TSG-RAN Meeting #7
Madrid, Spain, 13 – 15 March 2000

RP-000071

Title: **Agreed CRs to TS 25.225**

Source: **TSG-RAN WG1**

Agenda item: **6.1.3**

No.	Doc #	Spec	CR	Rev	Subject	Cat	Versio	Versio
1	R1-000124	25.225	004	1	Correction of CPICH measurements and ‘RX	F	3.1.1	3.2.0
2	R1-000227	25.225	005	2	Editorial modifications to 25.225 Measurements	D	3.1.1	3.2.0
3	R1-000403	25.225	006	1	Corrections to 25.225 Measurements for TDD	F	3.1.1	3.2.0

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Document R1-00-0124
e.g. for 3GPP use the format TP-99xxx
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25.225	CR	004r1	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source:	TSG RAN WG1		**Date:**	13.01.2000		
Subject:	Correction of CPICH measurements and 'RX Timing Deviation' range					
Work item:						

Category: *(only one category shall be marked with an X)*				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
	B	Addition of feature			Release 97	
	C	Functional modification of feature			Release 98	
	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	CPICH RSCP (5.1.2) and CPICH EC/No (5.1.8) definitions have to be aligned with FDD 25.215. A sentence was added to explain why these measurements are needed in this TDD specification. RX Timing Deviation measurement range (5.2.9) was extended to negative values to take into account negative differences of timing advance values. The upper limit of the range was reduced according to the updated timing advance range in 25.224.
Clauses affected:	Sections 5.1.2, 5.1.8, 5.2.9

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:	


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5.1.1 PCCPCH RSCP

Definition	Received Signal Code Power, the received power on PCCPCH of own or neighbour cell after despreading. The reference point for the RSCP is the antenna connector at the UE.
Applicable for	idle mode, connected mode (intra-frequency & inter-frequency)
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_LEV00: P-CCPCH_RSCP < -115dBm P-CCPCH_RSCP_LEV01: -115dBm ≤ P-CCPCH_RSCP < –114dBm P-CCPCH_RSCP_LEV02: -114dBm ≤ P-CCPCH_RSCP < –113dBm ... P-CCPCH_RSCP_LEV89: -27dBm ≤ P-CCPCH_RSCP < –26dBm P-CCPCH_RSCP_LEV90: -26dBm ≤ P-CCPCH_RSCP < –25dBm P-CCPCH_RSCP_LEV91: -25dBm ≤ P-CCPCH_RSCP

5.1.2 CPICH RSCP

Definition	Received Signal Code Power, the received power on <u>one</u> ~~the CPICH~~ code ~~after despreading~~ <u>measured on the Primary CPICH</u>. The reference point for the RSCP is the antenna connector at the UE. <u>(This measurement is used in TDD for monitoring FDD cells while camping on a TDD cell).</u>
Applicable for	idle mode, connected mode (inter-frequency)
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_LEV00: CPICH_RSCP < -115dBm CPICH_RSCP_LEV01: -115dBm ≤ CPICH_RSCP < –114dBm CPICH_RSCP_LEV02: -114dBm ≤ CPICH_RSCP < –113dBm ... CPICH_RSCP_LEV89: -27dBm ≤ CPICH_RSCP < –26dBm CPICH_RSCP_LEV90: -26dBm ≤ CPICH_RSCP < –25dBm CPICH_RSCP_LEV91: -25dBm ≤ CPICH_RSCP

5.1.3 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.
Applicable for	connected mode (intra-frequency)
Range/mapping	RSCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm. RSCP shall be reported in the unit UE_RSCP_LEV where: UE_RSCP_LEV00: RSCP < -115dBm UE_RSCP_LEV01: -115dBm ≤ RSCP < –114dBm UE_RSCP_LEV02: -114dBm ≤ RSCP < –113dBm ... UE_RSCP_LEV89: -27dBm ≤ RSCP < –26dBm UE_RSCP_LEV90: -26dBm ≤ RSCP < –25dBm UE_RSCP_LEV91: -25dBm ≤ RSCP

Applicable for	connected mode (intra-frequency)
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 SIR where: SIR_00: SIR < -11.0dB SIR_01: -11.0dB ≤ SIR < -10.5dB SIR_02: -10.5dB ≤ SIR < -10.0dB .... SIR_61: 19.0dB ≤ SIR < 19.5dB SIR_62: 19.5dB ≤ SIR < 20.0dB SIR_63: 20.0dB ≤ SIR

5.1.8 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. Measurement shall be performed on the Primary CPICH. The reference point for Ec/No is the antenna connector at the UE. (This measurement is used in TDD for monitoring FDD cells while camping on a TDD cell).
Applicable for	idle mode, connected mode (inter-frequency)
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

5.1.9 Physical channel BER

Definition	The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the data.
Applicable for	connected mode (intra-frequency)
Range/mapping	Physical channel BER is given with a logarithmic resolution of 0.065 with the range [10^-4.03 ... 1] including a separate case Physical channel BER=0. Physical channel BER shall be reported in the unit PhCH_BER_dB, where: PhCH_BER_dB_00: BER = 0 PhCH_BER_dB_01: -∞ < Log10(Physical channel BER) < -4.030 PhCH_BER_dB_02: -4.030 ≤ Log10(Physical channel BER) < -3.965 PhCH_BER_dB_03: -3.965 ≤ Log10(Physical channel BER) < -3.900 ... PhCH_BER_dB_61: -0.195 ≤ Log10(Physical channel BER) < -0.130 PhCH_BER_dB_62: -0.130 ≤ Log10(Physical channel BER) < -0.065 PhCH_BER_dB_63: -0.065 ≤ Log10(Physical channel BER) ≤ 0.000

5.1.10 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.

5.2.7 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.
Range/mapping	Transmitted carrier power is given with a resolution of 0.5dB with the range [0, ..., 50] dBm. Transmitted carrier power shall be reported in the unit UTRAN_TX_POWER, where: UTRAN_TX_POWER_000 to UTRAN_TX_POWER_015: reserved UTRAN_TX_POWER_016: 0.0dBm ≤ Transmitted carrier power < 0.5dBm UTRAN_TX_POWER_017: 0.5dBm ≤ Transmitted carrier power < 1.0dBm UTRAN_TX_POWER_018: 1.0dBm ≤ Transmitted carrier power < 1.5dBm ... UTRAN_TX_POWER_114: 49.0dBm ≤ Transmitted carrier power < 49.5dBm UTRAN_TX_POWER_115: 49.5dBm ≤ Transmitted carrier power < 50.0dBm UTRAN_TX_POWER_116: 50.0dBm ≤ Transmitted carrier power < 50.5dBm

5.2.8 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.
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

5.2.9 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
Range/mapping	RX Timing Deviation is given with a resolution of 0.25 chip with the range [-256~~0~~; 256~~5.75~~1024) chips (11~~2~~ 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~~4095~~

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

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25.225	**CR**	**005rev2**	Current Version:	3.1.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: TSG RAN WG1 **Date:** Feb. 23, 2000

Subject: Editorial modifications to 25.225 Measurements for TDD (CR005 rev2)

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	X

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change:
The following modifications are included in this CR:
- Names of the mapped measurement levels are aligned with FDD 25.215
- Resolution values for power measurements were changed from dBm to dB as already proposed in CR 003 rev1 (R1-99L43).

Clauses affected: Chapter 5

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments: CR history: CR005 rev1: R1-00-0181, CR005: R1-00-143


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4.4 Measurements for DCA

DCA is used to optimise the resource allocation by means of a channel quality criteria or traffic parameters. The DCA measurements are configured by the UTRAN. The UE reports the measurements to the UTRAN.

For DCA no measurements are performed in idle mode in the serving TDD cell.

When connecting with the initial access the UE immediately starts measuring the ISCP of time slots which are communicated on the BCH. The measurements and the preprocessing are done while the UTRAN assigns an UL channel for the UE for signalling and measurement reporting.

In connected mode the UE performs measurements according to a measurement control message from the UTRAN.

4.5 Measurements for timing advance

To update timing advance of a moving UE the UTRAN measures 'Received Timing Deviation', i.e. the time difference of the received UL transmission (PRACH, DPCH, PUSCH) in relation to its timeslot structure that means in relation to the ideal case where an UL transmission would have zero propagation delay. The measurements are reported to higher layers, where timing advance values are calculated and signalled to the UE.

5 Measurement abilities for UTRA TDD

In this chapter the physical layer measurements reported to higher layers. (this may also include UE internal measurements not reported over the air-interface) are defined.

5.1 UE measurement abilities

NOTE 1: Measurements for TDD which are specified on the Primary CCPCH (P-CCPCH) are carried out on the P-CCPCH or other physical channels with beacon function, see [6].

NOTE 2: For those channels providing beacon function [6], the received power measurements are based on the sum of the received powers for midambles $m^{(1)}$ and $m^{(2)}$.

NOTE 3: The UTRAN has to take into account the UE capabilities when specifying the timeslots to be measured in the measurement control message.

NOTE 4: The RSCP can either be measured on the data part or the midamble of a burst, since there is no power offset between both. However, in order to have a common reference, the measurement on the midamble is assumed.

NOTE 5: The line 'applicable for' indicates whether the measurement is applicable for inter-frequency and/or intra-frequency and furthermore for idle and/or connected mode.

5.1.1 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.
Applicable for	idle mode, connected mode (intra-frequency & inter-frequency)
Range/mapping	P-CCPCH RSCP is given with a resolution of 1 dB~~m~~ 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

5.1.2 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.
Applicable for	idle mode, connected mode (inter-frequency)
Range/mapping	CPICH RSCP is given with a resolution of 1 dB~~m~~ 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

5.1.3 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.
Applicable for	connected mode (intra-frequency)
Range/mapping	RSCP is given with a resolution of 1 dBm with the range [-115, ..., -25] dBm. RSCP shall be reported in the unit UE_RSCP_LEV where: UE_RSCP_LEV00: RSCP < -115dBm UE_RSCP_LEV01: -115dBm ≤ RSCP < –114dBm UE_RSCP_LEV02: -114dBm ≤ RSCP < –113dBm ... UE_RSCP_LEV89: -27dBm ≤ RSCP < –26dBm UE_RSCP_LEV90: -26dBm ≤ RSCP < –25dBm UE_RSCP_LEV91: -25dBm ≤ RSCP

5.1.4 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.
Applicable for	connected mode (intra-frequency)
Range/mapping	Timeslot ISCP is given with a resolution of 1 dB~~m~~ 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

5.1.5 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.
Applicable for	idle mode, connected mode (intra- & inter-frequency)
Range/mapping	UTRA carrier RSSI is given with a resolution of 1 dB~~m~~ 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

5.1.6 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.
Applicable for	idle mode, connected mode (inter-frequency)
Range/mapping	According to the definition of RXLEV in GSM 05.08.

5.1.7 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.
Applicable for	connected mode (intra-frequency)
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

5.1.8 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.
Applicable for	idle mode, connected mode (inter-frequency)
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

5.1.9 Physical channel BER

Definition	The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the data.
Applicable for	connected mode (intra-frequency)
Range/mapping	Physical channel BER is given with a logarithmic resolution of 0.065 with the range [10^-4.03 ... 1] including a separate case Physical channel BER=0. Physical channel BER shall be reported in the unit ~~PhCH_~~BER_LOG~~dB~~, where: ~~PhCH_~~BER_LOG~~dB~~_00: BER = 0 ~~PhCH_~~BER_LOG~~dB~~_01: -∞ < Log10(Physical channel BER) < -4.030 ~~PhCH_~~BER_LOG~~dB~~_02: -4.030 ≤ Log10(Physical channel BER) < -3.965 ~~PhCH_~~BER_LOG~~dB~~_03: -3.965 ≤ Log10(Physical channel BER) < -3.900 ... ~~PhCH_~~BER_LOG~~dB~~_61: -0.195 ≤ Log10(Physical channel BER) < -0.130 ~~PhCH_~~BER_LOG~~dB~~_62: -0.130 ≤ Log10(Physical channel BER) < -0.065 ~~PhCH_~~BER_LOG~~dB~~_63: -0.065 ≤ Log10(Physical channel BER) ≤ 0.000

5.1.10 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.
Applicable for	connected mode (intra-frequency)
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 ~~TCH_~~BLER_LOG~~dB~~, where: ~~TCH_~~BLER_LOG~~dB~~_00: BLER = 0 ~~TCH_~~BLER_LOG~~dB~~_01: -∞ < Log10(Transport channel BLER) < -4.030 ~~TCH_~~BLER_LOG~~dB~~_02: -4.030 ≤ Log10(Transport channel BLER) < -3.965 ~~TCH_~~BLER_LOG~~dB~~_03: -3.965 ≤ Log10(Transport channel BLER) < -3.900 ... ~~TCH_~~BLER_LOG~~dB~~_61: -0.195 ≤ Log10(Transport channel BLER) < -0.130 ~~TCH_~~BLER_LOG~~dB~~_62: -0.130 ≤ Log10(Transport channel BLER) < -0.065 ~~TCH_~~BLER_LOG~~dB~~_63: -0.065 ≤ Log10(Transport channel BLER) ≤ 0.000

5.1.11 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.
Applicable for	connected mode (intra-frequency).
Range/mapping	UE transmitted power is given with a resolution of 1dB~~m~~ 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

5.1.12 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.
Applicable for	idle mode, connected mode (intra-frequency)
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

5.1.13 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.
Applicable for	Idle mode, connected mode (inter-frequency)
Range/mapping	Observed time difference to GSM cell is given with a resolution of 3060ms/(13*4096) (12 bit) with the range [0, 3060) 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

5.2 UTRAN measurement abilities

NOTE 1: If the UTRAN supports multiple frequency bands then the measurements apply for each frequency band individually.

NOTE 2: The RSCP can either be measured on the data part or the midamble of a burst, since there is no power offset between both. However, in order to have a common reference, the measurement on the midamble is assumed.

5.2.1 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.
Range/mapping	RSCP is given with a resolution of 0.5 dB~~m~~ with the range [-120, ..., -80] dBm. RSCP shall be reported in the unit ~~UTRAN_~~RSCP_LEV where: ~~UTRAN_~~RSCP_LEV_00: RSCP < -120.0dBm ~~UTRAN_~~RSCP_LEV_01: -120.0dBm ≤ RSCP < –119.5dBm ~~UTRAN_~~RSCP_LEV_02: -119.5dBm ≤ RSCP < –119.0dBm ... ~~UTRAN_~~RSCP_LEV_79: -81.0dBm ≤ RSCP < –80.5dBm ~~UTRAN_~~RSCP_LEV_80: -80.5dBm ≤ RSCP < –80.0dBm ~~UTRAN_~~RSCP_LEV_81: -80.0dBm ≤ RSCP

5.2.2 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.
Range/mapping	Timeslot ISCP is given with a resolution of 0.5 dB~~m~~ 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

5.2.3 RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the UTRAN UL carrier channel bandwidth in a specified timeslot. The reference point for the RSSI shall be the antenna connector.
Range/mapping	RSSI is given with a resolution of 0.5dB~~m~~ with the range [-105, ..., -74] dBm. RSSI shall be reported in the unit RSSI_LEV, where: RSSI_LEV_00: RSSI < -105.0dBm RSSI_LEV_01: -105.0dBm ≤ RSSI < –104.5dBm RSSI_LEV_02: -104.5dBm ≤ RSSI < –104.0dBm ... RSSI_LEV_61: -75.0dBm ≤ RSSI < –74.5dBm RSSI_LEV_62: -74.5dBm ≤ RSSI < –74.0dBm RSSI_LEV_63: -74.0dBm ≤ RSSI

5.2.4 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.
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

5.2.5 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.
Range/mapping	Physical channel BER is given with a logarithmic resolution of 0.065 with the range [10^-4.03 ... 1] including a separate case Physical channel BER=0. Physical channel BER shall be reported in the unit ~~PhCH_~~BER_LOG~~dB~~, where: ~~PhCH_~~BER_LOG~~dB~~_00: BER = 0 ~~PhCH_~~BER_LOG~~dB~~_01: -∞ < Log10(Physical channel BER) < -4.030 ~~PhCH_~~BER_LOG~~dB~~_02: -4.030 ≤ Log10(Physical channel BER) < -3.965 ~~PhCH_~~BER_LOG~~dB~~_03: -3.965 ≤ Log10(Physical channel BER) < -3.900 ... ~~PhCH_~~BER_LOG~~dB~~_61: -0.195 ≤ Log10(Physical channel BER) < -0.130 ~~PhCH_~~BER_LOG~~dB~~_62: -0.130 ≤ Log10(Physical channel BER) < -0.065 ~~PhCH_~~BER_LOG~~dB~~_63: -0.065 ≤ Log10(Physical channel BER) ≤ 0.000

5.2.6 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.
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 ~~TCH_~~BLER_LOG~~dB~~, where: ~~TCH_~~BLER_LOG~~dB~~_00: BLER = 0 ~~TCH_~~BLER_LOG~~dB~~_01: -∞ < Log10(Transport channel BLER) < -4.030 ~~TCH_~~BLER_LOG~~dB~~_02: -4.030 ≤ Log10(Transport channel BLER) < -3.965 ~~TCH_~~BLER_LOG~~dB~~_03: -3.965 ≤ Log10(Transport channel BLER) < -3.900 ... ~~TCH_~~BLER_LOG~~dB~~_61: -0.195 ≤ Log10(Transport channel BLER) < -0.130 ~~TCH_~~BLER_LOG~~dB~~_62: -0.130 ≤ Log10(Transport channel BLER) < -0.065 ~~TCH_~~BLER_LOG~~dB~~_63: -0.065 ≤ Log10(Transport channel BLER) ≤ 0.000

5.2.7 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.
Range/mapping	Transmitted carrier power is given with a resolution of 0.5dB~~m~~ with the range [0, ..., 50] dBm. Transmitted carrier power shall be reported in the unit UTRAN_TX_POWER, where: UTRAN_TX_POWER_000 to UTRAN_TX_POWER_015: reserved UTRAN_TX_POWER_016: 0.0dBm ≤ Transmitted carrier power < 0.5dBm UTRAN_TX_POWER_017: 0.5dBm ≤ Transmitted carrier power < 1.0dBm UTRAN_TX_POWER_018: 1.0dBm ≤ Transmitted carrier power < 1.5dBm ... UTRAN_TX_POWER_114: 49.0dBm ≤ Transmitted carrier power < 49.5dBm UTRAN_TX_POWER_115: 49.5dBm ≤ Transmitted carrier power < 50.0dBm UTRAN_TX_POWER_116: 50.0dBm ≤ Transmitted carrier power < 50.5dBm

5.2.8 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.
Range/mapping	Transmitted code power is given with a resolution of 0.5dB~~m~~ 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

5.2.9 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
Range/mapping	RX Timing Deviation is given with a resolution of 0.25 chip with the range [0; 1024) chips (12 bit). RX Timing Deviation cell shall be reported in the unit RX_TIME_DEV, where RX_TIME_DEV: N* 0.25 chips ≤ RX Timing Deviation < (N+1)* 0.25 chips With N= 0, 1, 2, ..., 4095

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

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Madrid, Spain, 13-15 March 2000

Document *R1-00-0403*
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.225	CR	006rev1	Current Version:	3.1.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: TSG RAN WG1 **Date:** March 2, 2000

Subject: Corrections to 25.225 Measurements for TDD (CR006 rev1)

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

The following modifications are included in this CR:

- Removal of RSCP measurement in the UE (this measurement was included for SIR calculation, however it is not reported and therefore it is deleted as it is already decided for FDD on the RAN RRM ad hoc, compare also R1-00-0348).
- SIR definition (for UE and UTRAN) is now aligned with FDD (multiplication with SF)
- In the RSCP and ISCP definitions the term ‘after despreading’ is omitted to avoid misunderstandings between measurement point and reference point of the measurements (this is in line with FDD).
- The transmitted carrier power measured by the UTRAN is now defined relatively to the maximum transmission power for the cell (this was requested by RAN WG4 for FDD and is already included in 25.215 and 25.302 and is here applied for TDD).
- The SFN-SFN observed time difference definition type 1 of TDD is now aligned with the same definition in FDD (compare R1-00-0046, CR029 to 25.215).
- For ‘Observed time difference to GSM cell’ the beginning of the GSM 51-multiframe was clarified (analogous to R1-00-0042, CR 025 to 25.215).

Revision 1 of the CR adds the following corrections:

- The Physical Channel BER measurement in the UE is removed due to the discussions on the RAN RRM ad hoc (aligned with FDD proposal R1-00-0217/R1-00-0407).
- Additional to the Physical Channel BER measurement in the UTRAN a Transport Channel BER measurement in the UTRAN is introduced reducing complexity when considering BER measurement on the data part (in line with FDD proposal R1-00-0215 and LS R1-00-0401). For both BER measurements a revised mapping is applied (compare FDD proposal R1-00-0274).
- Corrections of 5.1.2 CPICH RSCP and 5.1.8 CPICH Ec/No to clarify these measurements for the case of TX diversity (analogous to FDD CR R1-00-0309).
- The range and mapping of 5.2.3 RSSI in the UTRAN is modified according to the decisions in the RAN RRM ad hoc (compare RPA-00-0040 and R1-00-0435 for FDD).
- For all places where ISCP is explained the phrase ‘only the non-orthogonal part of the interference is considered’ is replaced by ‘the interference which can’t be eliminated by the receiver’ to take into account the different receiver technologies lead to different ISCP values.

Clauses affected: Chapter 5

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

History: CR006 to 25.225 (R1-00-0318)

Handling of modifications of this CR if it affects sections modified by previous CRs:

- CR005r2 (R1-00-0227): Editorial modifications of 5.1.9 Physical Channel BER measured in the UE are obsolete since this CR here removes this measurement.
- CR005r2 (R1-00-0227): Editorial modifications of 5.2.5 Physical Channel BER measured in the UTRAN are overwritten by this CR here since this section is divided into two sections.
- CR005r2 (R1-00-0227): Editorial modifications of 5.2.3 RSSI measured in the UTRAN are overwritten by this CR here since the range and mapping was modified in this section.
- CR004r1 (R1-00-0124): Corrections of the definitions of 5.1.2 CPICH RSCP and 5.1.8 CPICH Ec/No and corrections in this CR here for the two subsections apply both together.

4.4 Measurements for DCA

DCA is used to optimise the resource allocation by means of a channel quality criteria or traffic parameters. The DCA measurements are configured by the UTRAN. The UE reports the measurements to the UTRAN.

For DCA no measurements are performed in idle mode in the serving TDD cell.

When connecting with the initial access the UE immediately starts measuring the ISCP of time slots which are communicated on the BCH. The measurements and the preprocessing are done while the UTRAN assigns an UL channel for the UE for signalling and measurement reporting.

In connected mode the UE performs measurements according to a measurement control message from the UTRAN.

4.5 Measurements for timing advance

To update timing advance of a moving UE the UTRAN measures 'Received Timing Deviation', i.e. the time difference of the received UL transmission (PRACH, DPCH, PUSCH) in relation to its timeslot structure that means in relation to the ideal case where an UL transmission would have zero propagation delay. The measurements are reported to higher layers, where timing advance values are calculated and signalled to the UE.

5 Measurement abilities for UTRA TDD

In this chapter the physical layer measurements reported to higher layers. (this may also include UE internal measurements not reported over the air-interface) are defined.

5.1 UE measurement abilities

NOTE 1: Measurements for TDD which are specified on the Primary CCPCH (P-CCPCH) are carried out on the P-CCPCH or other physical channels with beacon function, see [6].

NOTE 2: For those channels providing beacon function [6], the received power measurements are based on the sum of the received powers for midambles $m^{(1)}$ and $m^{(2)}$.

NOTE 3: The UTRAN has to take into account the UE capabilities when specifying the timeslots to be measured in the measurement control message.

NOTE 4: The RSCP can either be measured on the data part or the midamble of a burst, since there is no power offset between both. However, in order to have a common reference, the measurement on the midamble is assumed.

NOTE 5: The line 'applicable for' indicates whether the measurement is applicable for inter-frequency and/or intra-frequency and furthermore for idle and/or connected mode.

5.1.1 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.
Applicable for	idle mode, connected mode (intra-frequency & inter-frequency)
Range/mapping	P-CCPCH RSCP is given with a resolution of 1 dBm with the range [-115, ..., -25] dBm. P-CCPCH RSCP shall be reported in the unit P-CCPCH_RSCP_LEV where: P-CCPCH_RSCP_LEV00: P-CCPCH_RSCP < -115dBm P-CCPCH_RSCP_LEV01: -115dBm ≤ P-CCPCH_RSCP < –114dBm P-CCPCH_RSCP_LEV02: -114dBm ≤ P-CCPCH_RSCP < –113dBm ... P-CCPCH_RSCP_LEV89: -27dBm ≤ P-CCPCH_RSCP < –26dBm P-CCPCH_RSCP_LEV90: -26dBm ≤ P-CCPCH_RSCP < –25dBm P-CCPCH_RSCP_LEV91: -25dBm ≤ P-CCPCH_RSCP

5.1.2 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. If Tx diversity is applied on the Primary CPICH the received code power from each antenna shall be separately measured and summed together in [W] to a total received code power on the Primary CPICH.
Applicable for	idle mode, connected mode (inter-frequency)
Range/mapping	CPICH RSCP is given with a resolution of 1 dBm with the range [-115, ..., -25] dBm. CPICH RSCP shall be reported in the unit CPICH_RSCP_LEV where: CPICH_RSCP_LEV00: CPICH_RSCP < -115dBm CPICH_RSCP_LEV01: -115dBm ≤ CPICH_RSCP < –114dBm CPICH_RSCP_LEV02: -114dBm ≤ CPICH_RSCP < –113dBm ... CPICH_RSCP_LEV89: -27dBm ≤ CPICH_RSCP < –26dBm CPICH_RSCP_LEV90: -26dBm ≤ CPICH_RSCP < –25dBm CPICH_RSCP_LEV91: -25dBm ≤ CPICH_RSCP

~~5.1.3 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.~~
~~**Applicable for**~~	~~connected mode (intra-frequency)~~
~~**Range/mapping**~~	~~RSCP is given with a resolution of 1 dBm with the range [-115, ..., -25] dBm.~~ ~~RSCP shall be reported in the unit UE_RSCP_LEV where:~~ ~~UE_RSCP_LEV00: RSCP < -115dBm~~ ~~UE_RSCP_LEV01: -115dBm ≤ RSCP < -114dBm~~ ~~UE_RSCP_LEV02: -114dBm ≤ RSCP < –113dBm~~ ~~...~~ ~~UE_RSCP_LEV89: -27dBm ≤ RSCP < –26dBm~~ ~~UE_RSCP_LEV90: -26dBm ≤ RSCP < -25dBm~~ ~~UE_RSCP_LEV91: -25dBm ≤ RSCP~~

5.1.4 Timeslot ISCP

Definition	Interference Signal Code Power, the interference on the received signal in a specified timeslot ~~after despreading~~. Only thi~~s~~e ~~non-orthogonal~~ part of the interference that is not eliminated by the receiver ~~included~~ shall be included in the measurement. The reference point for the ISCP is the antenna connector at the UE.
Applicable for	Connected mode (intra-frequency)
Range/mapping	Timeslot ISCP is given with a resolution of 1 dBm with the range [-115, ..., -25] dBm. Timeslot ISCP shall be reported in the unit UE_TS_ISCP_LEV where: UE_TS_ISCP_LEV00: Timeslot_ISCP < -115dBm UE_TS_ISCP_LEV01: -115dBm ≤ Timeslot_ISCP < –114dBm UE_TS_ISCP_LEV02: -114dBm ≤ Timeslot_ISCP < –113dBm ... UE_TS_ISCP_LEV89: -27dBm ≤ Timeslot_ISCP < –26dBm UE_TS_ISCP_LEV90: -26dBm ≤ Timeslot_ISCP < –25dBm UE_TS_ISCP_LEV91: -25dBm ≤ Timeslot_ISCP

5.1.5 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.
Applicable for	idle mode, connected mode (intra- & inter-frequency)
Range/mapping	UTRA carrier RSSI is given with a resolution of 1 dBm with the range [-94, ..., -32] dBm. UTRA carrier RSSI shall be reported in the unit UTRA_carrier_RSSI_LEV where: UTRA_carrier_RSSI_LEV00: UTRA_carrier_RSSI < -94dBm UTRA_carrier_RSSI_LEV01: -94dBm ≤ UTRA_carrier_RSSI < –93dBm UTRA_carrier_RSSI_LEV02: -93dBm ≤ UTRA_carrier_RSSI < –92dBm ... UTRA_carrier_RSSI_LEV61: -34dBm ≤ UTRA_carrier_RSSI < –33dBm UTRA_carrier_RSSI_LEV62: -33dBm ≤ UTRA_carrier_RSSI < –32dBm UTRA_carrier_RSSI_LEV63: -32dBm ≤ UTRA_carrier_RSSI

5.1.6 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.
Applicable for	idle mode, connected mode (inter-frequency)
Range/mapping	According to the definition of RXLEV in GSM 05.08.

5.1.7 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.~~ Signal to Interference Ratio, defined as: (RSCP/ISCP)xSF. Where: RSCP = Received Signal Code Power, the received power on the code of a specified DPCH or PDSCH. ISCP = Interference Signal Code Power, the interference on the received signal in the same timeslot which can't be eliminated by the receiver. SF = The used spreading factor. The reference point for the SIR is the antenna connector of the UE.
Applicable for	Connected mode (intra-frequency)
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 SIR where: SIR_00: SIR < -11.0dB SIR_01: -11.0dB ≤ SIR < -10.5dB SIR_02: -10.5dB ≤ SIR < -10.0dB .... SIR_61: 19.0dB ≤ SIR < 19.5dB SIR_62: 19.5dB ≤ SIR < 20.0dB SIR_63: 20.0dB ≤ SIR

5.1.8 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. If Tx diversity is applied on the Primary CPICH the received energy per chip (Ec) from each antenna shall be separately measured and summed together in [Ws] to a total received chip energy per chip on the Primary CPICH, before calculating the Ec/No.
Applicable for	idle mode, connected mode (inter-frequency)
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

5.1.9 ~~Physical channel BER~~

~~Definition~~	~~The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the data.~~
~~Applicable for~~	~~Connected mode (intra-frequency)~~
~~Range/mapping~~	~~Physical channel BER is given with a logarithmic resolution of 0.065 with the range [10^-4.03 ... 1] including a separate case Physical channel BER=0.~~ ~~Physical channel BER shall be reported in the unit PhCH_BER_dB, where:~~ ~~PhCH_BER_dB_00: BER = 0~~ ~~PhCH_BER_dB_01: -∞ < Log10(Physical channel BER) < -4.030~~ ~~PhCH_BER_dB_02: -4.030 ≤ Log10(Physical channel BER) < -3.965~~ ~~PhCH_BER_dB_03: -3.965 ≤ Log10(Physical channel BER) < -3.900~~ ~~...~~ ~~PhCH_BER_dB_61: -0.195 ≤ Log10(Physical channel BER) < -0.130~~ ~~PhCH_BER_dB_62: -0.130 ≤ Log10(Physical channel BER) < -0.065~~ ~~PhCH_BER_dB_63: -0.065 ≤ Log10(Physical channel BER) ≤ 0.000~~

5.1.10 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.
Applicable for	Connected mode (intra-frequency)
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 TCH_BLER_dB, where: TCH_BLER_dB_00: BLER = 0 TCH_BLER_dB_01: -∞ < Log10(Transport channel BLER) < -4.030 TCH_BLER_dB_02: -4.030 ≤ Log10(Transport channel BLER) < -3.965 TCH_BLER_dB_03: -3.965 ≤ Log10(Transport channel BLER) < -3.900 ... TCH_BLER_dB_61: -0.195 ≤ Log10(Transport channel BLER) < -0.130 TCH_BLER_dB_62: -0.130 ≤ Log10(Transport channel BLER) < -0.065 TCH_BLER_dB_63: -0.065 ≤ Log10(Transport channel BLER) ≤ 0.000

5.1.11 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.
Applicable for	Connected mode (intra-frequency).
Range/mapping	UE transmitted power is given with a resolution of 1dBm 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

5.1.12 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: $T_m = T_{RxSFNkj} - T_{RxSFNik}$, 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 received most recent in time before ~~after~~ the time instant T_{RxSFNi} in the UE. If thi~~s~~e ~~next~~ frame SFN_k of the target UTRA cell is received exactly at T_{RxSFNi} then $T_{RxSFNk} = T_{RxSFNi}$ (which leads to T_m=0). OFF=(SFN_{kj} - SFN_{ik}) 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.
Applicable for	idle mode, connected mode (intra-frequency), connected mode (inter-frequency)
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

5.1.13 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 BCCH 51-multiframe of the considered target GSM frequency k received closest in time after the time $T_{RxSFN0i}$. ~~beacon frequency k which is following next after the start of frame SFN=0 of the serving TDD cell.~~ If the next GSM BCCH 51-multiframe is received exactly at $T_{RxSFN0i}$ then $T_{RxGSMk} = T_{RxSFN0i}$ (which leads to T_m=0). The beginning of the GSM BCCH 51-multiframe is defined as the beginning of the first tail bit of the frequency correction burst in the first TDMA-frame of the GSM BCCH 51-multiframe, i.e. the TDMA-frame following the IDLE-frame.
Applicable for	Idle mode, connected mode (inter-frequency)
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

5.2 UTRAN measurement abilities

NOTE 1: If the UTRAN supports multiple frequency bands then the measurements apply for each frequency band individually.

NOTE 2: The RSCP can either be measured on the data part or the midamble of a burst, since there is no power offset between both. However, in order to have a common reference, the measurement on the midamble is assumed.

5.2.1 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.
Range/mapping	RSCP is given with a resolution of 0.5 dBm with the range [-120, ..., -80] dBm. RSCP shall be reported in the unit UTRAN_RSCP_LEV where: UTRAN_RSCP_LEV00: RSCP < -120.0dBm UTRAN_RSCP_LEV01: -120.0dBm ≤ RSCP < –119.5dBm UTRAN_RSCP_LEV02: -119.5dBm ≤ RSCP < –119.0dBm ... UTRAN_RSCP_LEV79: -81.0dBm ≤ RSCP < –80.5dBm UTRAN_RSCP_LEV80: -80.5dBm ≤ RSCP < –80.0dBm UTRAN_RSCP_LEV81: -80.0dBm ≤ RSCP

5.2.2 Timeslot ISCP

Definition	Interference Signal Code Power, the interference on the received signal in a specified timeslot ~~after despreading~~. Only thi~~s~~e ~~non-orthogonal~~ part of the interference that is not eliminated by the receiver ~~included~~ shall be included in the measurement. The reference point for the ISCP shall be the antenna connector.
Range/mapping	Timeslot ISCP is given with a resolution of 0.5 dBm with the range [-120, ..., -80] dBm. Timeslot ISCP shall be reported in the unit UTRAN_TS_ISCP_LEV where: UTRAN_TS_ISCP_LEV00: Timeslot_ISCP < -120.0dBm UTRAN_TS_ISCP_LEV01: -120.0dBm ≤ Timeslot_ISCP < –119.5dBm UTRAN_TS_ISCP_LEV02: -119.5dBm ≤ Timeslot_ISCP < –119.0dBm ... UTRAN_TS_ISCP_LEV79: -81.0dBm ≤ Timeslot_ISCP < –80.5dBm UTRAN_TS_ISCP_LEV80: -80.5dBm ≤ Timeslot_ISCP < –80.0dBm UTRAN_TS_ISCP_LEV81: -80.0dBm ≤ Timeslot_ISCP

5.2.3 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.
Range/mapping	RSSI is given with a resolution of 0.1~~5~~dB~~m~~ with the range [-112~~05~~, ..., -50~~74~~] dBm. RSSI shall be reported in the unit RSSI_LEV, where: RSSI_LEV_000: RSSI < -112~~05~~.0dBm RSSI_LEV_001: -112~~05~~.0dBm ≤ RSSI < –111.9~~04.5~~dBm RSSI_LEV_002: -111.9~~04.5~~dBm ≤ RSSI < –111.8~~04.0~~dBm ... RSSI_LEV_619: -50.2~~75.0~~dBm ≤ RSSI < –50.1~~74.5~~dBm RSSI_LEV_620: -50.1~~74.5~~dBm ≤ RSSI < –50~~74~~.0dBm RSSI_LEV_62~~13~~: -50~~74~~.0dBm ≤ RSSI

5.2.4 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.~~ Signal to Interference Ratio, defined as: (RSCP/ISCP)xSF. Where: RSCP = Received Signal Code Power, the received power on the code of a specified DPCH, PRACH or PUSCH. ISCP = Interference Signal Code Power, the interference on the received signal in the same timeslot which can't be eliminated by the receiver. SF = The used spreading factor. The reference point for the SIR shall be the antenna connector.
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 SIR where: SIR_00: SIR < -11.0dB SIR_01: -11.0dB ≤ SIR < -10.5dB SIR_02: -10.5dB ≤ SIR < -10.0dB .... SIR_61: 19.0dB ≤ SIR < 19.5dB SIR_62: 19.5dB ≤ SIR < 20.0dB SIR_63: 20.0dB ≤ SIR

5.2.5 Transport channel BER

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

5.2.65 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.
Range/mapping	Physical channel BER is given with a logarithmic resolution of 0.0081256565 within the range [10^-2.06375 4.03 ... 1] includingwith twoa separate cases Physical channel BER=0 and Physical channel BER between 0 and 10^-2.06375.. Physical channel BER shall be reported in the unit PhCH_BER_LOGdB, where: PhCH_BER_LOGdB_000: Physical channel BER = 0 PhCH_BER_LOGdB_001: -∞ < Log10(Physical channel BER) < -2.063754.030 PhCH_BER_LOGdB_002: -2.063754.030 ≤ Log10(Physical channel BER) < -2.0556253.965 PhCH_BER_LOGdB_003: -2.0556253.965 ≤ Log10(Physical channel BER) < -2.04753.900 ... PhCH_BER_LOGdB_25361: -0.024375195 ≤ Log10(Physical channel BER) < -0.01625130 PhCH_BER_LOGdB_25462: -0.01625130 ≤ Log10(Physical channel BER) < -0.0081256565 PhCH_BER_LOGdB_25563: -0.0081256565 ≤ Log10(Physical channel BER) ≤ 0.000

5.2.76 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.
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 TCH_BLER_dB, where: TCH_BLER_dB_00: BLER = 0 TCH_BLER_dB_01: -∞ < Log10(Transport channel BLER) < -4.030 TCH_BLER_dB_02: -4.030 ≤ Log10(Transport channel BLER) < -3.965 TCH_BLER_dB_03: -3.965 ≤ Log10(Transport channel BLER) < -3.900 ... TCH_BLER_dB_61: -0.195 ≤ Log10(Transport channel BLER) < -0.130 TCH_BLER_dB_62: -0.130 ≤ Log10(Transport channel BLER) < -0.065 TCH_BLER_dB_63: -0.065 ≤ Log10(Transport channel BLER) ≤ 0.000

5.2.87 Transmitted carrier power

Definition	Transmitted carrier power, is the ratio between the total transmitted power on one DL carrier [W] from one UTRAN access point measured in a timeslot and the maximum transmission power [W] that is possible to use on the same carrier during the measurement period. The maximum transmission power is the configured maximum transmission power for the cell. The measurement shall be possible on any carrier transmitted from the UTRAN access point. The reference point for the ~~UTRAN total~~ transmitted carrier power measurement shall be the antenna connector. In case of Tx diversity the transmitted carrier power for each branch shall be measured.
Range/mapping	Transmitted carrier power is given with a resolution of 1%~~0.5dBm~~ with the range [0, ..., ~~5~~100] % ~~dBm~~. Transmitted carrier power shall be reported in the unit UTRAN_TX_POWER, where: UTRAN_TX_POWER_000: Transmitted carrier power = 0% ~~to UTRAN_TX_POWER_015: reserved~~ UTRAN_TX_POWER_001~~16~~: ~~0.0dBm~~0% ≤ Transmitted carrier power ≤ 1%~~< 0.5dBm~~ UTRAN_TX_POWER_002~~17~~: ~~0.5dBm~~1% ≤ Transmitted carrier power ≤ 2%~~< 1.0dBm~~ UTRAN_TX_POWER_003~~18~~: ~~1.0dBm~~2% ≤ Transmitted carrier power ≤ 3%~~< 1.5dBm~~ ... UTRAN_TX_POWER_098~~114~~: ~~49.0dBm~~97% ≤ Transmitted carrier power ≤ 98%~~< 49.5dBm~~ UTRAN_TX_POWER_099~~115~~: ~~49.5dBm~~98% ≤ Transmitted carrier power ≤ 99%~~< 50.0dBm~~ UTRAN_TX_POWER_100~~116~~: ~~50.0dBm~~99% ≤ Transmitted carrier power ≤ 100%~~< 50.5dBm~~

5.2.98 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.
Range/mapping	Transmitted code power is given with a resolution of 0.5dBm 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

5.2.109 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
Range/mapping	RX Timing Deviation is given with a resolution of 0.25 chip with the range [0; 1024) chips (12 bit). RX Timing Deviation cell shall be reported in the unit RX_TIME_DEV, where RX_TIME_DEV: N* 0.25 chips ≤ RX Timing Deviation < (N+1)* 0.25 chips With N= 0, 1, 2, ..., 4095

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