI] of the transport channel.

8.2.8.1 Accuracy requirement

Table 8-29

Parameter	Accuracy	Range
TrpBER	+/- []% of the absolute BER value.	

9 UE parallel measurements

9.1 General

The UE shall be able to perform parallel measurements according to table NEW-3.

In addition to the requirements in table NEW-3 the UE shall in parallel, in state CELL_DCH, also be able to measure and report the quantities according to table 9-1.

Table 9-1

Measurement quantity	**Number of parallel measurements possible to request from the UE**	**Minimum periodic reporting period (ms)**
Transport channel BLER	[1] per TrCh	[]
Physical channel BER *Editors Note: The precence of this measurement is depending on desicions in WG1.*	[1]	[]
DPCCH SIR	[1]	[]
UE transmitted power	[1]	[]
UE Rx-Tx time difference	[1] including timing to all radio links in active set	[]
SFN-SFN observed time difference type 2	[]	[]
UE GPS Timing of Cell Frames for LCS	[]	[]

Editors Note: The precence of the measurements for location services needs to be revised.

9.2 Parallel Measurement Requirements

Table 9-2: Network scenarios

Case	**Network sceanrio**	**Number of UMTS carriers present**
1a	single carrier UMTS network with no interaction with GSM networks or other UMTS networks	1
2a	multi carrier UMTS network with no interaction with GSM networks	2
2b		2
2c		3

Case	**Network sceanrio**	**Number of UMTS carriers present**
3a	single carrier UMTS network together with a GSM network	1
3b		1
4a	multi carrier UMTS network together with a GSM network	2
4b		2
4c		3

Table 9-3: Layer 1 parallel measurement capability

Case	**Intra-frequency CPICH RSCP or CPICH Ec/Io including cell search. Also the UTRA carrier RSSI shall be reported.**		**Inter-frequency CPICH RSCP or CPICH Ec/Io including cell search. Also one UTRA carrier RSSI per measured carrier shall be reported.**		**Inter-System GSM carrier RSSI**		**Filtering period setting (ms) Note 4**		
							Intra-freq.	Inter-freq	GSM
	Minimum number of neighbours to be reported to higher layers	Neighbour list size Note 1	Minimum number of neighbours to be reported to higher layers Note 2	Neighbour list size Note 3	Minimum number of neighbours to be reported to higher layers	Neighbour list size Note 1			
1a	[6]	[32]	[0]	[0]	[0]	[0]	[150]	-	-
2a	[6]	[20]	[4]	[12]	[0]	[0]	[150]	[240]	-
2b	[6]	[20]	[6]	[12]	[0]	[0]	[150]	[480]	-
2c	[6]	[16]	[4 + 4]	[8 + 8]	[0]	[0]	[150]	[480]	-
3a	[6]	[16]	[0]	[0]	[16]	[16]	[150]	-	[480]
3b	[6]	[12]	[0]	[0]	[20]	[20]	[150]	-	[960] Note 5
4a	[6]	[12]	[3]	[10]	[10]	[10]	[150]	[240]	[480]
4b	[6]	[12]	[6]	[10]	[10]	[10]	[150]	[480]	[960] Note 5
4c	[6]	[10]	[3 + 3]	[6 + 6]	[10]	[10]	[150]	[480]	[480]

NOTE 1: The total number of neighbours is in total [32]. The detailed share between intra-, inter and GSM cells is FFS.

NOTE 2: The number of neighbours to be reported is given in the form X or X+Y, where X and Y represents the number of neighbours to report from each carrier respectively, e.g. 4+4 indicates that 4 neighbours shall be measured on each of two inter-frequency carriers and 4 indicates that 4 neighbours shall be measured from 1 inter-frequency carrier.

NOTE 3: In the same manner as in Note 2, the number of neighbours in the neighbour list is given in the form X or X+Y, where X and Y represents the number of neighbours in the list for each carrier respectively.

NOTE 4: When the parameters for higher layer filtering is completed by WG2 this column will be updated to indicate the specific parameter setting for the in WG2 (25.331) specified parameters that controls the filtering.

NOTE 5: The GSM reporting period is 480 ms. In case of multiple measurement tasks, the reporting period of each single neighbour can be a multiple of 480 ms. Reporting period of each neighbour can be irregular.

Pattern for compressed mode measurements:

7 slot gap every 3rd frame, double frame method, 8 gaps / 240 ms, 16 gaps/ 480ms.

Annex A (Informative): Measurement Definition

In this Annex the definitions of those Measurements, whose requirements are specified, in clause 10 of this specification are reported for information. The complete list of measurements is specified in TSG RAN WG2 TS25.302 "Services Provided by Physical Layer". The physical layer measurements for FDD are described and defined in TSG RAN WG1 TS25.215 “Physical layer – Measurements (FDD)”.

A.1 Measurements Performance for UE

A.1.1 CPICH RSCP

Definition	Received Signal Code Power, the received power on one code after de-spreading measured on the pilot bits of the CPICH. The reference point for the RSCP is the antenna connector at the UE.

A.1.2 RSCP

[Editor’s Note: in accordance to RP-99564, while this measurement is agreed in TS 25.215 is not considered yet in TS 25.302; this measurement is here reported for consistency with TDD mode since during WG4#8 it was decided to consider this measurement for TDD].

Definition	Received Signal Code Power, the received power on one code after de-spreading measured on the pilot bits of the DPCCH after RL combination. The reference point for the RSCP is the antenna connector at the UE.

A.1.3 ISCP

Note that it is not a requirement that the ISCP shall be possible to report to higher layers. The ISCP is defined in this subclause because it is included in the definition of SIR.

Definition	Interference Signal Code Power, the interference on the received signal after de-spreading. Only the non-orthogonal part of the interference is included in the measurement. The reference point for the ISCP is the antenna connector at the UE.

A.1.4 SIR

Definition	Signal to Interference Ratio, defined as the RSCP divided by ISCP. The SIR shall be measured on DPCCH after RL combination. The reference point for the SIR is the antenna connector of the UE.

A.1.5 UTRA carrier RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Measurement shall be performed on a UTRAN downlink carrier. The reference point for the RSSI is the antenna connector at the UE.

A.1.6 GSM carrier RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Measurement shall be performed on a GSM BCCH carrier. The reference point for the RSSI is the antenna connector at the UE.

A.1.7 CPICH Ec/No

Definition	The received energy per chip divided by the power density in the band. The Ec/No is identical to RSCP/RSSI. Measurement shall be performed on the CPICH. The reference point for Ec/No is the antenna connector at the UE.

A.1.8 Transport channel BLER

Definition	Estimation of the transport channel block error rate (BLER). The BLER estimation shall be based on evaluating the CRC on each transport block after RL combination. BLER estimation is only required for transport channels containing CRC. In connected mode the BLER shall be possible to measure on any transport channel. If requested in idle mode it shall be possible to measure the BLER on transport channel PCH.

A.1.9 Physical channel BER

Definition	The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the DPDCH data after RL combination. At most it shall be possible to report a physical channel BER estimate at the end of each TTI for the transferred TrCh's, e.g. for TrCh's with a TTI of x ms a x ms averaged physical channel BER shall be possible to report every x ms.

A.1.10 UE transmitted power

Definition	The total UE transmitted power on one carrier. The reference point for the UE transmitted power shall be the UE antenna connector.

A.1.11 CFN-SFN observed time difference

Definition	The CFN-SFN observed time difference to cell is defined as: $OFF \times 38400 + T_m$, where: $T_m = T_{RxSFN} - (T_{UETx} - T_0)$, given in chip units with the range [0, 1, …, 38399] chips T_{UETx} is the time when the UE transmits an uplink DPCCH/DPDCH frame. T_0 is defined in TS 25.211 subclause 7.1.3. T_{RxSFN} is time at the beginning of the next received neighbouring P-CCPCH frame after the time instant T_{UETx}-T_0in the UE. If the next neighbouring P-CCPCH frame is received exactly at T_{UETx}-T_0 then $T_{RxSFN}=T_{UETx}-T_0$ (which leads to $T_m=0$). and $OFF=(CFN_{Tx}-SFN) \bmod 256$, given in number of frames with the range [0, 1, …, 255] frames CFN_{Tx} is the connection frame number for the UE transmission of an uplink DPCCH/DPDCH frame at the time T_{UETx}. SFN = the system frame number for the neighbouring P-CCPCH frame received in the UE at the time T_{RxSFN}.

A.1.12 SFN-SFN observed time difference

Definition	**Type 1:** The SFN-SFN observed time difference to cell is defined as: OFF×38400+ T_m, where: T_m= T_{RxSFNj} - T_{RxSFNi}, given in chip units with the range [0, 1, …, 38399] chips T_{RxSFNj} is the time at the beginning of a received neighbouring P-CCPCH frame from cell j. T_{RxSFNi} is time at the beginning of the next received neighbouring P-CCPCH frame from cell i after the time instant T_{RxSFNj} in the UE. If the next neighbouring P-CCPCH frame is received exactly at T_{RxSFNj} then T_{RxSFNj}= T_{RxSFNi} (which leads to T_m=0). And OFF=(SFN_j- SFN_i) mod 256, given in number of frames with the range [0, 1, …, 255] frames SFN_j = the system frame number for downlink P-CCPCH frame from cell j in the UE at the time T_{RxSFNj}. SFN_i = the system frame number for the P-CCPCH frame from cell i received in the UE at the time T_{RxSFNi}. **Type 2:** The relative timing difference between cell j and cell i, defined as $T_{CPICHRxj}$ - $T_{CPICHRxi}$, where: $T_{CPICHRxj}$ is the time when the UE receives one CPICH slot from cell j $T_{CPICHRxi}$ is the time when the UE receives the CPICH slot from cell i that is closest in time to the CPICH slot received from cell j
Applicable for	**Type 1:** Idle, Connected Intra **Type 2:** Idle, Connected Intra, Connected Inter

A.1.13 UE Rx-Tx time difference

Definition	The difference in time between the UE uplink DPCCH/DPDCH frame transmission and the first significant path, of the downlink DPCH frame from the measured radio link. Measurement shall be made for each cell included in the active set. Note: The definition of "first significant path" needs further elaboration.

A.1.14 Observed time difference to GSM cell

Definition	Time difference between the Primary CCPCH of the current cell and the timing of the GSM cell. The exact definition and further details on this parameter is contained in Chapter 9 of the TS25.302 "Services Provided by the Physical Layer".

A.2 Measurements Performance for UTRAN

A.2.1 RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the UTRAN uplink carrier channel bandwidth in an UTRAN access point. The reference point for the RSSI measurements shall be the antenna connector.

A.2.2 SIR

Definition	Signal to Interference Ratio, is defined as: (RSCP/ISCP)×SF. Measurement shall be performed on the DPCCH after RL combination in Node B. The reference point for the SIR measurements shall be the antenna connector.

A.2.3 Transmitted carrier power

Definition	Transmitted carrier power is the ratio between the total transmitted power and the maximum transmission power. Total transmitted power is the mean power [W] on one carrier from one UTRAN access point. Maximum transmission power is the mean power [W] on one carrier from UTRAN access point when transmitting at the configured maximum power for the cell. Measurement shall be possible on any carrier transmitted from the UTRAN access point. The reference point for the total transmitted power measurement shall be the antenna connector. In case of Tx diversity the total transmitted power for each branch shall be measured.

A.2.4 Transmitted code power

Definition	Transmitted code power, is the transmitted power on one carrier, one scrambling code and one channelisation code. Measurement shall be possible on any channelisation code transmitted from the UTRAN access point. The reference point for the transmitted code power measurement shall be the antenna connector. In case of Tx diversity the transmitted code power for each branch shall be measured.

A.2.5 Transport channel BLER

Definition	Estimation of the transport channel block error rate (BLER). The BLER estimation shall be based on evaluating the CRC on each transport block. Measurement shall be possible to perform on any transport channel after RL combination in Node B. BLER estimation is only required for transport channels containing CRC.

A.2.6 Transport Channel BER

Definition	The transport channel BER is an estimation of the average bit error rate (BER)) of RL-combined DPDCH data. The transport channel (TrCH) BER is measured from the data considering only non-punctured bits at the input of the channel decoder in Node B. It shall be possible to report an estimate of the transport channel BER for a TrCH after the end of each TTI of the TrCH. The reported TrCH BER shall be an estimate of the BER during the latest TTI for that TrCH. Transport channel BER is only required to be reported for TrCHs that are channel coded.

A.2.7 Physical channel BER

Definition	The Physical channel BER is an estimation of the average bit error rate (BER) on the DPCCH after RL combination in Node B. An estimate of the Physical channel BER shall be possible to be reported after the end of each TTI of any of the transferred TrCHs. The reported physical channel BER shall be an estimate of the BER during the latest TTI.

A.2.8 Round trip time

NOTE: The relation between this measurement and the TOA measurement defined by WG2 needs clarification.

Definition	Round trip time (RTT), is defined as RTT = $T_{RX} – T_{TX}$, where T_{TX} = The time of transmission of the beginning of a downlink DPCH frame to a UE. T_{RX} = The time of reception of the beginning (the first significant path) of the corresponding uplink DPCCH/DPDCH frame from the UE. Note: The definition of "first significant path" needs further elaboration. Measurement shall be possible on DPCH for each RL transmitted from an UTRAN access point and DPDCH/DPCCH for each RL received in the same UTRAN access point.

Annex B (informative): Change History

Document history		
V3.0.0	December 1999	
V3.1.0	March 2000	

RAN doc	Spec	CR	Re	Phas	Subject	Cat	Current	New
RP-000021	25.133	001		R99	Modification of RL Failure Requirement	F	3.0.0	3.1.0
RP-000021	25.133	002		R99	Idle Mode Tasks	C	3.0.0	3.1.0
RP-000021	25.133	003		R99	Revised UE handover requirements	F	3.0.0	3.1.0
RP-000021	25.133	004		R99	Editorial corrections	D	3.0.0	3.1.0
RP-000021	25.133	005		R99	UE measurement requirement update	F	3.0.0	3.1.0
RP-000021	25.133	006		R99	TDD Measurements Performance Requirements	B	3.0.0	3.1.0
RP-000021	25.133	007		R99	UTRAN measurement requirement update	F	3.0.0	3.1.0
RP-000021	25.133	008		R99	Requirements on parallel measurements	F	3.0.0	3.1.0
RP-000021	25.133	009		R99	Inclusion on transport channel BER.	F	3.0.0	3.1.0

Note on implementation of CR 25.133-003. On page 16 there is a dotted line above title 5.1.2.1.4 ACTIVE SET DIMENSION. The text following is a duplication of version 3.0.0 to the point of subclause 5.1.2.2.1.3. HARD HANDOVER DELAY. Therefore all text from page 16 starting from 5.1.2.1.4 ACTIVE SET DIMENSION is moved to subclause 5.1.2.2.1.3 HARD HANDOVER DELAY on page 19.

History

Document history		
V3.1.0	March 2000	Publication