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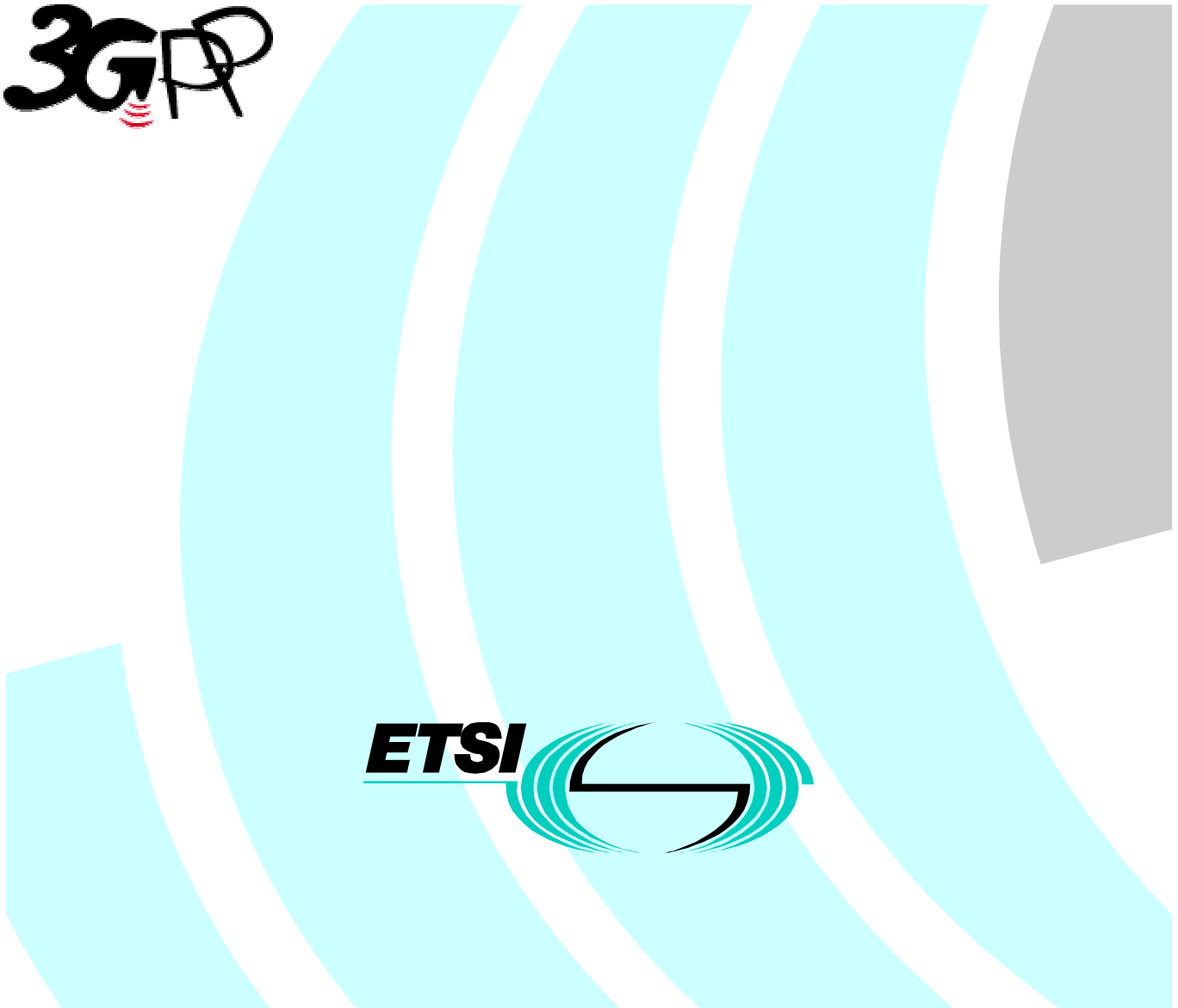
Technical Specification

**Universal Mobile Telecommunications System (UMTS);
Requirements for support of radio resource management (TDD)
(3GPP TS 25.123 version 3.3.0 Release 1999)**



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Foreword

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The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under www.etsi.org/key .

Contents

Foreword

This Technical Specification has been produced by the 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 this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

x the first digit:

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Y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the specification.

1 Scope

This Technical Specification specifies requirements for support of Radio Resource Management for TDD. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamic 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.
- A non-specific reference to an TS shall also be taken to refer to later versions published as an EN with the same number.

[1] (void)

[2] (void)

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

[4] 3GPP TS 25.104: "BTS Radio transmission and reception (FDD)".

[5] 3GPP TS 25.102: "MS Radio transmission and reception (TDD)".

[6] 3GPP TS 25.105: "BTS Radio transmission and reception (TDD)".

[7] (void)

[8] (void)

[9] 3GPP TS 25.142: "Basestation conformance testing (TDD)".

[10] (void)

[11] (void)

[12] 3GPP TS 25.922: "RRM Strategies".

[13] (void)

[14] 3GPP TS 25.225: "Physical layer measurements (TDD)".

[15] 3GPP TS 25.302: "Services provided by physical layer".

[16] 3GPP TS 25.331: "RRC srotocol specification".

[17] 3GPP TS 25.224: "Physical layer procedures (TDD)".

[18] 3GPP TS 25.304: "UE procedures in idle mode".

[19] ETSI ETR 273-1-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties; Part 1: Uncertainties in the measuremement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes".

[20] 3GPP TS 05.05: "Radio transmission and reception".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purpose of the present document the following definitions apply.

The main general definitions strictly related to the transmission and reception characteristics but important also for this specification 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 symbols apply:

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

$\hat{I}_{or}$ "RXLEV", see 25.101 or 25.102 clause 3.3 and Annex C.

3.3 Abbreviations

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

ACPR	Adjacent Channel Power Ratio
BER	Bit Error Ratio
BLER	Block Error Ratio
BS	Base Station
CW	Continuous wave (unmodulated signal)
DL	Down link (forward link)
$\frac{E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for different fields or physical channels to the total transmit power spectral density.
EIRP	Equivalent Isotropic Radiated Power
FDD	Frequency Division Duplexing
I_{oc}	The power spectral density of a band limited white noise source (simulating interference from other cells) as measured at the UE antenna connector.
I_{or}	The total transmit power spectral density of the down link at the base station antenna connector.
$\hat{I}_{or}$	The received power spectral density of the down link as measured at the UE antenna connector.
OCNS	Orthogonal Channel Noise Simulator, a mechanism used to simulate the users or control signals on the other orthogonal channels of a Forward link.
$\frac{PCCPCH\_E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for the PCCPCH to the total transmit power spectral density.
PICH	Paging Indicator Channel
PPM	Parts Per Million
RRM	Radio Resource Management
RSSI	Received Signal Strength Indicator
SCH	Synchronization Channel consisting of Primary and Secondary synchronization channels
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

3.4 Test tolerances

The requirements given in this specification make no allowance for measurement uncertainty. The test specifications 34.122 and 25.142 define test tolerances. These test tolerances are individually calculated for each test. The test tolerances are then added to the limits in this specification to create test limits. The measurement results are compared against the test limits as defined by the shared risk principle.

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

4 Idle mode tasks

4.1 Introduction

Cell selection and cell reselection delays are applicable when the repetition period of all relevant system information blocks is not more than 1 280 ms and the length of DRX cycle is not longer than 640 ms.

Whenever a PLMN has been selected the UE shall start to find a suitable cell to camp on, this is "cell selection".

When camped on cell the UE regularly searches for a better cell depending on the cell reselection criteria, this is called "cell reselection". The procedures for cell selection and reselection are described in 3GPP TS 25.304 "UE procedures in idle mode" and the measurements carried out by the UE are explained in specification 3GPP TS 25.225 "Physical Layer Measurements (TDD)". The measurements performance requirements are specified in clause 11.

4.2 RF cell selection scenario

Note: Some performance requirements in agreed scenarios are added into this clause. 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 section 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.

4.2.1.1.1 Test parameters

The stored information of the last registered PLMN is utilised in this test. The stored information includes the 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	
Timeslot Number		0	8
PCCPCH_Ec/Ior	dB	-3	
SCH_Ec/Ior	dB	-9	-9
SCH_t_{offset}		0	0
PICH_Ec/Ior	dB		-3
OCNS_Ec/Ior	dB	-4.28	-4.28
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/3.84 MHz	-70	-70
PCCPCH RSCP	dBm	-73	
Propagation Condition		AWGN	AWGN
Qmin	dBm	[ ]	[ ]
UE_TXPWR_MAX_RACH	dBm	[ ]	[ ]

Note: The values are only valid during the active part of SCH. Chip Energy of the other channels remains constant across the burst.

4.2.1.1.2 Minimum requirement

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 Cell Selection single carrier multi cell case

4.2.2.1 Cell selection delay

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.

4.2.2.1.1 Test parameters

The stored information of the last registered PLMN is utilised 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.

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 1		Channel 1		Channel 1	
Timeslot Number		0	8	0	8	0	8	0	8	0	8	0	8
PCCPCH_Ec/Ior	dB	-3		-3		-3		-3		-3		-3	
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	5	5	10	10	15	15	20	20	25	25
PICH_Ec/Ior	dB		-3		-3		-3		-3		-3		-3
OCNS	dB	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28
$\hat{I}_{or}/I_{oc}$	dB	10	10	7	7	3	3	0	0	-3	-3	-3	-3
I_{oc}	dBm/3.84 MHz	-70											
PCCPCH RSCP	dBm	-63		-66		-70		-73		-76		-76	
Propagation Condition		AWGN											
Qmin	dBm	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
UE_TXPWR_MAX_RACH	dBm	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Note: The values are only valid during the active part of SCH. Chip Energy of the other channels remains constant across the burst.

4.2.2.1.2 Minimum 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 fulfills the cell selection criteria .

4.3 RF Cell Re-Selection scenario

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

4.3.1 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 according to 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 P-CCPCH RSCP 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.

4.3.1.1.1 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. Two 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**			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		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	
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
*SCH_*t_{offset}		0	0	0	0	5	5	5	5	19	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		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	
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
*SCH_*t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS	dB	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP		-74	-74			-74	-74			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/3.84 MHz	-70											
Propagation Condition		AWGN											

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.

4.3.1.1.2 Minimum 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.

4.3.1.1.3 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].]

4.3.1.1.4 Maximum number of cells to be monitored

For re-selection purposes, the UE shall be capable of monitoring at least up to 32 neighboring 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 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.

4.3.2.1 Cell re-selection delay

When the UE is camped on an UTRAN cell, the UE shall be capable of re-selecting a GSM cell according to 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.

4.3.2.1.1 Test parameters

Tbd.

4.3.2.1.2 Minimum requirements

Cell re-selection shall be correct in more than [ ]% of the cases. Cell re-selection is correct if within [ ] 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.

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 TS25.225 and UE behaviour in response to UTRAN RRC messages is described in 3GPP TS 25.331.

For the handover preparation the UE receives from the UTRAN a list of cells (e.g. TDD, FDD or GSM).which the UE shall monitor (see "monitored set" in 3GPP TS 25.331 "RRC Protocol Specification") in its idle timeslots.

At the beginning of the measurement process the UE shall find synchronization to the cell to measure using the synchronization channel. This is described under "cell search" in TS 25.224 "Physical layer procedures (TDD)" if the monitored cell is a TDD cell and in 3GPP TS 25.214 "Physical layer procedures (FDD)" if it is an FDD cell.

For a TDD cell to monitor after this procedure the exact timing of the midamble of the P-CCPCH is known and the measurements can be performed. Depending on the UE implementation and if timing information about the cell to monitor is available, the UE may perform the measurements on the P-CCPCH directly without prior SCH synchronization.

5.1.2 Handover 3G to 3G

5.1.2.1 TDD/TDD Handover

For the search for other cells the UE is provided by a handover monitoring set by the UTRAN.

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

For the requirements in this clause, all cells are assumed to be unsynchronized.

5.1.2.1.1 Requirements

5.1.2.1.1.1 Maximum number of cells to be monitored

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

5.1.2.1.1.2 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. This measurement reporting delay excludes the delay uncertainty resulting when the measurement report is inserted to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH.

The DL reference measurement channel 12.2 kbps shall be used.

5.1.2.1.1.2.1 Correct reporting of neighbours in AWGN propagation condition

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure5-1. 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 1G shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 1G reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

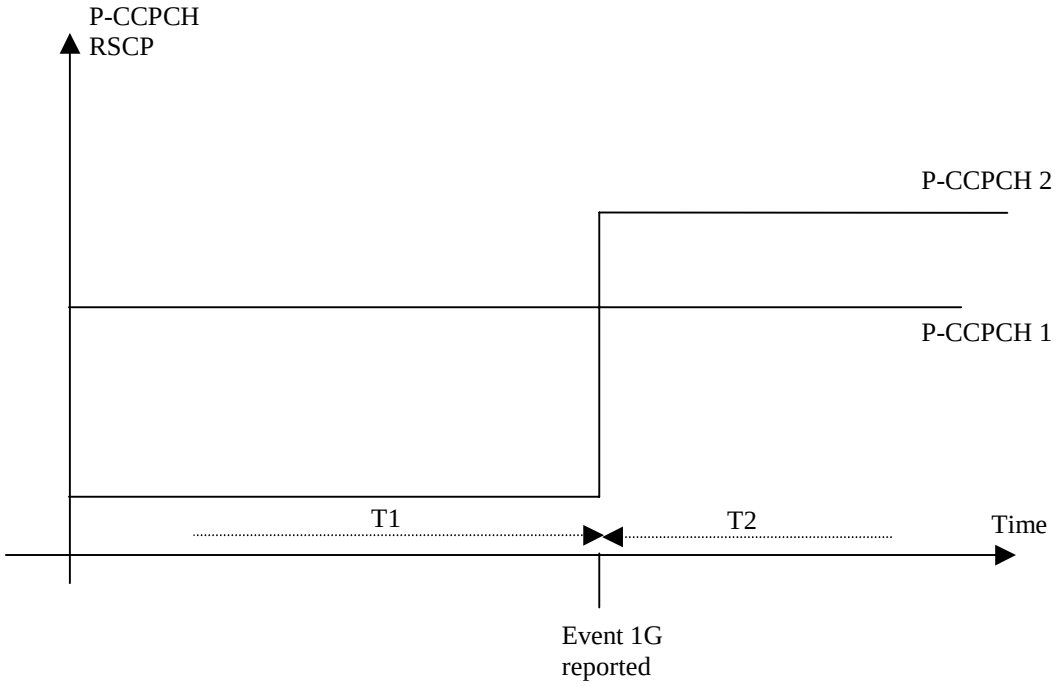

Figure 5.1: Illustration of parameters for handover measurement reporting test case

Table-5-1

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		0		8	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	15	15	15	15
PICH_Ec/Ior				-3	-3			-3	-3
DCH_Ec/Ior		[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
OCNS		-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28	-4.28
$\hat{I}_{or}/I_{oc}$	dB	3	3	3	3	-Infinity	5	-Infinity	5
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dB	-70	-70			-Infinity	-68		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

5.1.2.1.1.2.1.1 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 11.

5.1.2.1.1.3 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 5.2

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

5.1.2.2 TDD/FDD Handover

The handover procedure is initiated from UTRAN with an handover command message. The handover procedure may cause the UE to change its frequency.

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.

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.

The DL reference measurement channel 12.2 kbps shall be used.

5.1.2.2.1.2.2 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 FDD cell. The power level of CPICH Ec/Io of cell 2 and the P-CCPCH RSCP 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 the handover starts. The number of neighbour cells in the measurement control information is FFS.

Table 5.3

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		n.a		n.a.	
		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}		0	0	0	0	n.a.		n.a.	
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.	n.a.	n.a.
Absolute Threshold (SIR)	dB	[ ]				[ ]			
Hysteresis	dB	[ ]				[ ]			
Time to Trigger	msec	[ ]				[ ]			
Propagation Condition		AWGN				AWGN			

5.1.2.2.1.2.2 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.

5.1.2.2.1.2.3 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 5.4

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 utilize 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 clause 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 Technical Specifications.

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].

5.2 Cell Re-selection in Cell_FACH

Cell selection and cell reselection delays are applicable when the repetition period of all relevant system information blocks is not more than 1280 ms.

5.2.1 Cell re-selection single carrier multi cell case

5.2.1.1 Cell re-selection delay

When the UE is camped in Cell_FACH state on one of the cells, the UE shall be capable of re-selecting a new cell according the cell re-selection criteria. The cell re-selection delay is then defined as a time from when radio conditions are changed according to the test scenario to the moment in time when the UE starts sending the RRC Cell Update message to the UTRAN.

5.2.1.1.1 Test parameters

The same test parameters as specified in clause 4.3.1.1.1 for cell re-selection in idle mode shall be used.

5.2.1.1.2 Minimum requirements

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

5.3 Cell Re-selection in Cell_PCH

Cell selection and cell reselection delays are applicable when the repetition period of all relevant system information blocks is not more than 1 280 ms and the length of DRX cycle is not longer than [640] ms.

5.3.1 Requirements for Cell re-selection single carrier multi cell case

5.3.1.1 Cell re-selection delay

When the UE is camped in Cell_PCH state on one of the cells, the UE shall be capable of re-selecting a new cell according the cell re-selection criteria. The cell re-selection delay is then defined as a time from when radio conditions are changed according to the test scenario to the moment in time when the UE starts sending the RRC Cell Update message to the UTRAN.

5.3.1.1.1 Test Parameters

The same test parameters as specified in clause 4.3.1.1.1 for cell re-selection in idle mode shall be used.

5.3.1.1.2 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-selects a new cell, which fulfils the cell re-selection criteria.

5.4 Cell Re-selection in URA_PCH

Cell selection and cell reselection delays are applicable when the repetition period of all relevant system information blocks is not more than 1280 ms and the length of DRX cycle is not longer than [640] ms.

5.4.1 Requirements for Cell Re-selection single carrier multi cell case

5.4.1.1 Cell re-selection delay

When the UE is camped URA_PCH state on one of the cells, the UE shall be capable of re-selecting a new cell according the cell re-selection criteria. The cell re-selection delay is then defined as a time from when radio conditions are changed according to the test scenario to the moment in time when the UE starts sending the RRC Cell Update message to the UTRAN.

5.4.1.1.1 Test parameters

The same test parameters as specified in clause 4.3.1.1.1 for cell re-selection in idle mode shall be used.

5.4.1.1.2 Minimum requirements

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

5.5 Radio link management

5.5.1 Link adaptation

5.5.1.1 Definition of the function

Radio link adaptation is the ability of 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.

5.5.1.2 Link adaptation minimum delay requirement

When maximum transmit power has been reached and Inner Loop PC can no longer be maintained, UE shall start to use the transport format combination corresponding to the next lower bit rate within the assigned transport format set, within the maximum delay of [FFS]ms.

5.5.1.3 Link adaptation accuracy minimum requirement

UE shall not adapt to a lower transport format if the Inner Loop PC command requires its average output power over [FFS] ms to stay within [+FFS] dB of UE's maximum output power.

5.6 Cell update

(void)

5.7 URA update

(void)

6 RRC connection control

[Editor's Note: This Clause specifies triggering requirements on the RRC Connection re-establishment Procedure]

6.1 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 clause specifies time delay requirements on Physical Channel Reconfiguration and Transport Channel configuration in different reconfiguration cases.]

7 Dynamic channel allocation

7.1 Introduction

The channel assignment algorithm will be implemented on network side in the RNC. It will be distributed, interference adapted approach where each base station makes the channel assignment based on local signal strength measurements performed in the UE and the Node B. A priori knowledge about the used channels of the other base stations in the vicinity can be implicitly used without additional signalling traffic.

7.2 Implementation requirements

The purpose of DCA is on one side the limitation of the interference (keeping required QoS) and on the other side to maximise the system capacity due to minimising reuse distance. The details on channel assignment policy are given in [12].

7.3 Number of timeslots to be measured

The number of down link timeslots to be measured in the UE is broadcasted on the BCH in each cell. In general, the number of downlink timeslots in question will be less than 14, but in worst case the UE shall be capable to measure 14 downlink timeslots. In case of "simple UE" [FFS] timeslots shall at least be measured.

7.4 Measurement reporting delay

In order to save battery life time, in idle mode no measurements are performed for DCA. ISCP measurements are started at call establishment. Taking into account that the measured interference of the timeslots is preferable averaged over [FFS] frames, the measurement reporting delay in connecting phase shall not exceed [FFS] milliseconds.

8 Timing characterisitics

8.1 Timing Advance (TA) requirements

To update timing advance of a moving UE the UTRAN measures "RX Timing deviation". The measurements are reported to higher layers, where timing advance values are calculated and signaled to the UE. The measurement for timing advance is defined in 3GPP TS25.225 "Physical Layer Measurements (TDD)", the requirements on the measurement is specified in clause 11.2.9 "RX Timing Deviation". The UE shall adjust the timing of its transmissions within ±0.5 chip of the signalled timing advance value.

8.2 Cell synchronization accuracy

8.2.1 Definition

Cell synchronization accuracy is defined as the maximum deviation in frame start times between any pair of cells that have overlapping coverage areas.

8.2.2 Minimum requirements

The cell synchronization accuracy shall be better than or equal to 3μs.

9 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 3GPP TS 25.302 "Services Provided by Physical Layer". The physical layer measurements for TDD are described and defined in 3GPP TS 25.225 "Physical layer – Measurements (TDD)". In this clause for TDD, 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 3GPP TS 25.102 annex A, clause A.3.1. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in 3GPP TS 25.101 annex B.
- 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, if not otherwise stated.
- Single task reporting.
- Power control is active.

9.1 Measurements performance for UE

9.1.1 Performance for UE measurements in downlink (RX)

If not otherwise stated, the test parameters in table 9.1 should be applied for UE RX measurements requirements in this clause.

Table 9.1 Intra frequency test parameters for UE RX Measurements

Parameter	**Unit**	**Cell 1**		**Cell 2**	
UTRA RF Channel number		Channel 1		Channel 1	
Timeslot		0	8	0	8
P-CCPCH Ec/Ior	dB	-3	-	-3	-
SCH Ec/Ior	dB	-9	-9	-9	-9
PICH_Ec/Ior	dB	-	-3	-	-3

DPCH_Ec/Ior	dB	[]	[]	[]	[]
OCNS	dB	[]	[]	[]	[]
Îor/Ioc	dB	[ ]		[ ]	
Ioc	dBm/ 3.84 MHz	-70		-70	
Range 1:Io *Range 2: Io*	dBm	-94..-70 -94..-50		-94..-70 -94..-50	
Propagation condition	-	AWGN		AWGN	

9.1.1.1 COMMON CONTROL PHYSICAL CHANNEL MEASUREMENTS

These measurements consider *P-CCPCH RSCP* measurements for TDD cells and CPICH RSCP and CPICH Ec/Io measurements for FDD cells respectively. The corresponding measurements are necessary for UEs supporting the individual mode(s) only.

9.1.1.1.1 P-CCPCH RSCP (TDD)

9.1.1.1.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. The table 9.2 and notes 1-4 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 9.2 P-CCPCH RSCP intra frequency test parameters

Parameter	**Unit**	**Cell 1**		**Cell 2**	
UTRA RF Channel number		Channel 1		Channel 1	
Timeslot		0	8	0	8
P-CCPCH Ec/Ior	dB	-3	-	-3	-
SCH Ec/Ior	dB	-9	-9	-9	-9
PICH_Ec/Ior	dB	-	-3	-	-3
OCNS	dB	[]	[]	[]	[]
Îor/Ioc	dB	[ ]		[ ]	
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: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* | ≤ 20 dB.

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*.

9.1.1.1.2 Absolute accuracy requirements

The absolute accuracy of P-CCPCH RSCP is defined as measured one code power after de-spreading. In this test only Cell 1 in table 9.2 is present.

Table 9.3 P-CCPCH_RSCP Intra frequency absolute accuracy

Parameter	Value	Range	Accuracy	
			Normal conditions	Extreme conditions
P-CCPCH_RSCP	dB	1	± 6	± 9
	dB	2	± 8	± 11

9.1.1.1.3 Relative accuracy requirements

The relative accuracy of P-CCPCH 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 9.2 are present.

Table 9.4 P-CCPCH_RSCP Intra frequency relative accuracy

Parameter	Unit	Accuracy	
		Normal conditions	Extreme conditions
P-CCPCH_RSCP	dB	± 3	± 3

9.1.1.1.4 Range/mapping

Range/mapping	P-CCPCH RSCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm. P-CCPCH RSCP shall be reported in the unit P-CCPCH_RSCP_LEV where: P-CCPCH_RSCP_LEV_00: P-CCPCH_RSCP < -115dBm P-CCPCH_RSCP_LEV_01: -115dBm ≤ P-CCPCH_RSCP < -114dBm P-CCPCH_RSCP_LEV_02: -114dBm ≤ P-CCPCH_RSCP < -113dBm ... P-CCPCH_RSCP_LEV_89: -27dBm ≤ P-CCPCH_RSCP < -26dBm P-CCPCH_RSCP_LEV_90: -26dBm ≤ P-CCPCH_RSCP < -25dBm P-CCPCH_RSCP_LEV_91: -25dBm ≤ P-CCPCH_RSCP

9.1.1.1.2 CPICH measurements (FDD)

These measurements consider *CPICH RSCP* and *CPICH Ec/Io* measurements. Only necessary for UEs supporting FDD.

9.1.1.1.2.1 Inter frequency test parameters

In this case both cells are in different frequency. Table 9.5 and notes 1-5 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 9.5 CPICH Inter frequency test parameters

Parameter	Unit	Cell 1		Cell 2
Timeslot Number		0	8	n.a
UTRA RF Channel Number		Channel 1		Channel 2
CPICH_Ec/Ior	dB	n.a.	n.a.	-10
P-CCPCH_Ec/Ior	dB	-3		-12
SCH_Ec/Ior	dB	-9	-9	-12
SCH_t_{offset}		0	0	n.a.
PICH_Ec/Ior			-3	-15
DPCH_Ec/Ior	dB	[]	[]	-15
OCNS	dB	-4.28	-4.28	-1.11
$\hat{I}_{or}/I_{oc}$	dB	[]	[]	10.5
I_{oc}	dBm/3.84 MHz	-70		Note 5
Range 1:Io *Range 2: Io*	dBm	-94..-70 -94..-50		-94..-70 -94..-50
Propagation condition	-	AWGN		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.*

9.1.1.1.2.2 CPICH RSCP

[Informative note: This measurement is for handover.]

9.1.1.1.2.2.1 Inter frequency measurement relative accuracy requirement

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 9.5 are used. In this test cells 1and 2 are present.

Table 9.6 CPICH_RSCP Inter frequency relative accuracy

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

9.1.1.1.2.2.2 Range/mapping

CPICH RSCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm.			
CPICH RSCP shall be reported in the unit CPICH_RSCP_LEV where:			
CPICH_RSCP_LEV_00:			CPICH_RSCP < -115dBm
CPICH_RSCP_LEV_01:	-115dBm	≤	CPICH_RSCP < -114dBm
CPICH_RSCP_LEV_02:	-114dBm	≤	CPICH_RSCP < -113dBm
...			
CPICH_RSCP_LEV_89:	-27dBm	≤	CPICH_RSCP < -26dBm
CPICH_RSCP_LEV_90:	-26dBm	≤	CPICH_RSCP < -25dBm
CPICH_RSCP_LEV_91:	-25dBm	≤	CPICH_RSCP

9.1.1.1.2.3 CPICH Ec/Io

9.1.1.1.2.3.1 Inter frequency measurement relative accuracy requirement

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 9.5 is used. In this test cells 1and 2 are present.

Table 9.7 CPICH Ec/Io Inter frequency relative accuracy

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

9.1.1.1.2.3.2 Range/mapping

CPICH Ec/No is given with a resolution of 1 dB with the range [-24, ..., 0] dB.			
CPICH Ec/No shall be reported in the unit CPICH_Ec/No where:			
CPICH_Ec/No_00:			CPICH_Ec/No < -24dB
CPICH_Ec/No_01:	-24dB	≤	CPICH_Ec/No < -23dB
CPICH_Ec/No_02:	-23dB	≤	CPICH_Ec/No < -22dB
...			
CPICH_Ec/No_23:	-2dB	≤	CPICH_Ec/No < -1dB
CPICH_Ec/No_24:	-1dB	≤	CPICH_Ec/No < 0dB
CPICH_Ec/No_25:	0dB	≤	CPICH_ Ec/No

9.1.1.2 Timeslot ISCP

9.1.1.2.1 Absolute accuracy requirements

Table 9.8 Timeslot_ISCP Intra frequency absolute accuracy

Parameter	Value	Range	Accuracy	
			Normal conditions	Extreme conditions
Timeslot_ISCP	dB	1	± 6	± 9
	dB	2	± 8	± 11

9.1.1.2.2 Range/mapping

Timeslot ISCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm.			
Timeslot ISCP shall be reported in the unit UE_TS_ISCP_LEV where:			
UE_TS_ISCP_LEV_00:			Timeslot_ISCP < -115dBm
UE_TS_ISCP_LEV_01:	-115dBm	≤	Timeslot_ISCP < -114dBm
UE_TS_ISCP_LEV_02:	-114dBm	≤	Timeslot_ISCP < -113dBm
...			
UE_TS_ISCP_LEV_89:	-27dBm	≤	Timeslot_ISCP < -26dBm
UE_TS_ISCP_LEV_90:	-26dBm	≤	Timeslot_ISCP < -25dBm
UE_TS_ISCP_LEV_91:	-25dBm	≤	Timeslot_ISCP

9.1.1.3 UTRA carrier RSSI

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

9.1.1.3.1 Test parameters for requirement

The table 9.9 and notes 1,2 define the limits of signal strengths, where the requirement is applicable.

Table 9.9 UTRA carrier RSSI Inter frequency test parameters

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 2	Note 2
Range 1: Io	dBm/ 3.84 MHz	-94…-70	-94…-70
Range 2: Io		-94…-50	-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.*

9.1.1.3.2 Absolute accuracy requirement

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

Table 9.10 UTRA carrier RSSI Inter frequency absolute accuracy

Parameter	Value	Range	Accuracy	
			Normal conditions	Extreme conditions
UTRA Carrier RSSI	dB	1	± 4	± 7
	dB	2	± 6	± 9

9.1.1.3.3 Relative accuracy requirement

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 9.9 are used.

Table 9.11 UTRA carrier RSSI Inter frequency relative accuracy

Parameter	Unit	Accuracy	
		Normal condition	Extreme condition
Io	dBm	± 5	± 8

9.1.1.3.4 Range/mapping

UTRA carrier RSSI is given with a resolution of 1 dB with the range [-94, ..., -32] dBm.			
UTRA carrier RSSI shall be reported in the unit UTRA_carrier_RSSI_LEV where:			
UTRA_carrier_RSSI_LEV_00:			UTRA_carrier_RSSI < -94dBm
UTRA_carrier_RSSI_LEV_01:	-94dBm	≤	UTRA_carrier_RSSI < -93dBm
UTRA_carrier_RSSI_LEV_02:	-93dBm	≤	UTRA_carrier_RSSI < -92dBm
...			
UTRA_carrier_RSSI_LEV_61:	-34dBm	≤	UTRA_carrier_RSSI < -33dBm
UTRA_carrier_RSSI_LEV_62:	-33dBm	≤	UTRA_carrier_RSSI < -32dBm
UTRA_carrier_RSSI_LEV_63:	-32dBm	≤	UTRA_carrier_RSSI

9.1.1.4 GSM carrier RSSI

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

Only necessary for UEs supporting GSM.

The accuracy requirement is specified in GSM 05.08.

9.1.1.4.1 Range/mapping

According to the definition of RXLEV in GSM 05.08.

9.1.1.5 SIR

9.1.1.5.1 Absolute accuracy requirements

Table 9.12 SIR Intra frequency absolute accuracy

Parameter	Unit	Accuracy	
		Normal conditions	Extreme conditions
SIR	dB	±3 dB for 0<SIR<20dB	[ ]
SIR	dB	±(3 - SIR) for -7 ≤ SIR ≤ 0 dB	[ ]

9.1.1.5.2 Range/mapping

SIR is given with a resolution of 0.5 dB with the range [-11, ..., 20] dB. SIR shall be reported in the unit UE_SIR where: UE_SIR_00: SIR < -11.0dB UE_SIR_01: -11.0dB ≤ SIR < -10.5dB UE_SIR_02: -10.5dB ≤ SIR < -10.0dB .... UE_SIR_61: 19.0dB ≤ SIR < 19.5dB UE_SIR_62: 19.5dB ≤ SIR < 20.0dB UE_SIR_63: 20.0dB ≤ SIR

9.1.1.6 Transport channel BLER

The Transport Channel BLER value shall be calculated from a window with the size equal to the reporting interval (see clause on periodical reporting criteria in TS 25.331).

Requirement	The UE shall report the CRC results

9.1.1.6.1 Range/mapping

Transport channel BLER is given with a logarithmic resolution of 0.065 with the range [10^-4.03 ... 1] including a separate case Transport channel BLER=0. Transport channel BLER shall be reported in the unit BLER_LOG, where: BLER_LOG_00: BLER = 0 BLER_LOG_01: -∞ < Log10(Transport channel BLER) < -4.030 BLER_LOG_02: -4.030 ≤ Log10(Transport channel BLER) < -3.965 BLER_LOG_03: -3.965 ≤ Log10(Transport channel BLER) < -3.900 ... BLER_LOG_61: -0.195 ≤ Log10(Transport channel BLER) < -0.130 BLER_LOG_62: -0.130 ≤ Log10(Transport channel BLER) < -0.065 BLER_LOG_63: -0.065 ≤ Log10(Transport channel BLER) ≤ 0.000

9.1.1.7 SFN-SFN observed time difference

9.1.1.7.1 Accuracy requirements

Table 9.13 SFN-SFN observed time difference accuracy

Parameter	Unit	Accuracy
SFN-SFN observed time difference	chips period	+/-0.5 for both type 1 and 2

9.1.1.7.2 Range/mapping

Type 1:
SFN-SFN observed time difference is given with a resolution of 1 chip with the range [0; 9830400) chips (24 bits).
SFN-SFN observed time difference shall be reported in the unit T1_SFN-SFN_TIME, where T1_SFN-SFN_TIME_N:
N* 1 chip ≤ SFN-SFN observed time difference < (N+1)* 1 chip
With N= 0, 1, 2, ..., 9830399

Type 2:
SFN-SFN observed time difference is given with a resolution of 0.25 chip with the range (-1280; 1280] chips (14 bits).
SFN-SFN observed time difference shall be reported in the unit T2_SFN-SFN_TIME, where T2_SFN-SFN_TIME_N:
N* 0.25 chip –1280 chips < SFN-SFN observed time difference ≤ (N+1)* 0.25 chip –1280 chips
With N= 0, 1, 2, ..., 10239

9.1.1.8 Observed time difference to GSM cell

Only necessary for UEs supporting GSM.

9.1.1.8.1 Accuracy requirements

Table 9.14 Observed time difference to GSM cell accuracy

Parameter	Unit	Accuracy
Observed time difference to GSM cell	chips period	+/-20

9.1.1.8.2 Range/mapping

Observed time difference to GSM cell is given with a resolution of 3060ms/(13*4096) (12 bit) with the range [0, 3060/13) ms.
Observed time difference to GSM cell shall be reported in the unit GSM_TIME, where GSM_TIME_N:
N* 3060ms/(13*4096) ≤ Observed time difference to GSM cell < (N+1)* 3060ms/(13*4096)
With N= 0, 1, 2, ..., 4095

9.1.1.9 UE GPS Timing of Cell Frames for LCS

9.1.1.9.1 Accuracy requirement

Only necessary for UEs supporting LCS.

Table 9.15

Parameter	Unit	Accuracy
UE GPS timing of Cell Frames for LCS	chips period	[ ]

9.1.1.9.2 UE GPS timing of Cell Frames for LCS measurement report mapping

The reporting range is for UE GPS timing of Cell Frames for LCS is from 0 ... 2319360000000 chip.

Table 9.16

Reported value	Measured quantity value	Unit
GPS_TIME_00000000000000	UE GPS timing of Cell Frames for LCS < 0.0625	chip
GPS_TIME_00000000000001	0.0625 ≤ UE GPS timing of Cell Frames for LCS < 0.1250	chip
GPS_TIME_00000000000002	0.1250 ≤ UE GPS timing of Cell Frames for LCS < 0.1875	chip
GPS_TIME_37109759999997	2319359999999.8125 ≤ UE GPS timing of Cell Frames for LCS < 2319359999999.8750	chip
GPS_TIME_37109759999998	2319359999999. 8750 ≤ UE GPS timing of Cell Frames for LCS < 2319359999999. 9375	chip
GPS_TIME_37109759999999	2319 359999 999. 9375 ≤ UE GPS timing of Cell Frames for LCS < 2319360000000.0000	chip

9.1.1.10 SFN-CFN observed time difference

Note: This measurement is for handover timing purposes to identify active cell and neighbour cell time difference.

9.1.1.10.1 Accuracy requirements

Table 9.17 SFN-CFN observed time difference accuracy for a TDD neighbour cell

Parameter	Unit	Accuracy
SFN-CFN observed time difference	frames period	+/-0.5

Table 9.18 SFN-CFN observed time difference accuracy for a FDD neighbour cell

Parameter	Unit	Accuracy
SFN-CFN observed time difference	chips period	+/-1

9.1.1.10.2 Range/mapping

Table 9.19 SFN-CFN observed time difference range/mapping for a TDD neighbour cell

Reported value	Measured quantity value	Unit
SFN-CFN_TIME _000	0 ≤ Time difference ≤ 1	frame
SFN-CFN_TIME _001	1 ≤ Time difference < 2	frame
SFN-CFN_TIME _002	2 ≤ Time difference < 3	frame

…	…	…
SFN-CFN_TIME _253	253 ≤ Time difference < 254	frame
SFN-CFN_TIME _254	254 ≤ Time difference < 255	frame
SFN-CFN_TIME _255	255 ≤ Time difference ≤ 256	frame

Note 1: The reporting range is for *SFN-CFN observed time difference* is from 0 ... 256 frame.

Table 9.20 SFN-CFN observed time difference range/mapping for a FDD neighbour cell

Reported value	Measured quantity value	Unit
SFN-CFN_TIME _00000	0 ≤ Time difference ≤ 1	chip
SFN-CFN_TIME _00001	1 ≤ Time difference < 2	chip
SFN-CFN_TIME _00002	2 ≤ Time difference < 3	chip
…	…	…
SFN-CFN_TIME _38397	38397 ≤ Time difference < 38398	chip
SFN-CFN_TIME _38398	38398 ≤ Time difference < 38399	chip
SFN-CFN_TIME _38399	38399 ≤ Time difference ≤ 38400	chip

Note 1: The reporting range is for *SFN-CFN observed time difference* is from 0 ... 38400 chip.

9.1.2 Performance for UE Measurements in Uplink (TX)

The output power is defined as the average power of the transmit timeslot, and is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

9.1.2.1 UE transmitted power

9.1.2.1.1 Absolute accuracy requirements

Table 9.21 UE transmitted power absolute accuracy

Parameter	Unit	PUEMAX	
		24dBm	21dBm
UE transmitted power=PUEMAX	dB	+1/-3	±2
UE transmitted power=PUEMAX-1	dB	+1.5/-3.5	±2.5
UE transmitted power=PUEMAX-2	dB	+2/-4	±3
UE transmitted power=PUEMAX-3	dB	+2.5/-4.5	±3.5
PUEMAX-10≤UE transmitted power<PUEMAX-3	dB	+3/-5	±4

Note 1: User equipment maximum output power, PUEMAX, is the maximum output power level without tolerance defined for the power class of the UE in 3GPP TS 25.102 "UTRA (UE) TDD; Radio Transmission and Reception".

Note 2: UE transmitted power is the reported value.

9.1.2.1.2 Range/mapping

UE transmitted power is given with a resolution of 1dB with the range [-50, ..., 33] dBm.
UE transmitted power shall be reported in the unit UE_TX_POWER, where:

UE_TX_POWER_000 to UE_TX_POWER_020: reserved
UE_TX_POWER_021: -50dBm ≤ UE_transmitted_power < -49dBm
UE_TX_POWER_022: -49dBm ≤ UE_transmitted_power < -48dBm
UE_TX_POWER_023: -48dBm ≤ UE_transmitted_power < -47dBm
...
UE_TX_POWER_102: 31dBm ≤ UE_transmitted_power < 32dBm
UE_TX_POWER_103: 32dBm ≤ UE_transmitted_power < 33dBm
UE_TX_POWER_104: 33dBm ≤ UE_transmitted_power < 34dBm

9.2 Measurements Performance for UTRAN

9.2.1 Performance for UTRAN Measurements in Uplink (RX)

If not otherwise stated, the test parameters in table 9.22 should be applied for UE RX measurements requirements in this clause.

Table 9.22 Intra frequency test parameters for UTRAN RX Measurements

Parameter	Unit	Cell 1
UTRA RF Channel number		Channel 1
Timeslot		[ ]
DPCH Ec/Ior	dB	[ ]
Îor/Ioc	dB	[ ]
Ioc	dBm/ 3.84 MHz	-89
Range: Io	dBm	-105..-74
Propagation condition	-	AWGN

9.2.1.1 RSCP

9.2.1.1.1 Absolute accuracy requirements

Table 9.23 RSCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy	
		Normal conditions	Extreme conditions
RSCP	dB	+/-6dB	+/-9dB

9.2.1.1.2 Relative accuracy requirements

Table 9.24 RSCP Intra frequency relative accuracy

Parameter	Unit	Accuracy
RSCP	dB	+/-3dB for intra-frequency

9.2.1.1.3 Range/mapping

RSCP is given with a resolution of 0.5 dB with the range [-120, ..., -80] dBm.
RSCP shall be reported in the unit RSCP_LEV where:

RSCP_LEV_00:			RSCP < -120.0dBm
RSCP_LEV_01:	-120.0dBm	≤	RSCP < -119.5dBm
RSCP_LEV_02:	-119.5dBm	≤	RSCP < -119.0dBm
...			
RSCP_LEV_79:	-81.0dBm	≤	RSCP < -80.5dBm
RSCP_LEV_80:	-80.5dBm	≤	RSCP < -80.0dBm
RSCP_LEV_81:	-80.0dBm	≤	RSCP

9.2.1.2 Timeslot ISCP

9.2.1.2.1 Absolute accuracy requirements

Table 9.25 Timeslot ISCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy	
		Normal conditions	Extreme conditions
Timeslot ISCP	dB	+/-6dB	+/-9dB

9.2.1.2.2 Range/mapping

Timeslot ISCP is given with a resolution of 0.5 dB with the range [-120, ..., -80] dBm.
Timeslot ISCP shall be reported in the unit UTRAN_TS_ISCP_LEV where:

UTRAN_TS_ISCP_LEV_00:			Timeslot_ISCP < -120.0dBm
UTRAN_TS_ISCP_LEV_01:	-120.0dBm	≤	Timeslot_ISCP < -119.5dBm
UTRAN_TS_ISCP_LEV_02:	-119.5dBm	≤	Timeslot_ISCP < -119.0dBm
...			
UTRAN_TS_ISCP_LEV_79:	-81.0dBm	≤	Timeslot_ISCP < -80.5dBm
UTRAN_TS_ISCP_LEV_80:	-80.5dBm	≤	Timeslot_ISCP < -80.0dBm
UTRAN_TS_ISCP_LEV_81:	-80.0dBm	≤	Timeslot_ISCP

9.2.1.3 RSSI

9.2.1.3.1 Absolute accuracy requirements

Table 9.26 RSSI Intra frequency absolute accuracy

Parameter	Unit	Accuracy
RSSI	dB	+/-4dB

9.2.1.3.2 Range/mapping

RSSI is given with a resolution of 0.1dB with the range [-112, ..., -50] dBm.
RSSI shall be reported in the unit RSSI_LEV, where:

RSSI_LEV_000:			RSSI < -112.0dBm
RSSI_LEV_001:	-112.0dBm	≤	RSSI < –111.9dBm
RSSI_LEV_002:	-111.9dBm	≤	RSSI < –111.8dBm
...			
RSSI_LEV_619:	-50.2dBm	≤	RSSI < –50.1dBm
RSSI_LEV_620:	-50.1dBm	≤	RSSI < –50.0dBm
RSSI_LEV_621:	-50.0dBm	≤	RSSI

9.2.1.4 SIR

9.2.1.4.1 Absolute accuracy requirements

Table 9.27 SIR Intra frequency absolute accuracy

Parameter	Unit	Accuracy
SIR	dB	+/-3dB for 0<SIR<20 dB
SIR	dB	+/-(3 - SIR) dB for –7 ≤ SIR ≤ 0 dB

9.2.1.4.2 Range/mapping

SIR is given with a resolution of 0.5 dB with the range [-11, ..., 20] dB.
SIR shall be reported in the unit UTRAN_SIR where:

UTRAN_SIR_00:			SIR < -11.0dB
UTRAN_SIR_01:	-11.0dB	≤	SIR < -10.5dB
UTRAN_SIR_02:	-10.5dB	≤	SIR < -10.0dB
....			
UTRAN_SIR_61:	19.0dB	≤	SIR < 19.5dB
UTRAN_SIR_62:	19.5dB	≤	SIR < 20.0dB
UTRAN_SIR_63:	20.0dB	≤	SIR

9.2.1.5 Transport Channel BER

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

9.2.1.5.1 Accuracy requirement

Table 9.28 Transport channel BER accuracy

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

9.2.1.5.2 Range/mapping

Transport channel BER is given with a logarithmic resolution of 0.008125 within the range [10^-2.06375 ... 1] with two separate cases Transport channel BER=0 and Transport channel BER between 0 and 10^-2.06375..
Transport channel BER shall be reported in the unit TrCH_BER_LOG, where:

TrCH_BER_LOG_000:	Transport channel BER = 0		
TrCH_BER_LOG_001:	-∞	< Log10(Transport channel BER) <	-2.06375
TrCH_BER_LOG_002:	-2.06375	≤ Log10(Transport channel BER) <	-2.055625
TrCH_BER_LOG_003:	-2.055625	≤ Log10(Transport channel BER) <	-2.0475
...			
TrCH_BER_LOG_253:	-0.024375	≤ Log10(Transport channel BER) <	-0.01625
TrCH_BER_LOG_254:	-0.01625	≤ Log10(Transport channel BER) <	-0.008125
TrCH_BER_LOG_255:	-0.008125	≤ Log10(Transport channel BER) ≤	0.000

9.2.1.6 RX Timing Deviation

9.2.1.6.1 Accuracy requirements

Table 9.29 RX Timing Deviation accuracy

Parameter	Unit	Accuracy
RX Timing Deviation	-chips period	+/-0.5

9.2.1.6.2 Range/mapping

RX Timing Deviation is given with a resolution of 0.25 chip with the range [-256; 256) chips (11 bit).
RX Timing Deviation cell shall be reported in the unit RX_TIME_DEV, where
RX_TIME_DEV: (N* 0.25 –256) chips ≤ RX Timing Deviation < ((N+1)* 0.25 –256) chips
With N= 0, 1, 2, ..., 2047

Note: This measurement can be used for timing advance calculation or location services.

9.2.1.9 UTRAN GPS Timing of Cell Frames for LCS

9.2.1.9.1 Accuracy requirement

Only necessary for UEs supporting LCS.

Table 9.30

Parameter	Unit	Accuracy
UTRAN GPS timing of Cell Frames for LCS	chips period	[ ]

9.2.1.9.2 UTRAN GPS timing of Cell Frames for LCS measurement report mapping

The reporting range is for UTRAN GPS timing of Cell Frames for LCS is from 0 ... 2319360000000 chip.

Table 9.31

Reported value	Measured quantity value	Unit
GPS_TIME_00000000000000	UTRAN GPS timing of Cell Frames for LCS < 0. 0625	chip
GPS_TIME_00000000000001	0. 0625 ≤ UTRAN GPS timing of Cell Frames for LCS < 0. 1250	chip
GPS_TIME_00000000000002	0. 1250 ≤ UTRAN GPS timing of Cell Frames for LCS < 0. 1875	chip
…	…	…
GPS_TIME_37109759999997	2319359999999. 8125 ≤ UTRAN GPS timing of Cell Frames for LCS < 2319359999999. 8750	chip
GPS_TIME_37109759999998	2319359999999. 8750 ≤ UTRAN GPS timing of Cell Frames for LCS < 2319359999999. 9375	chip
GPS_TIME_37109759999999	2319 359999 999. 9375 ≤ UTRAN GPS timing of Cell Frames for LCS < 2319360000000.0000	chip

9.2.2 Performance for UTRAN measurements in downlink (TX)

The output power is defined as the average power of the transmit timeslot, and is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

9.2.2.1 Transmitted carrier power

9.2.2.1.1 Accuracy requirements

Table 9.32 Transmitted carrier power accuracy

Parameter	Unit	Accuracy
Transmitted carrier power	-	±10% in the range 10% ≤ TX carrier power ratio ≤90%

9.2.2.1.2 Range/mapping

Transmitted carrier power is given with a resolution of 1% with the range [0, ..., 100] %.
Transmitted carrier power shall be reported in the unit UTRAN_TX_POWER, where:
UTRAN_TX_POWER_000: Transmitted carrier power = 0%
UTRAN_TX_POWER_001: 0% < Transmitted carrier power ≤ 1%
UTRAN_TX_POWER_002: 1% < Transmitted carrier power ≤ 2%
UTRAN_TX_POWER_003: 2% < Transmitted carrier power ≤ 3%
...
UTRAN_TX_POWER_098: 97% < Transmitted carrier power ≤ 98%
UTRAN_TX_POWER_099: 98% < Transmitted carrier power ≤ 99%
UTRAN_TX_POWER_100: 99% < Transmitted carrier power ≤ 100%

9.2.2.2 Transmitted code power

9.2.2.2.1 Absolute accuracy requirements

Table 9.33 Transmitted code power absolute accuracy

Parameter	Unit	Accuracy
Transmitted code power	dB	[+/-3]dB

9.2.2.2.2 Relative accuracy requirements

Table 9.34 Transmitted code power relative accuracy

Parameter	Unit	Accuracy
Transmitted code power	dB	+/-2dB

9.2.2.2.3 Range/mapping

Transmitted code power is given with a resolution of 0.5dB with the range [-10, ..., 46] dBm.
Transmitted code power shall be reported in the unit UTRAN_TX_CODE_POWER, where:
UTRAN_TX_CODE_POWER_000 to UTRAN_TX_POWER_009: reserved
UTRAN_TX_ CODE_POWER_010: -10.0dBm ≤ CODE_POWER < -9.5dBm
UTRAN_TX_ CODE_POWER_011: -9.5dBm ≤ CODE_POWER < -8.5dBm
UTRAN_TX_ CODE_POWER_012: -8.5dBm ≤ CODE_POWER < -7.5dBm
...
UTRAN_TX_ CODE_POWER_120: 45.0dBm ≤ CODE_POWER < 45.5dBm
UTRAN_TX_ CODE_POWER_121: 45.5dBm ≤ CODE_POWER < 46.0dBm
UTRAN_TX_ CODE_POWER_122: 46.0dBm ≤ CODE_POWER < 46.5dBm

Annex A (informative): Change History

CRs approved by TSG-RAN#7.

RAN doc	Spec	CR	Rev	Phase	Subject	Cat	Old Version	New Version
RP-000020	25.123	001		R99	Update of test requirements for TDD/TDD Handover	F	3.0.0	3.1.0
RP-000020	25.123	002		R99	Update of the requirements for TDD/FDD Handover	F	3.0.0	3.1.0
RP-000020	25.123	003		R99	Update of Cell Selection and Re-selection sections	C	3.0.0	3.1.0
RP-000020	25.123	004		R99	Update of Power management and Radio Link Surveillance sections	F	3.0.0	3.1.0
RP-000020	25.123	005		R99	Update of measurements performance requirements	F	3.0.0	3.1.0
RP-000020	25.123	006		R99	Inclusion of transport channel BER	F	3.0.0	3.1.0
RP-000020	25.123	007		R99	Receiver Timing Advance	F	3.0.0	3.1.0
April 2000	25.123	-	-	R99	MCC Editorial update and clause 10 renumbering	A	3.1.0	3.1.1

CRs approved by TSG-RAN#8.

RAN Doc	Spec	CR	Rev	Phase	Subject	Cat	Version - Current	Version-New
RP-000209	25.123	008		R99	Correction of UTRAN "Transmitted carrier power" accuracy requirements	F	3.1.1	3.2.0
RP-000209	25.123	009		R99	Measurement reporting delay	F	3.1.1	3.2.0
RP-000209	25.123	010		R99	Update of UE SIR Measurements performance requirements	F	3.1.1	3.2.0
RP-000209	25.123	011		R99	UE Transport Channel BLER measurement	F	3.1.1	3.2.0
RP-000209	25.123	012		R99	Editorial corrections of 25.123	F	3.1.1	3.2.0
RP-000209	25.123	013		R99	Range and mapping in TS 25.123 (TDD)	F	3.1.1	3.2.0
RP-000209	25.123	014		R99	Requirement for UE Tx Power Measurement	F	3.1.1	3.2.0
RP-000209	25.123	015		R99	Addition of test parameters to RRM Measurements performance requirements	F	3.1.1	3.2.0

CRs approved by TSG-RAN#9.

RAN Doc	Spec	CR	Rev	Phase	Subject	Cat	Version - Current	Version-New
RP-000399	25.123	16		R99	Handling of measurement uncertainties in conformance testing (TDD) for RRM measurements	F	3.2.0	3.3.0
RP-000399	25.123	17		R99	Basestation Physical Channel BER Measurement	F	3.2.0	3.3.0
RP-000399	25.123	18		R99	Repetition Period of System Information	F	3.2.0	3.3.0
RP-000399	25.123	19		R99	RRC connection mobility in cell_FACH, cell_PCH and URA_PCH	F	3.2.0	3.3.0
RP-000399	25.123	20		R99	Basestation SIR Measurement	F	3.2.0	3.3.0

RP-000399	25.123	21		R99	UE SIR Measurement Accuracy	F	3.2.0	3.3.0
RP-000399	25.123	22		R99	UE TS ISCP range/mapping correction	F	3.2.0	3.3.0
RP-000399	25.123	23		R99	Alignment of TDD measurements for UE: SFN-CFN observed time difference	F	3.2.0	3.3.0
RP-000399	25.123	24		R99	UTRAN Transport Channel BLER	F	3.2.0	3.3.0
RP-000399	25.123	25		R99	Accuracy requirements for Node-B synchronization	F	3.2.0	3.3.0
RP-000399	25.123	26		R99	Alignment of TDD measurements with FDD: GPS related measurements	F	3.2.0	3.3.0

History

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