TSG-RAN meeting #6
Nice, France, 13 - 15 December 1999

TSG RP#6 (99)726

Technical Specification

3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN; Working Group 4 (WG4);

Requirements for Support of Radio Resource Management (TDD)

Reference
<Workitem> (<Shortfilename>.PDF)

Keywords
<keyword[, keyword]>

3GPP

Postal address

Office address

Internet
secretariat@3gpp.org
Individual copies of this deliverable
can be downloaded from
http://www.3gpp.org

Contents

Intellectual Property Rights

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

Pursuant to the ETSI Interim IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETR 314 (or the updates on http://www.etsi.fr/ipr) which are, or may be, or may become, essential to the present document.

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:

presented to TSG for information;

presented to TSG for approval;

Indicates TSG approved document under change control.

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

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

<symbol> <Explanation>

Symbol	Explanation
[…]	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)
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 4-1. The cell selection delay is defined as a time the UE needs for sending RRC Connection Request for Location Registration to UTRAN after the power has been switched on with a valid USIM and PIN is disabled.

4.2.1.2 Test Parameters

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

Table 4-1:

Parameter	**Unit**	**Cell 1**
UTRA RF Channel Number		Channel 1
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
OCNS	dB	To Be Calculated
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/3.84 MHz	-60
Propagation Condition		AWGN
Qmin	dB	[ ]
UE_TXPWR_MAX_RACH	dBm	[ ]

4.2.1.3 Performance Requirements

Correct cell selection shall be greater than [X%] with [Y%] confidence. Cell selection is correct if within [5] seconds the UE camps on the cell,.

4.2.2 Requirements for Cell Selection multicarrier 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 2	Channel 2	Channel 2
PCCPCH_Ec/Ior	dB	-12	-12	-12	-12	-12	-12
SCH_Ec/Ior	dB	-12	-12	-12	--12	-12	-12
PICH_Ec/Ior	dB	-15	-15	-15	-15	-15	-15
OCNS	dB	To Be Calculated	To Be Calculated	To Be Calculated	To Be Calculated	To Be Calculated	To Be Calculated
$\hat{I}_{or}/I_{oc}$	dB	0	-4.8	-9.5	-4.8	5.9	-9.5
I_{oc}	dBm/3.84 MHz	-60			-60		
Propagation Condition		AWGN			AWGN		
Qmin	dB	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
UE_TXPWR_MAX_RACH	dBm	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

4.2.2.3 Performance Requirements

Correct cell selection shall be greater than [X%] with [Y%] confidence. 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 in Table 4-3within [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 the UE needs for sending RRC Connection Request for Location Update message to UTRAN.

4.3.1.2 Test Parameters

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

Table 4-3:

Parameter	**Unit**	**Cell 1**		**Cell 2**		**Cell 3**		**Cell 4**		**Cell 5**		**Cell 6**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
$\hat{I}_{or}/I_{oc}$	dB	-4.8	0	0	-4.8	-9.5		-9.5		-9.5		-9.5	
I_{oc}	dBm/3.84 MHz	-60											
Propagation Condition		AWGN											
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst	dBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	dB	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	

Time T1 is X seconds and T2 is Y seconds.

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

4.3.1.3 Performance Requirements

Correct cell re-selection shall be greater than [X%] with [Y%] confidence. Cell re-selection is correct if within [5] seconds the UE re-reselects a new cell, which fulfills 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.

4.4 PLMN Selection and Re-Selection Scenario

4.5 Location Registration Scenario

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 start is defined as the time from when a report is triggered at the physical layer, and in the end of an available sufficiently large measurement slot, according to the event or periodic mechanism set to trigger the measurement report. The measurement reporting delay end is defined as the time when the UE tries to transmit the measurement report over the Uu interface.

The measurement reporting delay is defined as the time between the measurement reporting delay start and the measurement reporting delay stop.

For all possible events defined in the measurement control messages as measurement reporting criteria, the measurement reporting delay shall not exceed the time stated in the table below.

Table 5-1

TTI for DCCH carrying measurement report [ms]	Maximum measurement reporting delay [ms]
10	
20	
40	
80	

5.1.2.1.1.2.1 System Level Requirement on Measurement Reporting Delay

[This Section specifies a system level requirement on measurement reporting delay for the network scenario described; when the values in

Table 5-1 *in Section 5.1.2.2.1.2 will be specified, also the requirement described in this section will be taken into account; in this way a merge between the two sections will be possible]*

For handover purposes, the measurement reporting delay shall not exceed [5] seconds under the following network conditions: Initial serving cell at $\hat{I}_{or}$ = -70 dBm/3.84MHz, with 6 neighbours at $\hat{I}_{or}$ = -75 dBm/3.84MHz. Then the new cell is switched on at $\hat{I}_{or}$ = -60 dBm/3.84MHz, all steady signals.

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

5.1.1.2.1 Requirements

5.1.1.2.2 RF Parameters

5.1.4 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.

5.1.4.1 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 Power Management

8.1 UE Output Power Dynamics

Power Control is used to limit the interference level.

8.1.1 UE Power Control

Open loop power control is the ability of the UE transmitter to sets its output power to a specified value. For the TDD mode the reciprocity of the channel allows accurate estimation of the required open loop transmit power.

The UE open loop power control error is specified in, S25.102 "UTRA (UE) TDD; Radio Transmission and Reception".

8.2 BS Output Power Dynamics

Power control is used to limit the interference level. The transmitter uses a quality-based power control on the downlink.

8.2.1 Inner loop power control

Inner loop power control is the ability of the BS transmitter to adjust its output power in response to the UL received signal.

For inner loop correction on the Downlink Channel, the base station adjust its mean output power level in response to each valid power control bit received from the UE on the Uplink Traffic Channel. Inner Loop Control is based on SIR measurements at the UE receiver and the corresponding TPC command are generated by the UE.

8.2.1.1 Power control steps

The power control step is the step change in the DL transmitter output power in response to a TPC message from the UE. The reuirements on the Power Control Steps are specified in S25.105 "UTRA (BS) TDD; Radio Transmission and Reception".

8.2.1.2 Power control dynamic range

The power control dynamic range is the difference between the maximum and the minimum transmit output power for a specified reference condition. The requirements related to power Control Dynamic Range are specified in in S25.105 "UTRA (BS) TDD; Radio Transmission and Reception".

9 Radio Link Surveillance

10 Timing characterisitics

10.1 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’.

11 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.

All measurements in this section are defined using the 12.2kbps reference channel.

Unless explicitly stated, all measurements shall be reported within the defined requirements in 90% of the cases with 95% confidence.

[Note: all the measurement accuracy values shall be harmonised with the FDD values reported in Section 10 of TS 25.133]

11.1 Measurements Performance for UE

11.1.1 P-CCPCH RSCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[4]dB for levels below –[70]dBm; +/-[6]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Extreme Conditions** +/-[7]dB for levels below –[70]dBm; +/-[9]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Relative accuracy:** +-[2] dB for intra-frequency Valid when the minimum level > -[115] dBm, the difference in signal level < [20] dB and UTRA carrier RSSI>=-[95]dBm.

11.1.2 CPICH RSCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[6]dB for levels below –[70]dBm; +/-[8]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Extreme Conditions** +/-[9]dB for levels below –[70]dBm; +/-[11]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Relative accuracy:** +-[12] dB for intra-frequency +-[8] dB for inter-frequency Valid when the minimum level > -[115] dBm, the difference in signal level < [20] dB and UTRA carrier RSSI>=-[95]dBm.

11.1.3 RSCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[4]dB for levels below –[70]dBm; +/-[6]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Extreme Conditions** +/-[7]dB for levels below –[70]dBm; +/-[9]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Relative accuracy:** +-[2] dB for intra-frequency Valid when the minimum level > -[115] dBm, the difference in signal level < [20] dB and UTRA carrier RSSI>=-[95]dBm.

11.1.4 Timeslot ISCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[4]dB for levels below –[70]dBm; +/-[6]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Extreme Conditions** +/-[7]dB for levels below –[70]dBm; +/-[9]dB over the full range Valid for UTRA carrier RSSI >= -[95]dBm. **Relative accuracy:** +-[2] dB for intra-frequency Valid when the minimum level > -[115] dBm, the difference in signal level < [20] dB and UTRA carrier RSSI>=-[95]dBm.

11.1.5 UTRA carrier RSSI

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[4]dB for levels below –[70]dBm +/-[6]dB over the full range Valid for levels >-[95]dBm. **Extreme Conditions** +/-[7]dB for levels below –[70]dBm +/-[9]dB over the full range Valid for levels >-[95]dBm. **Relative accuracy** (between measurements on two carriers): +-[4] dB over the full range Valid when the minimum level > -[95] dBm and the difference < [20] dB.

11.1.6 GSM carrier RSSI

Requirement	According to the definition of RXLEV in GSM 05.08.

11.1.7 SIR

Requirement	

11.1.8 CPICH Ec/No

Requirement	**Absolute accuracy** (measured on one code): +/-[3]dB over the full range when UTRA carrier RSSI>= -[95]dBm and CPICH RSCP >= -[115]dBm. **Relative accuracy** (between measurements on two codes): +-[3] dB for intra-frequency +-[6] dB for inter-frequency When UTRA carrier RSSI>=-[95]dBm and CPICH RSCP >= -[115]dBm.

11.1.9 Physical channel BER

Requirement	

11.1.10 Transport channel BLER

Requirement	

11.1.11 UE transmitted power

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

11.1.12 SFN-SFN observed time difference

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

11.1.13 Observed time difference to GSM cell

Requirement	+- [20] chips.

11.2 Measurements Performance for UTRAN

11.2.1 RSCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[4]dB for levels below –70dBm; +/-[6]dB over the full range **Extreme Conditions** +/-[7]dB for levels below –70dBm; +/-[9]dB over the full range **Relative accuracy:** +-[2] dB for intra-frequency

11.2.2 Timeslot ISCP

Requirement	**Absolute accuracy:** **Normal Conditions** +/-[4]dB for levels below –70dBm; +/-[6]dB over the full range **Extreme Conditions** +/-[7]dB for levels below –70dBm; +/-[9]dB over the full range **Relative accuracy:** +-[2] dB for intra-frequency

11.2.3 RSSI

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

11.2.4 SIR

Requirement	**Absolute accuracy**: +/- [3]dB for 0<SIR<10 dB when RSSI>=-[105]dBm.

11.2.5 Physical channel BER

Requirement	

11.2.6 Transport channel BLER

Requirement	

11.2.7 Transmitted carrier power

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

11.2.8 Transmitted code power

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

11.2.9 RX Timing Deviation

Requirement	+/-[0.5] chips period

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

12 Annex A Measurement Definition (Informative)

In this Annex the definitions of those Measurements whose requirements are specified in Section 11 of this specification are reported for information. The complete list of measurements is specified in TSG RAN WG2 TS25.302 "Services Provided by Physical Layer". ". The physical layer measurements for TDD are described and defined in TSG RAN WG1 TS25.225 “Physical layer – Measurements (TDD)”.

12.1 Measurements Performance for UE

12.1.1 P-CCPCH RSCP

Definition	Received Signal Code Power, the received power on P-CCPCH of own or neighbour cell after despreading. The reference point for the RSCP is the antenna connector at the UE.

12.1.2 CPICH RSCP

Definition	Received Signal Code Power, the received power on the CPICH code after despreading. The reference point for the RSCP is the antenna connector at the UE.

12.1.3 RSCP

Definition	Received Signal Code Power, the received power on the code of a specified DPCH or PDSCH after despreading. The reference point for the RSCP is the antenna connector at the UE.

12.1.4 Timeslot ISCP

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

12.1.5 UTRA carrier RSSI

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

12.1.6 GSM carrier RSSI

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

12.1.7 SIR

Definition	Signal to Interference Ratio, defined as the RSCP of a DPCH or PDSCH divided by ISCP of the same timeslot. The reference point for the SIR is the antenna connector of the UE.

12.1.8 CPICH Ec/No

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

12.1.9 Physical channel BER

Definition	The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the data.

12.1.10 Transport channel BLER

Definition	Estimation of the transport channel block error rate (BLER). The BLER estimation shall be based on evaluating the CRC on each transport block.

12.1.11 UE transmitted power

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

12.1.12 SFN-SFN observed time difference

Definition	SFN-SFN observed time difference is the time difference of the reception times of frames from two cells (serving and target) measured in the UE and expressed in chips. It is distinguished in two types: Type 2 applies if the serving and the target cell have the same frame timing and SFN numbering. Type 1 applies in all other cases. **Type 1:** SFN-SFN observed time difference = OFF×38400+ T_m in chips, where: T_m= T_{RxSFNk} - T_{RxSFNi}, given in chip units with the range [0, 1, …, 38399] chips T_{RxSFNi}: time of start of the received frame SFN_i of the serving TDD cell i. T_{RxSFNk}: time of start of the received frame SFN_k of the target UTRA cell k after the time instant T_{RxSFNi} in the UE. If the next frame of the target UTRA cell is received exactly at T_{RxSFNi} then T_{RxSFNk}= T_{RxSFNi} (which leads to T_m=0). OFF=(SFN_k- SFN_i) mod 256, given in number of frames with the range [0, 1, …, 255] frames SFNi : system frame number for downlink frame from serving TDD cell i in the UE at the time T_{RxSFNi}. SFNk : system frame number for downlink frame from target UTRA cell k received in the UE at the time T_{RxSFNk}.(for FDD: the P-CCPCH frame) **Type 2:** SFN-SFN observed time difference = T_{RxTSk} - T_{RxTSi}, in chips, where T_{RxTSi}: time of start of a timeslot received of the serving TDD cell i. T_{RxTSk}: time of start of a timeslot received from the target UTRA cell k that is closest in time to the start of the timeslot of the serving TDD cell i.

12.1.13 Observed time difference to GSM cell

Definition	Observed time difference to GSM cell is the time difference T_m in ms, where T_m= T_{RxGSMk} - $T_{RxSFN0i}$ $T_{RxSFN0i}$: time of start of the received frame SFN=0 of the serving TDD cell i T_{RxGSMk}: time of start of the received 51-GSM-multiframe of the considered target GSM beacon frequency k which is following next after the start of frame SFN=0 of the serving TDD cell.

12.2 Measurements Performance for UTRAN

12.2.1 RSCP

Definition	Received Signal Code Power, the received power on one DPCH, PRACH or PUSCH code after despreading. The reference point for the RSCP shall be the antenna connector.

12.2.2 Timeslot ISCP

Definition	Interference Signal Code Power, the interference on the received signal in a specified timeslot after despreading. Only the non-orthogonal part of the interference is included in the measurement. The reference point for the ISCP shall be the antenna connector.

12.2.3 RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the UTRAN UL channel bandwidth in a specified timeslot. The reference point for the RSSI shall be the antenna connector.

12.2.4 SIR

Definition	Signal to Interference Ratio, defined as the RSCP of the DPCH or PUSCH divided by ISCP of the same timeslot. The reference point for the SIR shall be the antenna connector.

12.2.5 Physical channel BER

Definition	The physical channel BER is an estimation of the average bit error rate (BER) of a DPCH or PUSCH before channel decoding of the data.

12.2.6 Transport channel BLER

Definition	Estimation of the transport channel block error rate (BLER) of a DCH or USCH. The BLER estimation shall be based on evaluating the CRC on each transport block.

12.2.7 Transmitted carrier power

Definition	Transmitted carrier power, is the total transmitted power on one DL carrier from one UTRAN access point measured in a timeslot. The reference point for the UTRAN total transmitted power measurement shall be the antenna connector.

12.2.8 Transmitted code power

Definition	Transmitted Code Power, is the transmitted power on one carrier and one channelisation code in one timeslot. The reference point for the transmitted code power measurement shall be the antenna connector at the UTRAN access point cabinet.

12.2.9 RX Timing Deviation

Definition	'RX Timing Deviation' is the time difference $T_{RXdev} = T_{TS} - T_{RXpath}$ in chips, with T_{RXpath} : time of the reception in the Node B of the first significant uplink path to be used in the detection process T_{TS} : time of the beginning of the respective slot according to the Node B internal timing

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

History

Document history		
TS 25.123 v2.3.0	12 1999	The content of Tdoc R4-99844 was included except the content of Section 11 on Measurement Accuracy as agreed during the last WG4#9 meeting. The content of Tdoc R4-99968 was included in section 11; all values were reported in square brackets as agreed during the last WG4#9 meeting. The Open Item Section was deleted and it will be moved to the TR 30.504 "Workplan and Study Iems".
TS 25.123 v2.2.0	11 1999	The changes agreed during the RRM drafting session held in Helsinki on the 18TH and 19TH of November (changes described also in the RRM drafting session report Tdoc R4-99785) were included.
TS 25.123 v2.1.0	11 1999	As agreed during WG4#8 the changes proposed by the following documents were included: Tdoc R4-99706, Modified scope and structure for 25.103; Tdoc R4-99712, Updating 25.103 v2.0.0 "RF Parameters in Support of RRM; Tdoc R4-99624, Measurements for TDD based on WG1 decisions.
TS 25.123 v2.0.0	11 1999	The specification was created during WG4#8. The specification includes the part for TDD before included in TS 25.103 v2.0.0.

Editor for UMTS TS 25.123 is:

Daniele Franceschini CSELT

e-mail:daniele.franceschini@cselt.it

Phone: +39 011 228 5203

This document is written in Microsoft Word 7