TSG-RAN Working Group 1 meeting #9
Dresden, Germany
November 30 – December 3, 1999

TSGR1#9(99)I10

Agenda item: AH 16

Source: Ericsson

Title: CR 25.215-009r02: Range and resolution for RF related measurements

Document for: Decision

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1. Introduction

This is a revised version of Tdoc R1-99k27. The ranges has been adjusted according to an agreement in a measurement drafting session held during the first day of the WG1#9-meeting with represants from Ericsson, Nortel and Siemens. The works was based on the Tdoc R1-99i75 (FDD) and Tdoc R1-99i82 (TDD) also dealing with measurement ranges and resolutions and aimed to harmonise the proposals for FDD and TDD. Together with feasablity for the measurement range also mapping to bits has been considerd. For example, if a measurement is required only a few more values than what could be fitted in a certain number of bits the range was adjusted accordingly. This applies on the measurement UTRA carrier RSSI (UE) and RSSI (UTRAN) which where adjusted to fit into 6 bits. Also the SIR was extended somewhat to fully utilise 6 bits.

The aim of this document is to define ranges for the RF related measurements in TS 25.215.

2. RF related measurements

Measurement	**Range**	**Resolution**	**Comment**
CPICH RSCP	-115 -> -25 dBm	1 dB	Upper limit: To support reasonable dense cell structures without truncating of power measurements. For example a CPICH EIRP of 42dBm and a coupling loss of 82 dB gives a received level of -40dBm. This should be enough for the relevant handover areas. Considering that the CPICH RSCP also can be used in the open loop power control for path loss calculations, higher values can be measured especially close to the base station. A maximum value of –25dBm is specified by WG4 in 25.104 at the UE antenna connector. It is therefore proposed that the CPICH RSCP should be possible to measure up to –25dBm. Lower limit: In an AWGN channel -117dBm is required to read a dedicated channel (according to WG4 simulations). To read the BCCH in a fading channel a couple of dB more is needed, some results indicated around -112dBm. It is proposed that the lower limit is set to -115dBm, 3dB before we can read the BCCH. Resolution: Half of an assumed maximum relative accuracy of 2 dB. Currently a absolute accuracy around +-4dB is discussed within WG4.

PCCPCH RSCP	-115 -> -25 dBm	1 dB	See comments for CPICH RSCP. Same upper limit for PCCPCH RSCP for consitency, although the PCCPCH will not be used for the open loop power control.
RSCP	-115 -> -25 dBm	1 dB	See comments for CPICH RSCP.
Ec/No	-24 -> 0 dB	1 dB	Upper limit: As No always is larger than Ec, 0dB will be the upper limit. Lower limit: In IS-95 a range from -20->0 is used. Using a spreading factor of 256 will give a spreading gain of 24dB, therefore a lowest level of –24dB is proposed. Resolution: Half of an assumed maximum relative accuracy of 2 dB. Note that there are no accuracy requirements defined for the Ec/No by WG4 yet.
SIR	-11 -> 20 dB	0.5 dB	Upper limit: Same as for UTRAN. Lower limit: Same as for UTRAN. Resolution: In 25.302 it is stated that the precision shall be less than the minimum DL power control step size, which is 0,5dB. Having the current discussions on measurement accuracies within WG4 in mind where absolute accuracies around +-4dB for power measurements a 0,5dB step for the SIR will be sufficient. Requires exactly 6 bits
UTRA carrier RSSI	-94 -> -32 dBm	1 dB	Upper limit: To support reasonable dense cell structures without truncating of power measurements. The level -32dB should be sufficient. It is 10dB above the maximum CPICH RSCP level. Lower limit: The UE sensitivity was specified using a 9dB noise factor. That gives a noise level in the receiver of -99dBm. To achieve reasonable accuracy a couple of dB above the noise level is needed. The lower limit of the measurement is not critical therefore a lower level of -94dBm is proposed. Resolution: Currently a absolute accuracy around +-4dB is discussed within WG4. Therefore 1dB step should be suffiecient. Note that the upper limit has been changed from –30dB to –32 dBm and the lower from –95 to –94 dBm to align to mapping to 6 bits.
UE transmitted power	-50 -> 33 dBm	1 dB	Upper: +33dBm, maximum transmitted power for UE class 1 Lower: The minimum transmitted power according to section 6.4.3.1 in TS 25.101 is currently –44 dBm but discussions are ongoing to lower that limit to –50dBm. Resolution: Currently an absolute accuracy around +-6dB is discussed within WG4. Therefore 1dB step should be suffiecient.

Table 1 UE measurements

Measurement	Range	Resolution	Comment
RSSI	-105 -> -74 dBm	0.5 dB	Upper limit: More than 30dB above the noise floor should be more than sufficient. Note that the upper limit has been changed from –70dB to –74 dBm to align to mapping to 6 bits. Lower limit: Approximately 3 dB above the thermal noise floor (-108dBm over 3,84MHz) allowing for a 3dB noise figure in Node B. As this measurement may be use for load control it is important to measure as low as possible. Resolution: As the uplink RSSI may be used for load control the relative accuracy requirement may be high on this measurement. Therefore a 0,5 dB quantisation step is assumed.
SIR	-11 -> 20 dB	0.5 dB	Upper and lower limit: The working point will something around -3 to 4 dB depending on spreading factor and power difference between DPDCH and DPCCH. The upper limit has propbably som margin to the practical upper SIR limit for normal usage. Resolution: Having the current discussions on measurement accuracies within WG4 in mind where absolute accuracies around +-4dB for power measurements a 0,5dB step for the SIR will be sufficient. Requires exactly 6 bits.
Transmitted carrier power	0 -> 50 dBm	0.5 dB	Upper limit: +50dBm, 20W basestations (43dBm) can be assumed, probably basestations with higher power will be common (like 40W=46dBm). To have som margin an upper limit of 50dBm is proposed. Lower limit: 0 dBm, the minumum power when no dedicated channels are active. A proposal is 0dBm. Resolution: Currently an absolute accuracy between +-3 and +-6 dB is discussed within WG4. Currently nothing has been stated regarding the relative accuracy, which can be estimated to be significantly better. A 0,5dB step is choosen to being able to handle a good relative accuracy.
Transmitted code power	-10 -> 46 dBm	0.5 dB	Upper limit: +46dBm, a couple of dB below the maximum total transmitted power Lower limit: -10 dBm, Assuming a minimum Tx power approx. 30dB below the maximum BTS power (section 6.4.1 in 25.104) using a 1 W basstation will give a lower limit of 0 dBm, to have some margin for future low power base stations –10 dBm is proposed. Resolution: Currently an absolute accuracy between +-3 and +-6 dB is discussed within WG4. Nothing has been stated regarding the relative accuracy which can be estimated to be significantly better. A 0,5dB step is choosen to being able to handle a good relative accuracy.

Table 2 UTRAN measurements

3GPP TSG RAN WG1 Meeting #9
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Document ????9???
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.

25.215	CR	009r02	Current Version:	3.0.0

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

For submission to:	TSG-RAN #6	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: Ericsson **Date:** 1999-12-02

Subject: Range and resolution for RF related measurements

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: Currently no ranges and resolutions are defined for RF related measurements in TS 25.215. This CR proposes ranges and resolution for RF related measurements in 25.215.

Clauses affected: 5.1 UE measurement abilities, 5.1.1 CPICH RSCP, 5.1.2 RSCP, 5.1.4 SIR, 5.1.5 UTRA carrier RSSI, 5.1.6 GSM carrier RSSI, 5.1.7 CPICH Ec/No, 5.1.10 UE transmitted power, 5.2.1 RSSI, 5.2.2 SIR, 5.2.3 Transmitted carrier power, 5.2.4 Transmitted code power

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:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.1 UE measurement abilities

The structure of the table defining a UE measurement quantity is shown below:

Column field	**Comment**
Definition	Contains the definition of the measurement.
Applicable for	States if a measurement shall be possible to perform in Idle mode and/or Connected mode. For connected mode also information of the possibility to perform the measurement on intra-frequency and/or inter-frequency are given. The following terms are used in the tables: Idle = Shall be possible to perform in idle mode Connected Intra = Shall be possible to perform in connected mode on an intra-frequency Connected Inter = Shall be possible to perform in connected mode on an inter-frequency
Range/mapping	Gives the range and mapping to bits for the measurements quantity.

5.1.1 CPICH RSCP

Definition	Received Signal Code Power, the received power on one code after de-spreading measured on the pilot bits of the CPICH. The reference point for the RSCP is the antenna connector at the UE.
Applicable for	Idle, Connected Intra, Connected Inter
Range/mapping	CPICH RSCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm. CPICH RSCP shall be reported in the unit CPICH_RSCP_LEV where: CPICH_RSCP_LEV_00: CPICH RSCP < –115 dBm CPICH_RSCP_LEV_01: -115 dBm ≤ CPICH RSCP < –114 dBm CPICH_RSCP_LEV_02: -114 dBm ≤ CPICH RSCP < –113 dBm ... CPICH_RSCP_LEV_89: -27 dBm ≤ CPICH RSCP < -26 dBm CPICH_RSCP_LEV_90: -26 dBm ≤ CPICH RSCP < -25 dBm CPICH_RSCP_LEV_91: -25 dBm ≤ CPICH RSCP

5.1.2 RSCP

Definition	Received Signal Code Power, the received power on one code after de-spreading measured on the pilot bits of the DPCCH after RL combination. The reference point for the RSCP is the antenna connector at the UE.
Applicable for	Connected Intra
Range/mapping	RSCP is given with a resolution of 1 dB with the range [-115, ..., -40] dBm. RSCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm. RSCP shall be reported in the unit RSCP_LEV where: RSCP_LEV_00: RSCP < –115 dBm RSCP_LEV_01: -115 dBm ≤ RSCP < –114 dBm RSCP_LEV_02: -114 dBm ≤ RSCP < –113 dBm ... RSCP_LEV_89: -27 dBm ≤ RSCP < -26 dBm RSCP_LEV_90: -26 dBm ≤ RSCP < -25 dBm RSCP_LEV_91: -25 dBm ≤ RSCP

5.1.3 ISCP

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

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

5.1.4 SIR

Definition	Signal to Interference Ratio, defined as the RSCP divided by ISCP. The SIR shall be measured on DPCCH after RL combination. The reference point for the SIR is the antenna connector of the UE.
Applicable for	Connected Intra
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 < –11.0 dB UE_SIR_01: -11.0 dB ≤ SIR < –10.5 dB UE_SIR_02: -10.5 dB ≤ SIR < –10.0 dB ... UE_SIR_61: 19.0 dB ≤ SIR < 19.5 dB UE_SIR_62: 19.5 dB ≤ SIR < 20.0 dB UE_SIR_63: 20.0 dB ≤ SIR

5.1.5 UTRA carrier RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Measurement shall be performed on a UTRAN downlink carrier. The reference point for the RSSI is the antenna connector at the UE.
Applicable for	Idle, Connected Intra, Connected Inter
Range/mapping	UTRA carrier RSSI is given with a resolution of 1 dB with the range [-94, ..., -32] dBm. UTRA carrier RSSI shall be reported in the unit UTRA_carrier_RSSI_LEV where: UTRA_carrier_RSSI_LEV_00: UTRA carrier RSSI < –94 dBm UTRA_carrier_RSSI_LEV_01: -94 dBm ≤ UTRA carrier RSSI < –93 dBm UTRA_carrier_RSSI_LEV_02: -93 dBm ≤ UTRA carrier RSSI < –92 dBm ... UTRA_carrier_RSSI_LEV_61: -32 dBm ≤ UTRA carrier RSSI < -33 dBm UTRA_carrier_RSSI_LEV_62: -33 dBm ≤ UTRA carrier RSSI < -32 dBm UTRA_carrier_RSSI_LEV_63: -32 dBm ≤ UTRA carrier RSSI

5.1.6 GSM carrier RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Measurement shall be performed on a GSM BCCH carrier. The reference point for the RSSI is the antenna connector at the UE.
Applicable for	Idle, Connected Inter
Range/mapping	According to the definition of RXLEV in GSM 05.08.

5.1.7 CPICH Ec/No

Definition	The received energy per chip divided by the power density in the band. The Ec/No is identical to RSCP/RSSI. Measurement shall be performed on the CPICH. The reference point for Ec/No is the antenna connector at the UE.
Applicable for	Idle, Connected Intra, Connected Inter
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 < –24 dB CPICH_Ec/No_01: -24 dB ≤ CPICH Ec/No < –23 dB CPICH_Ec/No_02: -23 dB ≤ CPICH Ec/No < –22 dB ... CPICH_Ec/No_23: -2 dB ≤ CPICH Ec/No < -1 dB CPICH_Ec/No_24: -1 dB ≤ CPICH Ec/No < 0 dB CPICH_Ec/No_25: 0 dB ≤ CPICH Ec/No

5.1.8 Transport channel BLER

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

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 DPDCH data after RL combination. At most it shall be possible to report a physical channel BER estimate at the end of each TTI for the transferred TrCh's, e.g. for TrCh's with a TTI of x ms a x ms averaged physical channel BER shall be possible to report every x ms.
Applicable for	Connected Intra
Range/mapping	

5.1.10 UE transmitted power

Definition	The total UE transmitted power on one carrier. The reference point for the UE transmitted power shall be the UE antenna connector.
Applicable for	Connected Intra
Range/mapping	UE transmitted power is given with a resolution of 1 dB with the range [-50, ..., 33] dBm. UE transmitted power shall be reported in the unit UE_TX_POWER where: UE_TX_POWER_021: -50 dBm ≤ UE transmitted power < –49 dBm UE_TX_POWER_022: -49 dBm ≤ UE transmitted power < –48 dBm UE_TX_POWER_023: -48 dBm ≤ UE transmitted power < –47 dBm ... UE_TX_POWER_102 31 dBm ≤ UE transmitted power < 32 dBm UE_TX_POWER_103: 32 dBm ≤ UE transmitted power < 33 dBm UE_TX_POWER_104: 33 dBm ≤ UE transmitted power < 34 dBm

5.1.11 CFN-SFN observed time difference

Definition	The CFN-SFN observed time difference to cell is defined as: OFF×38400+ T_m, where: T_m= T_{RxSFN} - (T_{UETx}-T_0), given in chip units with the range [0, 1, …, 38399] chips T_{UETx} is the time when the UE transmits an uplink DPCCH/DPDCH frame. T_0 is defined in TS 25.211 section 7.1.3. T_{RxSFN} is time at the beginning of the next received neighbouring P-CCPCH frame after the time instant T_{UETx}-T_0in the UE. If the next neighbouring P-CCPCH frame is received exactly at T_{UETx}-T_0 then T_{RxSFN}=T_{UETx}-T_0 (which leads to T_m=0). and OFF=(CFN_{Tx}-SFN) mod 256, given in number of frames with the range [0, 1, …, 255] frames CFN_{Tx} is the connection frame number for the UE transmission of an uplink DPCCH/DPDCH frame at the time T_{UETx}. SFN = the system frame number for the neighbouring P-CCPCH frame received in the UE at the time T_{RxSFN}.
Applicable for	Connected Inter, Connected Intra
Range/mapping	Time difference is given with the resolution of one chip with the range [0, …, 9830399] chips.

5.1.12 SFN-SFN observed time difference

Definition	**Type 1:** The SFN-SFN observed time difference to cell is defined as: OFF×38400+ T_m, where: T_m= T_{RxSFNj} - T_{RxSFNi}, given in chip units with the range [0, 1, …, 38399] chips T_{RxSFNj} is the time at the beginning of a received neighbouring P-CCPCH frame from cell j. T_{RxSFNi} is time at the beginning of the next received neighbouring P-CCPCH frame from cell i after the time instant T_{RxSFNj} in the UE. If the next neighbouring P-CCPCH frame is received exactly at T_{RxSFNj} then T_{RxSFNj}= T_{RxSFNi} (which leads to T_m=0). and OFF=(SFN_j- SFN_i) mod 256, given in number of frames with the range [0, 1, …, 255] frames SFN_j = the system frame number for downlink P-CCPCH frame from cell j in the UE at the time T_{RxSFNj}. SFN_i = the system frame number for the P-CCPCH frame from cell i received in the UE at the time T_{RxSFNi}. **Type 2:** The relative timing difference between cell j and cell i, defined as $T_{CPICHRxj}$ - $T_{CPICHRxi}$, where: $T_{CPICHRxj}$ is the time when the UE receives one CPICH slot from cell j $T_{CPICHRxi}$ is the time when the UE receives the CPICH slot from cell i that is closest in time to the CPICH slot received from cell j
Applicable for	**Type 1:** Idle, Connected Intra **Type 2:** Idle, Connected Intra, Connected Inter
Range/mapping	**Type 1:** Time difference is given with a resolution of one chip with the range [0, …, 9830399] chips. **Type 2:** Time difference is given with a resolution of 0.5 chip with the range [-1279, …, 1280] chips.

5.1.13 UE Rx-Tx time difference

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

5.1.14 PCCPCH RSCP

Definition	Received Signal Code Power, the received power on one code measured on the PCCPCH from a TDD cell. The reference point for the RSCP is the antenna connector at the UE. Note: The RSCP can either be measured on the data part or the midamble of a burst, since there is no power difference between these two parts. However, in order to have a common reference, measurement on the midamble is assumed.
Applicable for	Idle, Connected Inter
Range/mapping	PCCPCH RSCP is given with a resolution of 1 dB with the range [-115, ..., -25] dBm. PCCPCH RSCP shall be reported in the unit PCCPCH_RSCP_LEV where: PCCPCH_RSCP_LEV_00: PCCPCH RSCP < –115 dBm PCCPCH_RSCP_LEV_01: -115 dBm ≤ PCCPCH RSCP < –114 dBm PCCPCH_RSCP_LEV_02: -114 dBm ≤ PCCPCH RSCP < –113 dBm ... PCCPCH_RSCP_LEV_89: -27 dBm ≤ PCCPCH RSCP < -26 dBm PCCPCH_RSCP_LEV_90: -26 dBm ≤ PCCPCH RSCP < -25 dBm PCCPCH_RSCP_LEV_91: -25 dBm ≤ PCCPCH RSCP

5.2 UTRAN measurement abilities

The structure of the table defining a UTRAN measurement quantity is shown below:

Column field	**Comment**
Definition	Contains the definition of the measurement.
Range/mapping	Gives the range and mapping to bits for the measurements quantity.

5.2.1 RSSI

Definition	Received Signal Strength Indicator, the wide-band received power within the UTRAN uplink carrier channel bandwidth in an UTRAN access point. The reference point for the RSSI measurements shall be the antenna connector.
Range/mapping	RSSI is given with a resolution of 0.5 dB with the range [-105, ..., -74] dBm. RSSI shall be reported in the unit RSSI_LEV where: RSSI_LEV_00: RSSI < –105.0 dBm RSSI_LEV_01: -105.0 dBm ≤ RSSI < –104.5 dBm RSSI_LEV_02: -104.5 dBm ≤ RSSI < –104.0 dBm ... RSSI_LEV_61: -73.0 dBm ≤ RSSI < -73.5 dBm RSSI_LEV_62: -73.5 dBm ≤ RSSI < -74.0 dBm RSSI_LEV_63: -74.0 dBm ≤ RSSI

5.2.2 SIR

Definition	Signal to Interference Ratio, is defined as the RSCP divided by the ISCP. Measurement shall be performed on the DPCCH after RL combination in Node B. The reference point for the SIR measurements shall be the antenna connector.
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 < –11.0 dB UTRAN_SIR_01: -11.0 dB ≤ SIR < –10.5 dB UTRAN_SIR_02: -10.5 dB ≤ SIR < –10.0 dB ... UTRAN_SIR_61: 19.0 dB ≤ SIR < 19.5 dB UTRAN_SIR_62: 19.5 dB ≤ SIR < 20.0 dB UTRAN_SIR_63: 20.0 dB ≤ SIR

5.2.3 Transmitted carrier power

Definition	Transmitted carrier power, is the total transmitted power on one carrier from one UTRAN access point. Measurement shall be possible on any carrier transmitted from the UTRAN access point. The reference point for the total transmitted power measurement shall be the antenna connector. In case of Tx diversity the total transmitted power for each branch shall be measured.
Range/mapping	Transmitted carrier power is given with a resolution of 0.5 dB with the range [0, ..., 50] dBm Transmitted carrier power shall be reported in the unit UTRAN_TX_POWER where: UTRAN_TX_POWER_016: 0.0 dBm ≤ Transmitted carrier power < 0.5 dBm UTRAN_TX_POWER_017: 0.5 dBm ≤ Transmitted carrier power < 1.0 dBm UTRAN_TX_POWER_018: 1.0 dBm ≤ Transmitted carrier power < 1.5 dBm ... UTRAN_TX_POWER_114 49.0 dBm ≤ Transmitted carrier power < 49.5 dBm UTRAN_TX_POWER_115: 49.5 dBm ≤ Transmitted carrier power < 50.0 dBm UTRAN_TX_POWER_116: 50.0 dBm ≤ Transmitted carrier power < 50.5 dBm

5.2.4 Transmitted code power

Definition	Transmitted code power, is the transmitted power on one carrier, one scrambling code and one channelisation code. Measurement shall be possible on any channelisation code transmitted from the UTRAN access point. The reference point for the transmitted code power measurement shall be the antenna connector. In case of Tx diversity the transmitted code power for each branch shall be measured.
Range/mapping	Transmitted code power is given with a resolution of 0.5 dB with the range [-10, ..., 46] dBm. Transmitted code power shall be reported in the unit UTRAN_CODE_POWER where: UTRAN_CODE_POWER_010: -10.0 dBm ≤ Transmitted code power < -9.5 dBm UTRAN_CODE_POWER_011: -9.5 dBm ≤ Transmitted code power < -9.0 dBm UTRAN_CODE_POWER_012: -9.0 dBm ≤ Transmitted code power < -8.5 dBm ... UTRAN_CODE_POWER_120 45.0 dBm ≤ Transmitted code power < 45.5 dBm UTRAN_CODE_POWER_121: 45.5 dBm ≤ Transmitted code power < 46.0 dBm UTRAN_CODE_POWER_122: 46.0 dBm ≤ Transmitted code power < 46.5 dBm