

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	<p>The Transport channel BLER shall be reported for $0 \leq \text{Transport channel BLER} \leq 1$ in the unit BLER_dB where:</p> <p>BLER_dB_00: Transport channel BLER = 0 BLER_dB_01: $-\infty < \text{Log}_{10}(\text{Transport channel BLER}) < -4.03$ BLER_dB_02: $-4.03 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -3.965$ BLER_dB_03: $-3.965 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -3.9$... BLER_dB_61: $-0.195 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -0.13$ BLER_dB_62: $-0.13 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -0.065$ BLER_dB_63: $-0.065 \leq \text{Log}_{10}(\text{Transport channel BLER}) \leq 0$</p>

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	<p>The Physical channel BER shall be reported for $0 \leq \text{Physical channel BER} \leq 1$ in the unit BER_dB where:</p> <p>BER_dB_00: Physical channel BER = 0 BER_dB_01: $-\infty < \text{Log}_{10}(\text{Physical channel BER}) < -4.03$ BER_dB_02: $-4.03 \leq \text{Log}_{10}(\text{Physical channel BER}) < -3.965$ BER_dB_03: $-3.965 \leq \text{Log}_{10}(\text{Physical channel BER}) < -3.9$... BER_dB_61: $-0.195 \leq \text{Log}_{10}(\text{Physical channel BER}) < -0.13$ BER_dB_62: $-0.13 \leq \text{Log}_{10}(\text{Physical channel BER}) < -0.065$ BER_dB_63: $-0.065 \leq \text{Log}_{10}(\text{Physical channel BER}) \leq 0$</p>

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	<p>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:</p> <p>UE_TX_POWER_021: $-50 \text{ dBm} \leq \text{UE transmitted power} < -49 \text{ dBm}$ UE_TX_POWER_022: $-49 \text{ dBm} \leq \text{UE transmitted power} < -48 \text{ dBm}$ UE_TX_POWER_023: $-48 \text{ dBm} \leq \text{UE transmitted power} < -47 \text{ dBm}$... UE_TX_POWER_102 31 dBm $\leq \text{UE transmitted power} < 32 \text{ dBm}$ UE_TX_POWER_103: $32 \text{ dBm} \leq \text{UE transmitted power} < 33 \text{ dBm}$ UE_TX_POWER_104: $33 \text{ dBm} \leq \text{UE transmitted power} < 34 \text{ dBm}$</p>

5.1.11 CFN-SFN observed time difference

Definition	<p>The CFN-SFN observed time difference to cell is defined as: $OFF \times 38400 + T_m$, where:</p> <p>$T_m = T_{RxSFN} - (T_{UETx} - T_0)$, given in chip units with the range [0, 1, ..., 38399] chips</p> <p>T_{UETx} is the time when the UE transmits an uplink DPCCH/DPDCH frame.</p> <p>T_0 is defined in TS 25.211 section 7.1.3.</p> <p>T_{RxSFN} is time at the beginning of the next received neighbouring P-CCPCH frame after the time instant $T_{UETx} - T_0$ in 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 $T_m = 0$).</p> <p>and</p> <p>$OFF = (CFN_{Tx} - SFN) \bmod 256$, given in number of frames with the range [0, 1, ..., 255] frames</p> <p>CFN_{Tx} is the connection frame number for the UE transmission of an uplink DPCCH/DPDCH frame at the time T_{UETx}.</p> <p>SFN = the system frame number for the neighbouring P-CCPCH frame received in the UE at the time T_{RxSFN}.</p> <p>In case the inter-frequency measurement is done with compressed mode, the value for the parameter OFF is always reported to be 0.</p> <p>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.</p> <p><i>Note: In Compressed mode it is not required to read cell SFN of the target neighbour cell.</i></p>
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	<p>Type 1:</p> <p>The SFN-SFN observed time difference to cell is defined as: $OFF \times 38400 + T_m$, where:</p> <p>$T_m = T_{RxSFNi} - T_{RxSFNj}$, given in chip units with the range [0, 1, ..., 38399] chips</p> <p>T_{RxSFNj} is the time at the beginning of a received neighbouring P-CCPCH frame from cell j.</p> <p>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 $T_{RxSFNi} = T_{RxSFNj}$ (which leads to $T_m = 0$).</p> <p>and</p> <p>$OFF = (SFN_j - SFN_i) \bmod 256$, given in number of frames with the range [0, 1, ..., 255] frames</p> <p>SFN_j = the system frame number for downlink P-CCPCH frame from cell j in the UE at the time T_{RxSFNj}.</p> <p>SFN_i = the system frame number for the P-CCPCH frame from cell i received in the UE at the time T_{RxSFNi}.</p> <p>Type 2:</p> <p>The relative timing difference between cell j and cell i, defined as $T_{CPICHRxj} - T_{CPICHRxi}$, where:</p> <p>$T_{CPICHRxj}$ is the time when the UE receives one Primary CPICH slot from cell j</p> <p>$T_{CPICHRxi}$ 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</p>
Applicable for	<p>Type 1: Idle, Connected Intra</p> <p>Type 2: Idle, Connected Intra, Connected Inter</p>
Range/mapping	<p>Type 1: Time difference is given with a resolution of one chip with the range [0, ..., 9830399] chips.</p> <p>Type 2: Time difference is given with a resolution of 0.25 chip with the range [-1279.75, ..., 1280] chips.</p>

5.1.13 UE Rx-Tx time difference

Definition	<p>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.</p> <p>Note: The definition of "first significant path" needs further elaboration.</p>
Applicable for	Connected Intra
Range/mapping	The UE Rx-Tx time difference is given with the resolution of 0.25 chip with the range [876, ..., 1172] chips.

5.1.14 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.
Applicable for	Idle, Connected Inter
Range/mapping	The Observed time difference to GSM cell is given with the resolution of $3060/(4096*13)$ ms with the range $[0, \dots, 3060/13 - 3060/(4096*13)]$ ms.

5.1.15 UE GPS Timing of Cell Frames for LCS

Definition	The timing between cell j and GPS Time Of Week. $T_{UE-GPSj}$ 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 significant multipath of the cell j CPICH, where cell j is a cell within the active set.
Applicable for	Connected Intra, Connected Inter
Range/mapping	The resolution of $T_{UE-GPSj}$ is $1\mu\text{s}$. The range is from 0 to 6.04×10^{11} μs .

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 $[-105, \dots, -74]$ dBm. RSSI shall be reported in the unit RSSI_LEV where: RSSI_LEV_00: $\text{RSSI} < -105.0$ dBm RSSI_LEV_01: -105.0 dBm \leq RSSI < -104.5 dBm RSSI_LEV_02: -104.5 dBm \leq RSSI < -104.0 dBm ... RSSI_LEV_61: -73.0 dBm \leq RSSI < -73.5 dBm RSSI_LEV_62: -73.5 dBm \leq RSSI < -74.0 dBm RSSI_LEV_63: -74.0 dBm \leq RSSI

5.2.2 SIR

Definition	<p>Signal to Interference Ratio, is defined as: $(RSCP/ISCP) \times SF$. 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.</p> <p>where:</p> <p>RSCP = Received Signal Code Power, the received power on one code.</p> <p>ISCP = Interference Signal Code Power, the interference on the received signal. Only the non-orthogonal part of the interference is included in the measurement.</p> <p>SF=The spreading factor used on the DPCCH.</p>
Range/mapping	<p>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:</p> <p>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</p>

5.2.3 Transmitted carrier power

Definition	<p>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.</p>
Range/mapping	<p>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:</p> <p>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</p>

5.2.4 Transmitted code power

Definition	<p>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 any DPCH transmitted from the UTRAN access point and shall reflect the power on the pilot bits of the DPCH. 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.</p>
Range/mapping	<p>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:</p> <p>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</p>

5.2.5 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. Measurement shall be possible to perform on any transport channel after RL combination in Node B. BLER estimation is only required for transport channels containing CRC.
Range/mapping	<p>The Transport channel BLER shall be reported for $0 \leq \text{Transport channel BLER} \leq 1$ in the unit BLER_dB where:</p> <p>BLER_dB_00: Transport channel BLER = 0 BLER_dB_01: $-\infty < \text{Log}_{10}(\text{Transport channel BLER}) < -4.03$ BLER_dB_02: $-4.03 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -3.965$ BLER_dB_03: $-3.965 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -3.9$... BLER_dB_61: $-0.195 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -0.13$ BLER_dB_62: $-0.13 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -0.065$ BLER_dB_63: $-0.065 \leq \text{Log}_{10}(\text{Transport channel BLER}) \leq 0$</p>

5.2.6 Physical channel BER

Definition	<p>Type 1: Measured on the DPDCH: The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the DPDCH data after RL combination in Node B.</p> <p>Type 2: Measured on the DPCCH: The Physical channel BER is an estimation of the average bit error rate (BER) on the DPCCH after RL combination in Node B.</p> <p>It shall be possible to report a physical channel BER estimate of type 1 or of type 2 or of both types 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.</p>
Range/mapping	<p>The Physical channel BER shall be reported for $0 \leq \text{Physical channel BER} \leq 1$ in the unit BER_dB where:</p> <p>BER_dB_00: Physical channel BER = 0 BER_dB_01: $-\infty < \text{Log}_{10}(\text{Physical channel BER}) < -4.03$ BER_dB_02: $-4.03 \leq \text{Log}_{10}(\text{Physical channel BER}) < -3.965$ BER_dB_03: $-3.965 \leq \text{Log}_{10}(\text{Physical channel BER}) < -3.9$... BER_dB_61: $-0.195 \leq \text{Log}_{10}(\text{Physical channel BER}) < -0.13$ BER_dB_62: $-0.13 \leq \text{Log}_{10}(\text{Physical channel BER}) < -0.065$ BER_dB_63: $-0.065 \leq \text{Log}_{10}(\text{Physical channel BER}) \leq 0$</p>