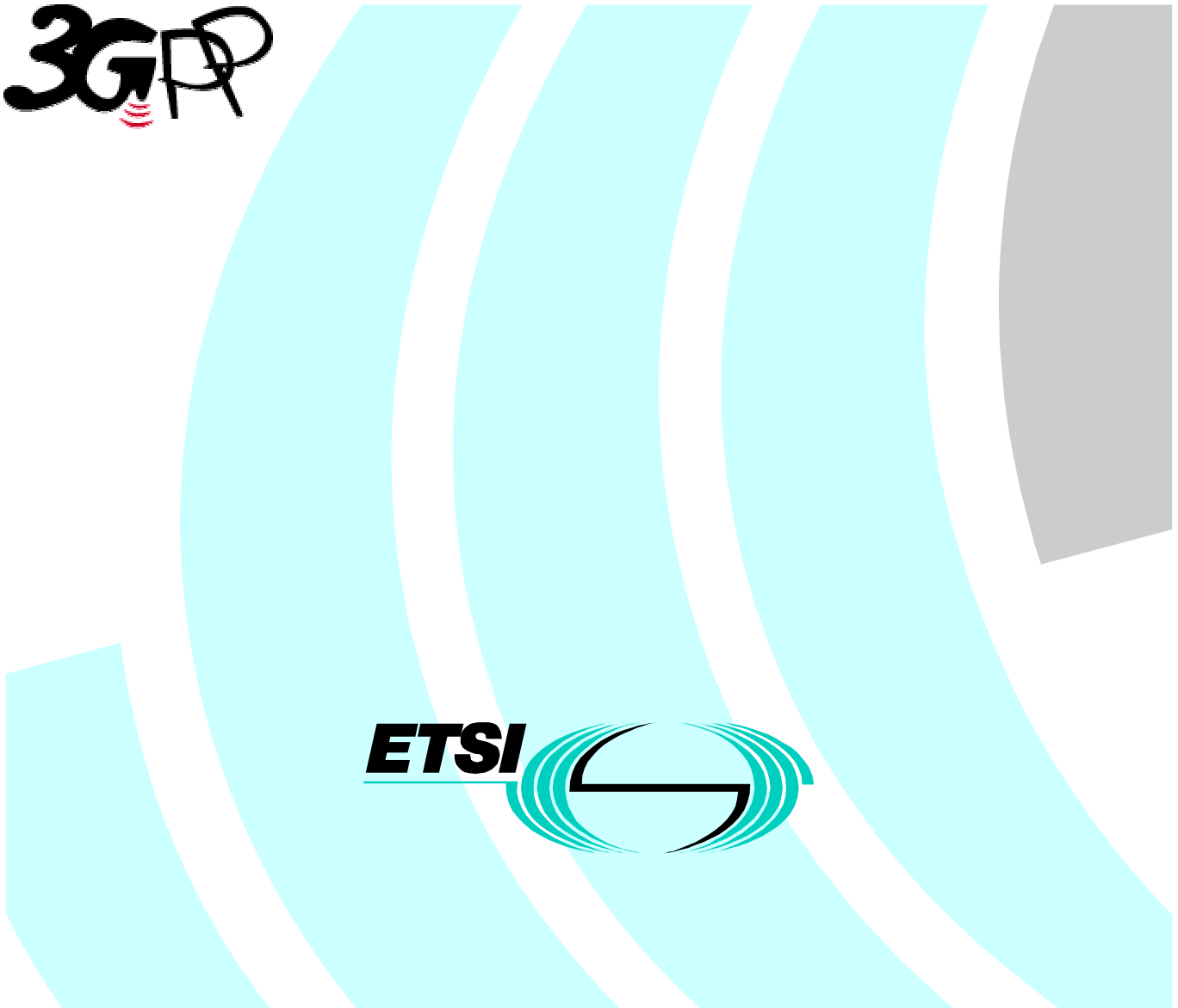
ETSI TS 125 123 V3.1.1 (2000-05)

Technical Specification

Universal Mobile Telecommunications System (UMTS);
Requirements for Support of Radio Resource Management (TDD)
(3G TS 25.123 version 3.1.1 Release 1999)



Reference
RTS/TSGR-0425123UR1

Keywords
UMTS

ETSI

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Foreword

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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:

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x the first digit:

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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 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.
- 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] 3GPP Homepage: www.3GPP.org

[2] 25.150 Introduction

[3] 25.101 MS Radio transmission and reception (FDD)

[4] 25.104 BTS Radio transmission and reception (FDD)

[5] 25.102 MS Radio transmission and reception (TDD)

[6] 25.105 BTS Radio transmission and reception (TDD)

[7] 25.103 RF parameters in support of RRM

[8] 25.141 Basestation conformance testing (FDD)

[9] 25.142 Basestation conformance testing (TDD)

[10] 25.113 Basestation EMC

[11] 25.942 RF System scenarios

[12] 25.922 RRM Strategies

[13] 25.215 Physical Layer Measurements (FDD)

[14] 25.225 Physical Layer Measurements (TDD)

[15] 25.302 Services provided by Physical Layer

[16] 25.331 RRC Protocol Specification

[17] 25.224 Physical Layer Procedures (TDD)

[18] 25.304 UE procedures in Idle Mode

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 section 3.3 and Annex C.

3.3 Abbreviations

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

RRM	Radio Resource Management
ACPR	Adjacent Channel Power 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
FER	Frame Error Rate
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.

$\frac{PCCPCH\_E_c}{I_{or}}$ The ratio of the average transmit energy per PN chip for the PCCPCH to the total transmit power spectral density.

PPM Parts Per Million
OCNS Orthogonal Channel Noise Simulator, a mechanism used to simulate the users or control signals on the other orthogonal channels of a Forward link.
PICH Paging Indicator Channel
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
RRM Radio Resource Management
ACPR Adjacent Channel Power Ratio
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 Rate
PPM Parts Per Million
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.

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 RAN TS 25.304 'UE procedures in idle mode' and the measurements carried out by the UE are explained in specification 3GPP RAN TS 25.225 'Physical Layer Measurements (TDD)'. The measurements performance requirements are specified in section 11.

4.2 RF Cell Selection Scenario

[Note: Some performance requirements in agreed scenarios are added into this section. 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 0-1.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	
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.

4.2.1.3 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 single 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 section 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.

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.

4.2.2.3 Performance Requirements

ell 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 section. 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 section inTable 4-3 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 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.

4.3.1.2 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			
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	dBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	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	dBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	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.

4.3.1.3 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 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 Requirements for UTRAN to GSM Cell Re-Selection

Note: These requirements are depending on supported UE capabilities.

Note: 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 UTRAN cell, the UE shall be capable of re-selecting a GSM cell in the test case defined in the following section in within [ ] 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.

4.3.2.2 Test Parameters

Tbd.

4.3.2.3 Performance 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 TS25.331.

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 RAN 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 3GPP RAN TS 25.224 'Physical layer procedures (TDD)' if the monitored cell is a TDD cell and in 3GPP RAN 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 section, 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.

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.

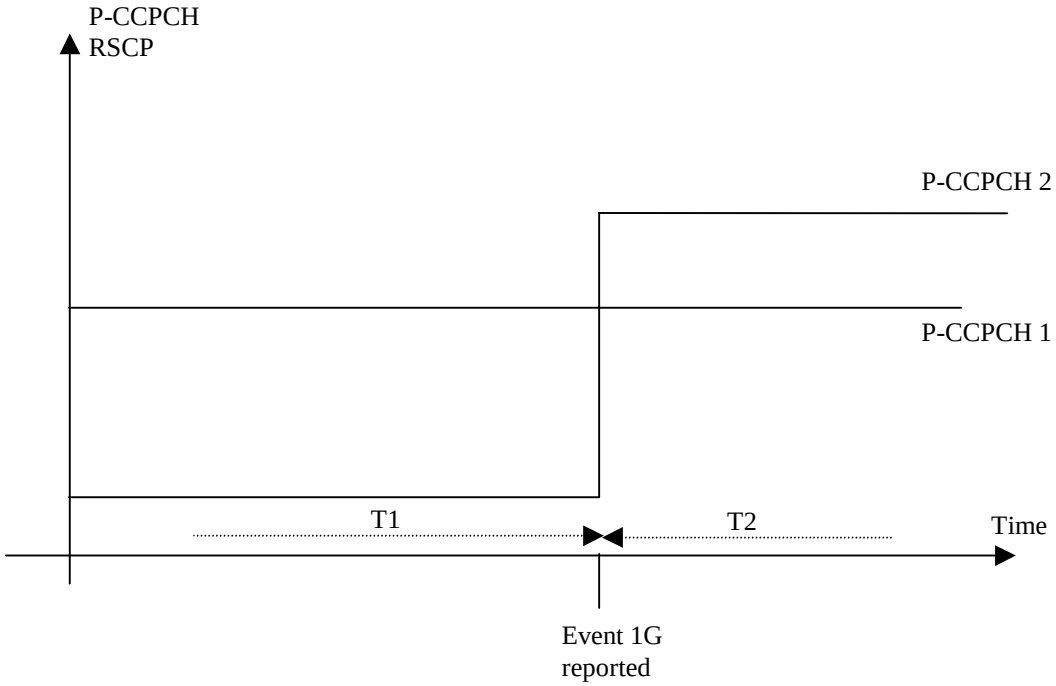

Figure 5-1: Illustration of parameters for handover measurement reporting test case

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 section 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 5.1

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 5.2

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 section 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 5.3

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 section 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].

5.2 Radio Link Management

5.2.1 Link adaptation

5.2.1.1 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.

5.2.1.2 Link adaptation delay minimum 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.

5.2.1.3 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.

5.3 Cell Update

5.4 URA Update

6 RRC Connection Control

[Editor's Note: This Section 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 section 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 inTS25.225 "Physical Layer Measurements (TDD)", the requirements on the measurement is specified in section 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.

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 TSG RAN WG2 S25.302 "Services Provided by Physical Layer". The physical layer measurements for TDD are described and defined in TSG RAN WG1 TS25.225 "Physical layer – Measurements (TDD)". In this section 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 TS 25.102 annex A, section 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 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.
- Single task reporting.
- Power control is active.

10 Measurements Performance for UE

10.1 PRIMARY COMMON CONTROL PHYSICAL CHANNEL MEASUREMENTS

These measurements consider *P-CCPCH RSCP* measurements.

10.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. The table 10-1 and notes 1-4 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 10.1

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	[ ] [ ]		[ ] [ ]	
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*. *Io –13.7 dB= Ioc.*

10.1.2 P-CCPCH RSCP

10.1.2.1 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 10.1 is present.

Table 10.2: Range 1

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

Table 10.3: Range 2

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

10.1.2.2 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 1 are present.

Table 10.4: Range 2

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

10.2 COMMON PILOT MEASUREMENTS

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

10.2.1 Intra frequency test parameters

In this case all cells are in the same frequency. The table 10.5 and notes 1-4 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 10.5

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.*

10.2.2 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 10.6 and notes 1-5 define the limits of signal strengths and code powers, where the requirement is applicable.

Table 10.6

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
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.*

10.2.3 CPICH RSCP

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

10.2.4 Intra frequency measurements accuracy

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

10.2.4.1 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 10-1 is present.

Table 10.7: Range 1

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

Table 10.8: Range 2

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

10.2.4.2 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 10.9: Range 2

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

10.2.5 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 10-2 is used. In this test cells 1and 2 are present.

Table 10.10: Range 2

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

10.3 CPICH Ec/Io

[Informative note: This measurement is for Cell selection/re-selection and for handover evaluation.]

10.3.1 Intra frequency measurements accuracy

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

10.3.1.1 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 10-1 is present.

Table 10.11 Range 2

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

10.3.1.2 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 10-1 are present.

Table 10.12: Range 2

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

10.3.2 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 10-2 is used. In this test cells 1and 2 are present.

Table 10.13: Range 2

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

10.4 Timeslot ISCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-6dB for levels below -70dBm; +/-8dB over the full range Valid for UTRA carrier RSSI >= -94dBm. **Extreme Conditions** +/-9dB for levels below -70dBm; +/-11dB over the full range Valid for UTRA carrier RSSI >= –94dBm.

10.5 UTRA carrier RSSI

Requirement	**Absolute accuracy:** **Normal Conditions** +/-4dB for levels below –70dBm Valid for levels > -94dBm. **Extreme Conditions** +/-7dB for levels below -70dBm Valid for levels > –94dBm. **Relative accuracy** (between measurements on two carriers): +/-5dB over the full range Valid when the minimum level > -94 dBm and the difference < 20 dB.

10.6 GSM carrier RSSI

Requirement	According to the definition of RXLEV in GSM 05.08.

10.7 SIR

Requirement	**Absolute accuracy:** for [ ]<[ ]dB when UTRA carrier RSSI>=-94dBm

10.8 Physical channel BER

Requirement	+/-10% of the absolute Physical channel BER value

10.9 Transport channel BLER

Requirement	The UE shall report the CRC results

10.10 UE transmitted power

Requirement	**Absolute accuracy:** **Normal Conditions** +/-9dB over the full range. **Extreme Conditions** +/-12dB over the full range.

10.11 SFN-SFN observed time difference

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

10.12 Observed time difference to GSM cell

Requirement	+/-20chips.

10.13 Measurements Performance for UTRAN

10.13.1 RSCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-6dB for levels below –70dBm; +/-8dB over the full range Valid for RSSI >= -94dBm **Extreme Conditions** +/-9dB for levels below –70dBm; +/-11dB over the full range Valid for RSSI >= -94dBm **Relative accuracy:** +/-3dB for intra-frequency Valid when the minimum level > -95-10log10(SF)dBm, the difference in signal level < 20dB and RSSI>= –94dBm.

10.13.2 Timeslot ISCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-6dB for levels below –70dBm; +/-8dB over the full range **Extreme Conditions** +/-9dB for levels below –70dBm; +/-11dB over the full range

10.13.3 RSSI

Requirement	**Absolute accuracy:** +/-4dB over the full range.

10.13.4 SIR

Requirement	**Absolute accuracy:** +/-3dB for 0<SIR<10 dB when RSSI>= –104dBm.

10.13.5 Physical channel BER

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

10.13.5.1 Accuracy requirement

Table 10.14

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

10.13.6 Transport channel BLER

Requirement	

10.13.7 Transport Channel BER

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

10.13.7.1 Accuracy requirement

Table 10.15

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

10.13.8 Transmitted carrier power

Requirement	**Accuracy:** 40% for 5%<(transmitted carrier power)<=100%

10.13.9 Transmitted code power

Requirement	**Absolute accuracy:** [+/-3]dB over the full range. **Relative accuracy** (relative to the maximum transmit power): +/-2dB over the full range.

10.13.10 RX Timing Deviation

Requirement	+/-0.5 chips period

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

Annex A (informative): Change History

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

History

Document history		
V3.1.1	May 2000	Publication