3GPP TSG RAN WG1 Meeting #16
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e.g. for 3GPP use the format TP-99xxx
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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	077r1	Current Version:	3.4.0

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

For submission to:	TSG-RAN #10	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:** 2000-10-10

Subject: Clarification of reference point for UE/UTRAN 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: In 25.215 the term “antenna connector” is used to define the reference point for UE/UTRAN measurements. This CR clarifies what is meant with that term by adding a reference to the relevant WG4 specifications.

Clauses affected: 2, 5.1, 5.2

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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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.

[1] 3G TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[2] 3G TS 25.212: "Multiplexing and channel coding (FDD)".

[3] 3G TS 25.213: "Spreading and modulation (FDD)".

[4] 3G TS 25.214: "Physical layer procedures (FDD)".

[5] 3G TS 25.215: "Physical layer - Measurements (FDD)".

[6] 3G TS 25.221: "Physical channels and mapping of transport channels onto physical channels (TDD)".

[7] 3G TS 25.222: "Multiplexing and channel coding (TDD)".

[8] 3G TS 25.223: "Spreading and modulation (TDD)".

[9] 3G TS 25.224: "Physical layer procedures (TDD)".

[10] 3G TS 25.301: "Radio Interface Protocol Architecture".

[11] 3G TS 25.302: "Services provided by the Physical layer".

[12] 3G TS 25.303: "UE functions and interlayer procedures in connected mode".

[13] 3G TS 25.304: "UE procedures in idle mode".

[14] 3G TS 25.331: "RRC Protocol Specification".

[15] 3G TR 25.922: "Radio Resource Management Strategies".

[16] 3G TR 25.923: "Report on Location Services (LCS)".

[17] 3G TR 25.401: "UTRAN Overall Description".

[18] 3G TS 25.101: “UE Radio transmission and Reception (FDD)”

[19] 3G TS 25.104: “UTRA (BS) FDD; Radio transmission and Reception”

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.

The term "antenna connector of the UE" used in this sub-clause to define the reference point for the UE measurements is defined in [18].

5.1.1 CPICH RSCP

Definition	Received Signal Code Power, the received power on one code measured on the Primary CPICH. The reference point for the RSCP ~~is~~shall be the antenna connector ~~at~~of 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, Connected Intra, Connected Inter

5.1.2 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~~shall be the antenna connector ~~at~~of 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

5.1.3 SIR

Definition	Signal to Interference Ratio, defined as: (RSCP/ISCP)?(SF/2). The SIR shall be measured on DPCCH after RL combination. The reference point for the SIR ~~is~~shall be the antenna connector of the UE. where: RSCP = Received Signal Code Power, the received power on one code measured on the pilot bits. ISCP = Interference Signal Code Power, the interference on the received signal measured on the pilot bits. Only the non-orthogonal part of the interference is included in the measurement. SF=The spreading factor used.
Applicable for	Connected Intra

5.1.4 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~~shall be the antenna connector ~~at~~of the UE.
Applicable for	Idle, Connected Intra, Connected Inter

5.1.5 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~~shall be the antenna connector ~~at~~of the UE.
Applicable for	Idle, Connected Inter

5.1.6 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 the CPICH Ec/No ~~is~~shall be the antenna connector ~~at~~of 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, Connected Intra, Connected Inter

5.1.7 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

5.1.8 UE transmitted power

Definition	The total UE transmitted power on one carrier. The reference point for the UE transmitted power shall be the antenna connector of the UE ~~antenna connector~~.
Applicable for	Connected Intra

5.1.9 SFN-CFN observed time difference

Definition	The SFN-CFN observed time difference to cell is defined as: OFF?38400+ T_m, where: T_m= (T_{UETx}-T_0) - T_{RxSFN}, 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 [1]. T_{RxSFN} is the time at the beginning of the neighbouring P-CCPCH frame received most recent in time before the time instant T_{UETx}-T_0 in the UE. If the beginning of the 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=(SFN-CFN_{Tx}) 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 is the system frame number for the neighbouring P-CCPCH frame received in the UE at the time T_{RxSFN}. The reference point for the SFN-CFN observed time difference shall be the antenna connector of the UE. In case the inter-frequency measurement is done with compressed mode, the value for the parameter OFF is always reported to be 0. In case that the SFN measurement indicator indicates that the UE does not need to read cell SFN of the target neighbour cell, the value of the parameter OFF is always be set to 0.
NOTE: In Compressed mode it is not required to read cell SFN of the target neighbour cell.	
Applicable for	Connected Inter, Connected Intra

5.1.10 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 neighbouring P-CCPCH frame from cell i received most recent in time before 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_i- SFN_j) mod 256, given in number of frames with the range [0, 1, …, 255] frames SFN_j is the system frame number for downlink P-CCPCH frame from cell j in the UE at the time T_{RxSFNj}. SFN_i is the system frame number for the P-CCPCH frame from cell i received in the UE at the time T_{RxSFNi}. The reference point for the SFN-SFN observed time difference type 1 shall be the antenna connector of the UE. **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 Primary CPICH slot from cell j $T_{CPICHRxi}$ is the time when the UE receives the Primary CPICH slot from cell i that is closest in time to the Primary CPICH slot received from cell j. The reference point for the SFN-SFN observed time difference type 2 shall be the antenna connector of the UE.
Applicable for	**Type 1:** Idle, Connected Intra **Type 2:** Idle, Connected Intra, Connected Inter

5.1.11 UE Rx-Tx time difference

Definition	The difference in time between the UE uplink DPCCH/DPDCH frame transmission and the first detected path (in time), of the downlink DPCH frame from the measured radio link. The reference point for the UE Rx-Tx time difference shall be the antenna connector of the UE. Measurement shall be made for each cell included in the active set.
Applicable for	Connected Intra

5.1.12 Observed time difference to GSM cell

Definition	The Observed time difference to GSM cell is defined as: T_{RxGSMj} - T_{RxSFNi}, where: T_{RxSFNi} is the time at the beginning of the P-CCPCH frame with SFN=0 from cell i. T_{RxGSMj} is the time at the beginning of the GSM BCCH 51-multiframe from GSM frequency j received closest in time after the time T_{RxSFNi}. If the next GSM multiframe is received exactly at T_{RxSFNi} then T_{RxGSMj} =T_{RxSFNi} (which leads to T_{RxGSMj} - T_{RxSFNi} = 0). The timing measurement shall reflect the timing situation when the most recent (in time) P-CCPCH with SFN=0 was received in the UE. The reference point for the Observed time difference to GSM cell shall be the antenna connector of the UE. 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, Connected Inter

5.1.13 UE GPS Timing of Cell Frames for LCS

Definition	The timing between cell j and GPS Time Of Week. $T_{UE\text{-}GPSj}$ is defined as the time of occurrence of a specified UTRAN event according to GPS time. The specified UTRAN event is the beginning of a particular frame (identified through its SFN) in the first detected path (in time) of the cell j CPICH, where cell j is a cell within the active set.
Applicable for	Connected Intra, Connected Inter

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.

The term “antenna connector” used in this sub-clause to define the reference point for the UTRAN measurements refers to the “BS antenna connector” (test port A) as described in [19]. The term “antenna connector” refer to Rx or Tx antenna connector as described in the respective measurement definitions.

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 Rx antenna connector.

5.2.2 SIR

Definition	Signal to Interference Ratio, is defined as: (RSCP/ISCP)?SF. Measurement shall be performed on the DPCCH of a Radio Link Set. In compressed mode the SIR shall not be measured in the transmission gap. The reference point for the SIR measurements shall be the Rx antenna connector. where: RSCP = Received Signal Code Power, unbiased measurement of the received power on one code. ISCP = Interference Signal Code Power, the interference on the received signal. SF=The spreading factor used on the DPCCH.

5.2.3 SIR_{error}

Definition	$SIR_{error} = SIR - SIR_{target\_ave}$, where: SIR = the SIR measured by UTRAN, defined in section 5.2, given in dB. SIR_{target_ave} = the SIR_{target} averaged over the same time period as the SIR used in the SIR_{error} calculation. The averaging of SIR_{target} shall be made in a linear scale and SIR_{target_ave} shall be given in dB.

5.2.4 Transmitted carrier power

Definition	Transmitted carrier power, is the ratio between the total transmitted power and the maximum transmission power. Total transmission power is the mean power [W] on one carrier from one UTRAN access point. Maximum transmission power is the mean power [W] on one carrier from one UTRAN access point when transmitting at the configured maximum power for the cell. Measurement shall be possible on any carrier transmitted from the UTRAN access point. The reference point for the transmitted carrier power measurement shall be the Tx antenna connector. In case of Tx diversity the transmitted carrier power for each branch shall be measured and the maximum of the two values shall be reported to higher layers, i.e. only one value will be reported to higher layers.

5.2.5 Transmitted code power

Definition	Transmitted code power, is the transmitted power on one channelisation code on one given scrambling code on one given carrier. Measurement shall be possible on the DPCCH-field of any dedicated radio link transmitted from the UTRAN access point and shall reflect the power on the pilot bits of the DPCCH-field. When measuring the transmitted code power in compressed mode all slots shall be included in the measurement, e.g. also the slots in the transmission gap shall be included in the measurement. The reference point for the transmitted code power measurement shall be the Tx antenna connector. In case of Tx diversity the transmitted code power for each branch shall be measured and summed together in [W].

5.2.6 Transport channel BER

Definition	The transport channel BER is an estimation of the average bit error rate (BER) of the DPDCH data of a Radio Link Set. 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.

5.2.7 Physical channel BER

Definition	The Physical channel BER is an estimation of the average bit error rate (BER) on the DPCCH of a Radio Link Set. An estimate of the Physical channel BER shall be possible to be reported after the end of each TTI of any of the transferred TrCHs. The reported physical channel BER shall be an estimate of the BER averaged over the latest TTI of the respective TrCH.

5.2.8 Round trip time

Definition	Round trip time (RTT), is defined as RTT = $T_{RX} - T_{TX}$, where T_{TX} = The time of transmission of the beginning of a downlink DPCH frame to a UE. The reference point for T_{TX} shall be the Tx antenna connector. T_{RX} = The time of reception of the beginning (the first detected path, in time) of the corresponding uplink DPCCH/DPDCH frame from the UE. The reference point for T_{RX} shall be the Rx antenna connector. Measurement shall be possible on DPCH for each RL transmitted from an UTRAN access point and DPDCH/DPCCH for each RL received in the same UTRAN access point.

5.2.9 UTRAN GPS Timing of Cell Frames for LCS

Definition	The timing between cell j and GPS Time Of Week. $T_{UTRAN-GPSj}$ is defined as the time of occurrence of a specified UTRAN event according to GPS time. The specified UTRAN event is the beginning of a particular frame (identified through its SFN) in the first detected path (in time) of the cell j CPICH, where cell j is a cell within the active set.
Applicable for	Connected Intra, Connected Inter

5.2.10 PRACH/PCPCH Propagation delay

Definition	Propagation delay is defined as one-way propagation delay as measured during either PRACH or PCPCH access: PRACH : Propagation delay = $(T_{RX} - T_{TX} - 2560)/2$, where: T_{TX} = The transmission time of AICH access slot (n-2-AICH transmission timing), where 0?(n-2-AICH Transmission Timing)?14 and AICH_Transmission_Timing can have values 0 or 1. The reference point for T_{TX} shall be the Tx antenna connector. T_{RX} = The time of reception of the beginning (the first detected path, in time) of the PRACH message from the UE at PRACH access slot n. The reference point for T_{RX} shall be the Rx antenna connector. PCPCH: Propagation delay = $(T_{RX} - T_{TX} - (L_{pc\text{-}preamble}+1)*2560 - (k-1)*38400)/2$, where T_{TX} = The transmission time of CD-ICH at access slot (n-2-T_{cpch}), where 0?(n-2-T_{cpch})?14 and T_{cpch} can have values 0 or 1. The reference point for T_{TX} shall be the Tx antenna connector. T_{RX} = The time of reception of the first chip (the first detected path, in time) of the kth frame of the PCPCH message from the UE, where k ?{1, 2,…, N_Max_frames}. The reference point for T_{RX} shall be the Rx antenna connector. N_max_frames is a higher layer parameter and defines the maximum length of the PCPCH message. The PCPCH message begins at uplink access slot $(n+L_{pc\text{-}preamble}/2)$, where 0?$(n + L_{pc\text{-}preamble}/2)$?14 and where $L_{pc\text{-}preamble}$ can have values 0 or 8.