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*Technical Specification*

**Universal Mobile Telecommunications System (UMTS);**
**User Equipment (UE) radio transmission and reception (FDD)**
**(3GPP TS 25.101 version 6.5.0 Release 6)**



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# 1 Scope

The present document establishes the minimum RF characteristics of the FDD mode of UTRA for the User Equipment (UE).

# 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.
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[1] (void)

[2] ITU-R Recommendation SM.329: " Unwanted emissions in the spurious domain ".

[3] (void)

[4] 3GPP TS 25.433: "UTRAN Iub Interface NBAP Signalling".

[5] ETSI ETR 273: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties; Part 1: Uncertainties in the measurement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes".

[6] 3GPP TS 45.004: "Digital cellular telecommunications system (Phase 2+); Modulation'.

[7] 3GPP TS 25.331: 'Radio Resource Control (RRC); Protocol Specification'

[8] 3GPP TS25.214: 'Physical layer procedures (FDD)

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the following definitions apply:

**Power Spectral Density:** The units of Power Spectral Density (PSD) are extensively used in this document. PSD is a function of power versus frequency and when integrated across a given bandwidth, the function represents the mean power in such a bandwidth. When the mean power is normalised to (divided by) the chip-rate it represents the mean energy per chip. Some signals are directly defined in terms of energy per chip, (DPCH_$E_c$, $E_c$, OCNS_$E_c$ and S-CCPCH_$E_c$) and others defined in terms of PSD ($I_o$, $I_{oc}$, $I_{or}$ and $\hat{I}_{or}$). There also exist quantities that are a ratio of energy per chip to PSD (DPCH_$E_c/I_{or}$, $E_c/I_{or}$ etc.). This is the common practice of relating energy magnitudes in communication systems.
It can be seen that if both energy magnitudes in the ratio are divided by time, the ratio is converted from an energy ratio to a power ratio, which is more useful from a measurement point of view. It follows that an energy per chip of X dBm/3.84 MHz can be expressed as a mean power per chip of X dBm. Similarly, a signal PSD of Y dBm/3.84 MHz can be expressed as a signal power of Y dBm.



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**Maximum Output Power:** This s a measure of the maximum power the UE can transmit (i.e. the actual power as would be measured assuming no measurement error) in a bandwidth of at least (1+ α) times the chip rate of the radio access mode. The period of measurement shall be at least one timeslot.

**Mean power:** When applied to a W-CDMA modulated signal this is the power (transmitted or received) in a bandwidth of at least (1+ α) times the chip rate of the radio access mode. The period of measurement shall be at least one timeslot unless otherwise stated.

**Nominal Maximum Output Power:** This is the nominal power defined by the UE power class.

**RRC filtered mean power:** The mean power as measured through a root raised cosine filter with roll-off factor α and a bandwidth equal to the chip rate of the radio access mode.

NOTE 1: The RRC filtered mean power of a perfectly modulated W-CDMA signal is 0.246 dB lower than the mean power of the same signal.

NOTE 2: The roll-off factor α is defined in section 6.8.1.

**Throughput:** Number of information bits per second excluding CRC bits successfully received on HS-DSCH by a HSDPA capable UE.

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

| | |
|---|---|
| ACLR | Adjacent Channel Leakage power Ratio |
| ACS | Adjacent Channel Selectivity |
| AICH | Acquisition Indication Channel |
| BER | Bit Error Ratio |
| BLER | Block Error Ratio |
| CQI | Channel Quality Indicator |
| CW | Continuous Wave (un-modulated signal) |
| DCH | Dedicated Channel, which is mapped into Dedicated Physical Channel. |
| DL | Down Link (forward link) |
| DTX | Discontinuous Transmission |
| DPCCH | Dedicated Physical Control Channel |
| DPCH | Dedicated Physical Channel |
| $DPCH_E_c$ | Average energy per PN chip for DPCH. |
| $\frac{DPCH_E_c}{I_{or}}$ | The ratio of the transmit energy per PN chip of the DPCH to the total transmit power spectral density at the Node B antenna connector. |
| DPDCH | Dedicated Physical Data Channel |
| EIRP | Effective Isotropic Radiated Power |
| $E_c$ | Average energy per PN chip. |
| $\frac{E_c}{I_{or}}$ | The ratio of the average transmit energy per PN chip for different fields or physical channels to the total transmit power spectral density. |
| FACH | Forward Access Channel |
| FDD | Frequency Division Duplex |
| FDR | False transmit format Detection Ratio. A false Transport Format detection occurs when the receiver detects a different TF to that which was transmitted, and the decoded transport block(s) for this incorrect TF passes the CRC check(s). |
| $F_{uw}$ | Frequency of unwanted signal. This is specified in bracket in terms of an absolute frequency(s) or a frequency offset from the assigned channel frequency. |
| HARQ | Hybrid Automatic Repeat Request |
| HSDPA | High Speed Downlink Packet Access |
| HS-DSCH | High Speed Downlink Shared Channel |
| HS-PDSCH | High Speed Physical Downlink Shared Channel |
| HS-SCCH | High Speed Shared Control Channel |



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Information Data Rate
: Rate of the user information, which must be transmitted over the Air Interface. For example, output rate of the voice codec.

$\hat{I}_o$
: The total received power spectral density, including signal and interference, as measured at the UE antenna connector.

$\hat{I}_{oc}$
: The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited white noise source (simulating interference from cells, which are not defined in a test procedure) as measured at the UE antenna connector.

$I_{or}$
: The total transmit power spectral density (integrated in a bandwidth of (1+α) times the chip rate and normalized to the chip rate)of the downlink signal at the Node B antenna connector.

$\hat{I}_{or}$
: The received power spectral density (integrated in a bandwidth of (1+α) times the chip rate and normalized to the chip rate) of the downlink signal as measured at the UE antenna connector.

MER
: Message Error Ratio

Node B
: A logical node responsible for radio transmission / reception in one or more cells to/from the User Equipment. Terminates the Iub interface towards the RNC

OCNS
: Orthogonal Channel Noise Simulator, a mechanism used to simulate the users or control signals on the other orthogonal channels of a downlink link.

$OCNS_E_c$
: Average energy per PN chip for the OCNS.

$\frac{OCNS_E_c}{I_{or}}$
: The ratio of the average transmit energy per PN chip for the OCNS to the total transmit power spectral density.

P-CCPCH
: Primary Common Control Physical Channel

PCH
: Paging Channel

$P-CCPCH\frac{E_c}{I_o}$
: The ratio of the received P-CCPCH energy per chip to the total received power spectral density at the UE antenna connector.

$\frac{P-CCPCH_E_c}{I_{or}}$
: The ratio of the average transmit energy per PN chip for the P-CCPCH to the total transmit power spectral density.

P-CPICH
: Primary Common Pilot Channel

PICH
: Paging Indicator Channel

PPM
: Parts Per Million

R
: Number of information bits per second excluding CRC bits successfully received on HS-DSCH by a HSDPA capable UE.

<REFSENS>
: Reference sensitivity

<REF $\hat{I}_{or}$ >
: Reference $\hat{I}_{or}$

RACH
: Random Access Channel

SCH
: Synchronization Channel consisting of Primary and Secondary synchronization channels

$S-CCPCH$
: Secondary Common Control Physical Channel.

$S-CCPCH_E_c$
: Average energy per PN chip for S-CCPCH.

SIR
: Signal to Interference ratio

SML
: Soft Metric Location (Soft channel bit)

SSDT
: Site Selection Diversity Transmission

STTD
: Space Time Transmit Diversity

TDD
: Time Division Duplexing

TFC
: Transport Format Combination

TFCI
: Transport Format Combination Indicator

TPC
: Transmit Power Control

TSTD
: Time Switched Transmit Diversity

UE
: User Equipment

UL
: Up Link (reverse link)

UTRA
: UMTS Terrestrial Radio Access



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# 4 General

## 4.1 Relationship between Minimum Requirements and Test Requirements

The Minimum Requirements given in this specification make no allowance for measurement uncertainty. The test specification 34.121 Annex F defines Test Tolerances. These Test Tolerances are individually calculated for each test. The Test Tolerances are used to relax the Minimum Requirements in this specification to create Test Requirements.

The measurement results returned by the test system are compared – without any modification - against the Test Requirements as defined by the shared risk principle.

The Shared Risk principle is defined in ETR 273 Part 1 sub-part 2 section 6.5.

## 4.2 Power Classes

For UE power classes 1 and 2, a number of RF parameter are not specified. It is intended that these are part of a later release.

## 4.3 Control and monitoring functions

This requirement verifies that the control and monitoring functions of the UE prevent it from transmitting if no acceptable cell can be found by the UE.

### 4.3.1 Minimum requirement

The power of the UE, as measured with a thermal detector, shall not exceed -30dBm if no acceptable cell can be found by the UE.

# 5 Frequency bands and channel arrangement

## 5.1 General

The information presented in this subclause is based on a chip rate of 3.84 Mcps.

NOTE: Other chip rates may be considered in future releases.

## 5.2 Frequency bands

a) UTRA/FDD is designed to operate in the following paired bands:

**Table 5.0: UTRA FDD frequency bands**

| Operating Band | UL Frequencies UE transmit, Node B receive | DL frequencies UE receive, Node B transmit |
|---|---|---|
| I | 1920 – 1980 MHz | 2110 –2170 MHz |
| II | 1850 –1910 MHz | 1930 –1990 MHz |
| III | 1710-1785 MHz | 1805-1880 MHz |
| IV | 1710-1755 MHz | 2110-2155 MHz |
| V | 824 – 849 MHz | 869-894 MHz |
| VI | 830-840 MHz | 875-885 MHz |



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Note: Band VI specifications are developed for use in Japan. The Band VI frequency ranges in the table are subject to coming regulatory decisions.

b) Deployment in other frequency bands is not precluded

# 5.3 TX–RX frequency separation

a) UTRA/FDD is designed to operate with the following TX-RX frequency separation

**Table 5.0A: TX-RX frequency separation**

| Operating Band | TX-RX frequency separation |
|---|---|
| I | 190 MHz |
| II | 80 MHz. |
| III | 95 MHz. |
| IV | 400 MHz |
| V | 45 MHz |
| VI | 45 MHz |

b) UTRA/FDD can support both fixed and variable transmit to receive frequency separation.

c) The use of other transmit to receive frequency separations in existing or other frequency bands shall not be precluded.

# 5.4 Channel arrangement

## 5.4.1 Channel spacing

The nominal channel spacing is 5 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

## 5.4.2 Channel raster

The channel raster is 200 kHz, for all bands which means that the centre frequency must be an integer multiple of 200 kHz. In addition a number of additional centre frequencies are specified according to table 5.1A, which means that the centre frequencies for these channels are shifted 100 kHz relative to the general raster.

## 5.4.3 Channel number

The carrier frequency is designated by the UTRA Absolute Radio Frequency Channel Number (UARFCN). The UARFCN values are defined as follows:

**Table 5.1: UARFCN definition (general)**

| **UPLINK (UL)** UE transmit, Node B receive | | **DOWNLINK (DL)** UE receive, Node B transmit | |
|---|---|---|---|
| **UARFCN** | **Carrier frequency [MHz]** ($F_{UL}$) (Note 1) | **UARFCN** | **Carrier frequency [MHz]** ($F_{DL}$) (Note 2) |
| $N_u = 5 * F_{UL}$ | 0.0 MHz ≤ $F_{UL}$ ≤ 3276.6 MHz | $N_d = 5 * F_{DL}$ | 0.0 MHz ≤ $F_{DL}$ ≤ 3276.6 MHz |
| Note 1: $F_{UL}$ is the uplink frequency in MHz<br>Note 2: $F_{DL}$ is the downlink frequency in MHz | | | |



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**Table 5.1A: UARFCN definition (additional channels)**

| Band | UPLINK (UL) UE transmit, Node B receive | | DOWNLINK (DL) UE receive, Node B transmit | |
|---|---|---|---|---|
| | UARFCN | Carrier frequency [MHz] ($F_{UL}$) | UARFCN | Carrier frequency [MHz] ($F_{DL}$) |
| I | - | - | - | - |
| II | $N_u = 5 * (F_{UL} - 1850.1\ MHz)$ | 1852.5, 1857.5, 1862.5, 1867.5, 1872.5, 1877.5, 1882.5, 1887.5, 1892.5, 1897.5, 1902.5, 1907.5 | $N_d = 5 * (F_{DL} - 1850.1\ MHz)$ | 1932.5, 1937.5, 1942.5, 1947.5, 1952.5, 1957.5, 1962.5, 1967.5, 1972.5, 1977.5, 1982.5, 1987.5 |
| III | - | - | - | - |
| IV | $N_u = 5 * (F_{UL} - 1480.1\ MHz)$ | 1712.5, 1717.5, 1722.5, 1727.5, 1732.5, 1737.5 1742.5, 1747.5, 1752.5 | $N_d = 5 * (F_{DL} - 1820.1\ MHz)$ | 2112.5, 2117.5, 2122.5, 2127.5, 2132.5, 2137.5, 2142.5, 2147.5, 2152.5 |
| V | $N_u = 5 * (F_{UL} - 670.1\ MHz)$ | 826.5, 827.5, 831.5, 832.5, 837.5, 842.5 | $N_d = 5 * (F_{DL} - 670.1\ MHz)$ | 871.5, 872.5, 876.5, 877.5, 882.5, 887.5 |
| VI | $N_u = 5 * (F_{UL} - 670.1\ MHz)$ | 832.5, 837.5 | $N_d = 5 * (F_{DL} - 670.1\ MHz)$ | 877.5, 882.5 |

### 5.4.4 UARFCN

The following UARFCN range shall be supported for each paired band

**Table 5.2: UTRA Absolute Radio Frequency Channel Number**

| Band | Uplink (UL) UE transmit, Node B receive | | Downlink (DL) UE receive, Node B transmit | |
|---|---|---|---|---|
| | General | Additional | General | Additional |
| I | 9612 to 9888 | - | 10562 to 10838 | - |
| II | 9262 to 9538 | 12, 37, 62, 87, 112, 137, 162, 187, 212, 237, 262, 287 | 9662 to 9938 | 412, 437, 462, 487, 512, 537, 562, 587, 612, 637, 662, 687 |
| III | 8562 to 8913 | - | 9037 to 9388 | - |
| IV | 8562 to 8763 | 1162, 1187, 1212, 1237, 1262, 1287, 1312, 1337, 1362 | 10562 to 10763 | 1462, 1487, 1512, 1537, 1562, 1587, 1612, 1637, 1662 |
| V | 4132 to 4233 | 782, 787, 807, 812, 837, 862 | 4357 to 4458 | 1007, 1012, 1032, 1037, 1062, 1087 |
| VI | 4162 to 4188 | 812, 837 | 4387 to 4413 | 1037, 1062 |

# 6 Transmitter characteristics

## 6.1 General

Unless otherwise stated, the transmitter characteristics are specified at the antenna connector of the UE. For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed. Transmitter characteristics for UE(s) with multiple antennas/antenna connectors are FFS.

The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of the present document. It is recognised that different requirements and test methods are likely to be required for the different types of UE.



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# 6.2 Transmit power

## 6.2.1 UE maximum output power

The following Power Classes define the nominal maximum output power. The nominal power defined is the broadband transmit power of the UE, i.e. the power in a bandwidth of at least (1+α) times the chip rate of the radio access mode. The period of measurement shall be at least one timeslot.

**Table 6.1: UE Power Classes**

| Operating Band | Power Class 1 | | Power Class 2 | | Power Class 3 | | Power Class 4 | |
|---|---|---|---|---|---|---|---|---|
| | Power (dBm) | Tol (dB) | Power (dBm) | Tol (dB) | Power (dBm) | Tol (dB) | Power (dBm) | Tol (dB) |
| Band I | +33 | +1/-3 | +27 | +1/-3 | +24 | +1/-3 | +21 | +2/-2 |
| Band II | - | - | - | - | +24 | +1/-3 | +21 | +2/-2 |
| Band III | - | - | - | - | +24 | +1/-3 | +21 | +2/-2 |
| Band IV | - | - | - | - | +24 | +1/-3 | +21 | +2/-2 |
| Band V | - | - | - | - | +24 | +1/-3 | +21 | +2/-2 |
| Band VI | - | - | - | - | +24 | +1/-3 | +21 | +2/-2 |

NOTE: The tolerance allowed for the nominal maximum output power applies even for the multi-code DPDCH transmission mode.

## 6.2.2 UE maximum output power with HS-DPCCH

The applicability of this clause for UEs that support E-DCH is FFS.

For all values of $\beta_{hs}$ defined in [8] the UE maximum output powers as specified in Table 6.1a are applicable in the case when the HS-DPCCH is fully or partially transmitted during a DPCCH timeslot. In DPCCH time slots, where HS-DPCCH is not transmitted, the UE maximum output power shall fulfil the requirements specified in Table 6.1.

**Table 6.1a: UE maximum output powers with HS-DPCCH**

| Ratio of $\beta_c$ to $\beta_d$ for all values of $\beta_{hs}$ | Power Class 3 | | Power Class 4 | |
|---|---|---|---|---|
| | Power (dBm) | Tol (dB) | Power (dBm) | Tol (dB) |
| $1/15 \le \beta_c/\beta_d \le 12/15$ | +24 | +1/-3 | +21 | +2/-2 |
| $13/15 \le \beta_c/\beta_d \le 15/8$ | +23 | +2/-3 | +20 | +3/-2 |
| $15/7 \le \beta_c/\beta_d \le 15/0$ | +22 | +3/-3 | +19 | +4/-2 |

# 6.3 Frequency Error

The UE modulated carrier frequency shall be accurate to within ±0.1 PPM observed over a period of one timeslot compared to the carrier frequency received from the Node B. For the PRACH and PCPCH preambles the measurement interval is lengthened to 3904 chips (being the 4096 chip nominal preamble period less a 25 μs transient period allowance at each end of the burst). These signals will have an apparent error due to Node B frequency error and Doppler shift. In the later case, signals from the Node B must be averaged over sufficient time that errors due to noise or interference are allowed for within the above ±0.1PPM figure. The UE shall use the same frequency source for both RF frequency generation and the chip clock.

# 6.4 Output power dynamics

Power control is used to limit the interference level.



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## 6.4.1 Open loop power control

Open loop power control is the ability of the UE transmitter to sets its output power to a specific value. The open loop power control tolerance is given in Table 6.3

### 6.4.1.1 Minimum requirement

The UE open loop power is defined as the mean power in a timeslot or ON power duration, whichever is available.

**Table 6.3: Open loop power control tolerance**

| Conditions | Tolerance |
|---|---|
| Normal conditions | ± 9 dB |
| Extreme conditions | ± 12 dB |

## 6.4.2 Inner loop power control in the uplink

Inner loop power control in the Uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink.

### 6.4.2.1 Power control steps

The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE.

#### 6.4.2.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of $\Delta_{TPC}$ or $\Delta_{RP\text{-}TPC}$, in the slot immediately after the TPC_cmd can be derived

a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 6.4.

b) The transmitter average output power step due to inner loop power control shall be within the range shown in Table 6.5. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration.

The inner loop power step is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target timeslot, not including the transient duration. The transient duration is from 25µs before the slot boundary to 25µs after the slot boundary.

**Table 6.4: Transmitter power control range**

| TPC_ cmd | Transmitter power control range | | | | | |
|---|---|---|---|---|---|---|
| | 1 dB step size | | 2 dB step size | | 3 dB step size | |
| | Lower | Upper | Lower | Upper | Lower | Upper |
| + 1 | +0.5 dB | +1.5 dB | +1 dB | +3 dB | +1.5 dB | +4.5 dB |
| 0 | -0.5 dB | +0.5 dB | -0.5 dB | +0.5 dB | -0.5 dB | +0.5 dB |
| -1 | -0.5 dB | -1.5 dB | -1 dB | -3 dB | -1.5 dB | -4.5 dB |



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**Table 6.5: Transmitter aggregate power control range**

| TPC_ cmd group | Transmitter power control range after 10 equal TPC_ cmd groups | | | | Transmitter power control range after 7 equal TPC_ cmd groups | |
|---|---|---|---|---|---|---|
| | 1 dB step size | | 2 dB step size | | 3 dB step size | |
| | Lower | Upper | Lower | Upper | Lower | Upper |
| +1 | +8 dB | +12 dB | +16 dB | +24 dB | +16 dB | +26 dB |
| 0 | -1 dB | +1 dB | -1 dB | +1 dB | -1 dB | +1 dB |
| -1 | -8 dB | -12 dB | -16 dB | -24 dB | -16 dB | -26 dB |
| 0,0,0,0,+1 | +6 dB | +14 dB | N/A | N/A | N/A | N/A |
| 0,0,0,0,-1 | -6 dB | -14 dB | N/A | N/A | N/A | N/A |

The UE shall meet the above requirements for inner loop power control over the power range bounded by the Minimum output power as defined in subclause 6.4.3, and the Maximum output power supported by the UE (i.e. the actual power as would be measured assuming no measurement error). This power shall be in the range specified for the power class of the UE in subclause 6.2.1.

## 6.4.3 Minimum output power

The minimum controlled output power of the UE is when the power is set to a minimum value.

### 6.4.3.1 Minimum requirement

The minimum output power is defined as the mean power in one time slot. The minimum output power shall be less than –50 dBm.

## 6.4.4 Out-of-synchronization handling of output power

The UE shall monitor the DPCCH quality in order to detect a loss of the signal on Layer 1, as specified in TS 25.214. The thresholds $Q_{out}$ and $Q_{in}$ specify at what DPCCH quality levels the UE shall shut its power off and when it shall turn its power on respectively. The thresholds are not defined explicitly, but are defined by the conditions under which the UE shall shut its transmitter off and turn it on, as stated in this subclause.

The DPCCH quality shall be monitored in the UE and compared to the thresholds $Q_{out}$ and $Q_{in}$ for the purpose of monitoring synchronization. The threshold $Q_{out}$ should correspond to a level of DPCCH quality where no reliable detection of the TPC commands transmitted on the downlink DPCCH can be made. This can be at a TPC command error ratio level of e.g. 30%. The threshold $Q_{in}$ should correspond to a level of DPCCH quality where detection of the TPC commands transmitted on the downlink DPCCH is significantly more reliable than at $Q_{out}$. This can be at a TPC command error ratio level of e.g. 20%.

### 6.4.4.1 Minimum requirement

When the UE estimates the DPCCH quality over the last 160 ms period to be worse than a threshold $Q_{out}$, the UE shall shut its transmitter off within 40 ms. The UE shall not turn its transmitter on again until the DPCCH quality exceeds an acceptable level $Q_{in}$. When the UE estimates the DPCCH quality over the last 160 ms period to be better than a threshold $Q_{in}$, the UE shall again turn its transmitter on within 40 ms.

The UE transmitter shall be considered 'off' if the transmitted power is below the level defined in subclause 6.5.1 (Transmit off power). Otherwise the transmitter shall be considered as 'on'.

### 6.4.4.2 Test case

This subclause specifies a test case, which provides additional information for how the minimum requirement should be interpreted for the purpose of conformance testing.

The quality levels at the thresholds $Q_{out}$ and $Q_{in}$ correspond to different signal levels depending on the downlink conditions DCH parameters. For the conditions in Table 6.6, a signal with the quality at the level $Q_{out}$ can be generated by a DPCCH_Ec/Ior ratio of –25 dB, and a signal with $Q_{in}$ by a DPCCH_Ec/Ior ratio of –21 dB. The DL reference



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measurement channel (12.2) kbps specified in subclause A.3.1 and with static propagation conditions. The downlink physical channels, other than those specified in Table 6.6, are as specified in Table C.3 of Annex C.

Figure 6.1 shows an example scenario where the DPCCH_Ec/Ior ratio varies from a level where the DPCH is demodulated under normal conditions, down to a level below $Q_{out}$ where the UE shall shut its power off and then back up to a level above $Q_{in}$ where the UE shall turn the power back on.

**Table 6.6: DCH parameters for the Out-of-synch handling test case**

| Parameter | Unit | Value |
|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| $\frac{DPDCH_E_c}{I_{or}}$ | dB | See figure 6.1: Before point A -16.6<br>After point A Not defined |
| $\frac{DPCCH_E_c}{I_{or}}$ | dB | See figure 6.1 |
| Information Data Rate | kbps | 12.2 |

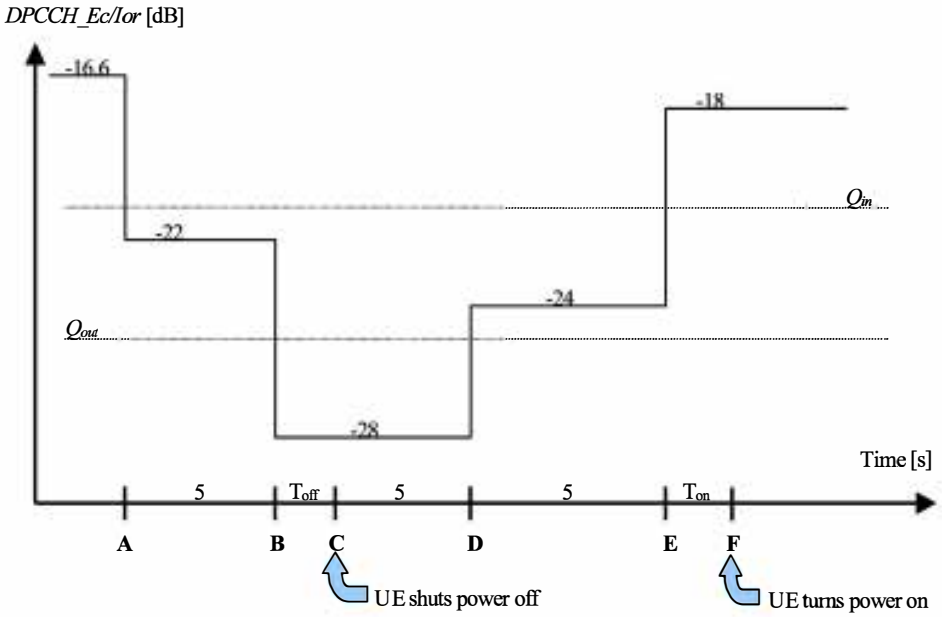



**Figure 6.1: Test case for out-of-synch handling in the UE**

In this test case, the requirements for the UE are that:

1. The UE shall not shut its transmitter off before point B.
2. The UE shall shut its transmitter off before point C, which is $T_{off}$ = 200 ms after point B.
3. The UE shall not turn its transmitter on between points C and E.
4. The UE shall turn its transmitter on before point F, which is $T_{on}$ = 200 ms after point E.



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# 6.5 Transmit ON/OFF power

## 6.5.1 Transmit OFF power

Transmit OFF power is defined as the RRC filtered mean power when the transmitter is off. The transmitter is considered to be off when the UE is not allowed to transmit. During UL compressed mode gaps, the UE is not considered to be off.

### 6.5.1.1 Minimum requirement

The transmit OFF power is defined as the RRC filtered mean power in a duration of at least one timeslot excluding any transient periods. The requirement for the transmit OFF power shall be less than –56 dBm.

## 6.5.2 Transmit ON/OFF Time mask

The time mask for transmit ON/OFF defines the transient period allowed for the UE between transmit OFF power and transmit ON power. During the transient period there are no additional requirements on UE transmit power beyond what is required in subclause 6.2 maximum output power observed over a period of at least one timeslot. ON/OFF scenarios include PRACH/PCPCH preamble bursts, the beginning or end of PRACH/PCPCH message parts and the beginning or end of UL DPCH transmissions.

### 6.5.2.1 Minimum requirement

The transmit power levels versus time shall meet the requirements in figure 6.2 for PRACH preambles and CPCH preambles, and the requirements in figure 6.3 for all other cases. The off power observation period is defined as the RRC filtered mean power in a duration of at least one timeslot excluding any transient periods. The on power observation period is defined as the mean power over one timeslot excluding any transient periods. For PRACH/PCPCH preambles, the on power observation period is 3904 chips (4096 chips less the transient periods).

The off power specification in figures 6.2 and 6.3 is as defined in 6.5.1.1.

The average on power specification in figures 6.2 and 6.3 depends on each possible case.

- First preamble of RACH/CPCH: Open loop accuracy (Table 6.3).
- During preamble ramping of the RACH/CPCH, and between final RACH/CPCH preamble and RACH/CPCH message part: Accuracy depending on size of the required power difference.(Table 6.7). The step in total transmitted power between final RACH/CPCH preamble and RACH/CPCH message (control part + data part) shall be rounded to the closest integer dB value. A power step exactly half-way between two integer values shall be rounded to the closest integer of greater magnitude.
- After transmission gaps in compressed mode: Accuracy as in Table 6.9.
- Power step to Maximum Power: Maximum power accuracy (Table 6.1).



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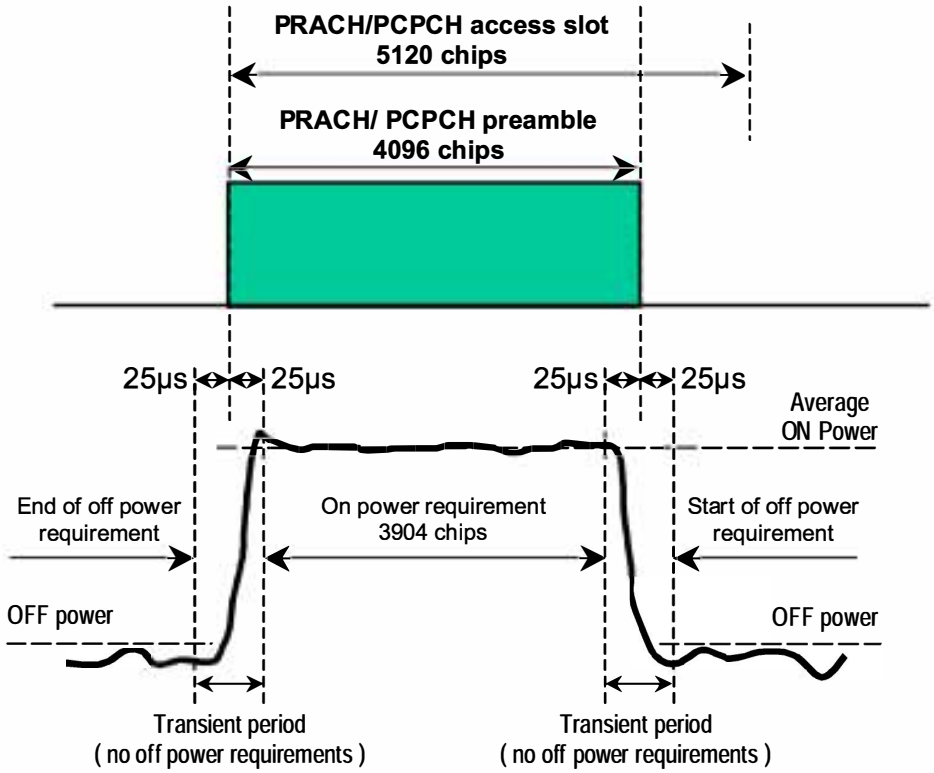



**Figure 6.2: Transmit ON/OFF template for PRACH preambles and CPCH preambles**



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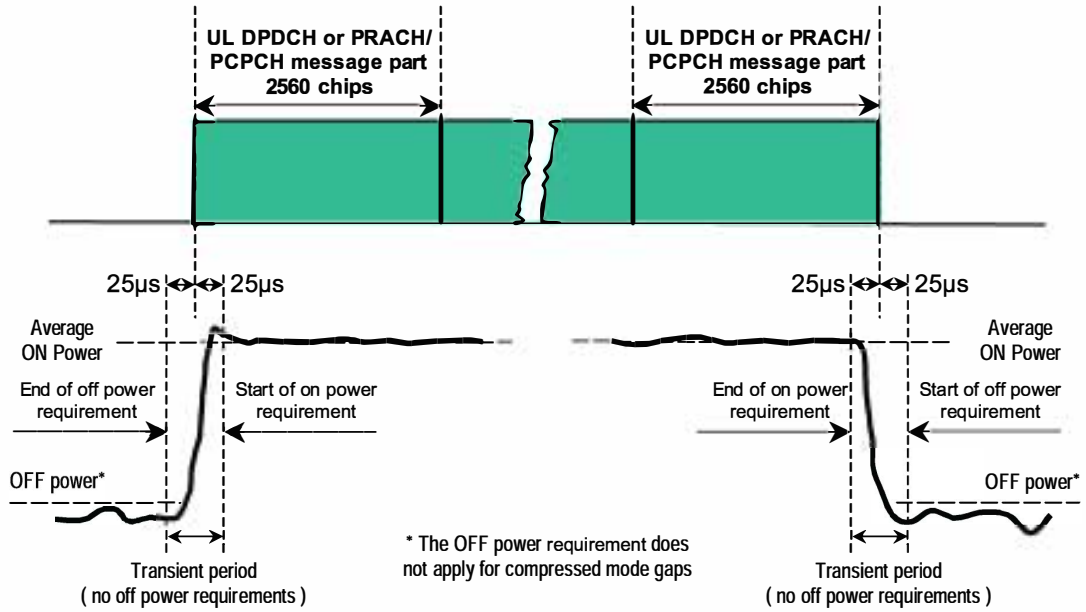



**Figure 6.3: Transmit ON/OFF template for all other On/Off cases**

**Table 6.7: Transmitter power difference tolerance for RACH/CPCH preamble ramping, and between final RACH/CPCH preamble and RACH/CPCH message part**

| Power step size (Up or down)* ΔP [dB] | Transmitter power difference tolerance [dB] |
|---|---|
| 0 | +/- 1 |
| 1 | +/- 1 |
| 2 | +/- 1.5 |
| 3 | +/- 2 |
| 4 ≤ Δ P ≤10 | +/- 2.5 |
| 11 ≤ Δ P ≤15 | +/- 3.5 |
| 16 ≤ Δ P ≤20 | +/- 4.5 |
| 21 ≤ Δ P | +/- 6.5 |

NOTE: Power step size for RACH/CPCH preamble ramping is from 1 to 8 dB with 1 dB steps.

## 6.5.3 Change of TFC

A change of TFC (Transport Format Combination) in uplink means that the power in the uplink varies according to the change in data rate. DTX, where the DPDCH is turned off, is a special case of variable data, which is used to minimise the interference between UE(s) by reducing the UE transmit power when voice, user or control information is not present.

### 6.5.3.1 Minimum requirement

A change of output power is required when the TFC, and thereby the data rate, is changed. The ratio of the amplitude between the DPDCH codes and the DPCCH code will vary. The power step due to a change in TFC shall be calculated in the UE so that the power transmitted on the DPCCH shall follow the inner loop power control. The step in total transmitted power (DPCCH + DPDCH) shall then be rounded to the closest integer dB value. A power step exactly half-way between two integer values shall be rounded to the closest integer of greater magnitude. The accuracy of the power step, given the step size, is specified in Table 6.8. The power change due to a change in TFC is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target



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timeslot, not including the transient duration. The transient duration is from 25µs before the slot boundary to 25µs after the slot boundary.

**Table 6.8: Transmitter power step tolerance**

| Power step size (Up or down) ΔP [dB] | Transmitter power step tolerance [dB] |
|---|---|
| 0 | +/- 0.5 |
| 1 | +/- 0.5 |
| 2 | +/- 1.0 |
| 3 | +/- 1.5 |
| 4 ≤ Δ P ≤10 | +/- 2.0 |
| 11 ≤ Δ P ≤15 | +/- 3.0 |
| 16 ≤ Δ P ≤20 | +/- 4.0 |
| 21 ≤ Δ P | +/- 6.0 |

The mean power of successive slots shall be calculated according to Figure 6.4.

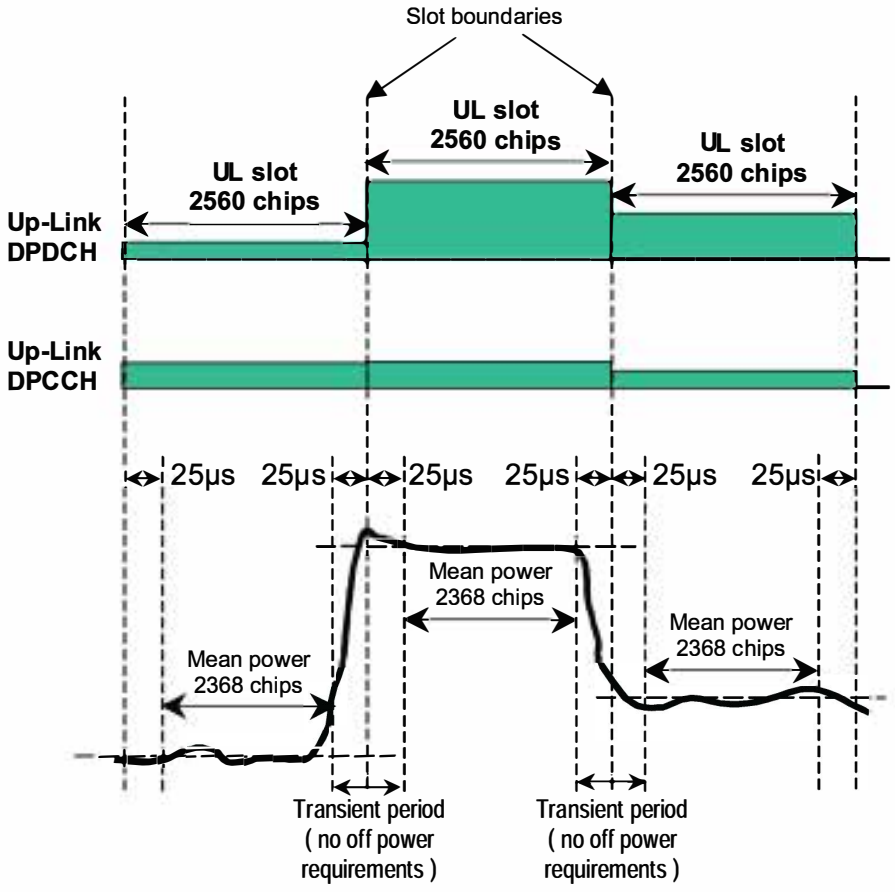



**Figure 6.4: Transmit template during TFC change**

## 6.5.4 Power setting in uplink compressed mode

Compressed mode in uplink means that the power in uplink is changed.



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### 6.5.4.1 Minimum requirement

A change of output power is required during uplink compressed frames since the transmission of data is performed in a shorter interval. The ratio of the amplitude between the DPDCH codes and the DPCCH code will also vary. The power step due to compressed mode shall be calculated in the UE so that the energy transmitted on the pilot bits during each transmitted slot shall follow the inner loop power control.

Thereby, the power during compressed mode, and immediately afterwards, shall be such that the mean power of the DPCCH follows the steps due to inner loop power control combined with additional steps of $10Log_{10}(N_{pilot.prev} / N_{pilot.curr})$ dB where $N_{pilot.prev}$ is the number of pilot bits in the previously transmitted slot, and $N_{pilot.curr}$ is the current number of pilot bits per slot.

The resulting step in total transmitted power (DPCCH +DPDCH) shall then be rounded to the closest integer dB value. A power step exactly half-way between two integer values shall be rounded to the closest integer of greatest magnitude. The accuracy of the power step, given the step size, is specified in Table 6.8 in subclause 6.5.3.1. The power step is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target timeslot, when neither the original timeslot nor the reference timeslot are in a transmission gap. The transient duration is not included, and is from 25μs before the slot boundary to 25μs after the slot boundary.

In addition to any power change due to the ratio $N_{pilot.prev} / N_{pilot.curr}$, the mean power of the DPCCH in the first slot after a compressed mode transmission gap shall differ from the mean power of the DPCCH in the last slot before the transmission gap by an amount $\Delta_{RESUME}$, where $\Delta_{RESUME}$ is calculated as described in clause 5.1.2.3 of TS 25.214.

The resulting difference in the total transmitted power (DPCCH + DPDCH) shall then be rounded to the closest integer dB value. A power difference exactly half-way between two integer values shall be rounded to the closest integer of greatest magnitude. The accuracy of the resulting difference in the total transmitted power (DPCCH + DPDCH) after a transmission gap of up to 14 slots shall be as specified in Table 6.9.

**Table 6.9: Transmitter power difference tolerance after a transmission gap of up to 14 slots**

| Power difference (Up or down) ΔP [dB] | Transmitter power step tolerance after a transmission gap [dB] |
|---|---|
| $\Delta P \leq 2$ | +/- 3 |
| 3 | +/- 3 |
| $4 \leq \Delta P \leq 10$ | +/- 3.5 |
| $11 \leq \Delta P \leq 15$ | +/- 4 |
| $16 \leq \Delta P \leq 20$ | +/- 4.5 |
| $21 \leq \Delta P$ | +/- 6.5 |

The power difference is defined as the difference between the mean power of the original (reference) timeslot before the transmission gap and the mean power of the target timeslot after the transmission gap, not including the transient durations. The transient durations at the start and end of the transmission gaps are each from 25μs before the slot boundary to 25μs after the slot boundary.

The mean power of successive slots shall be calculated according to figure 6.5.



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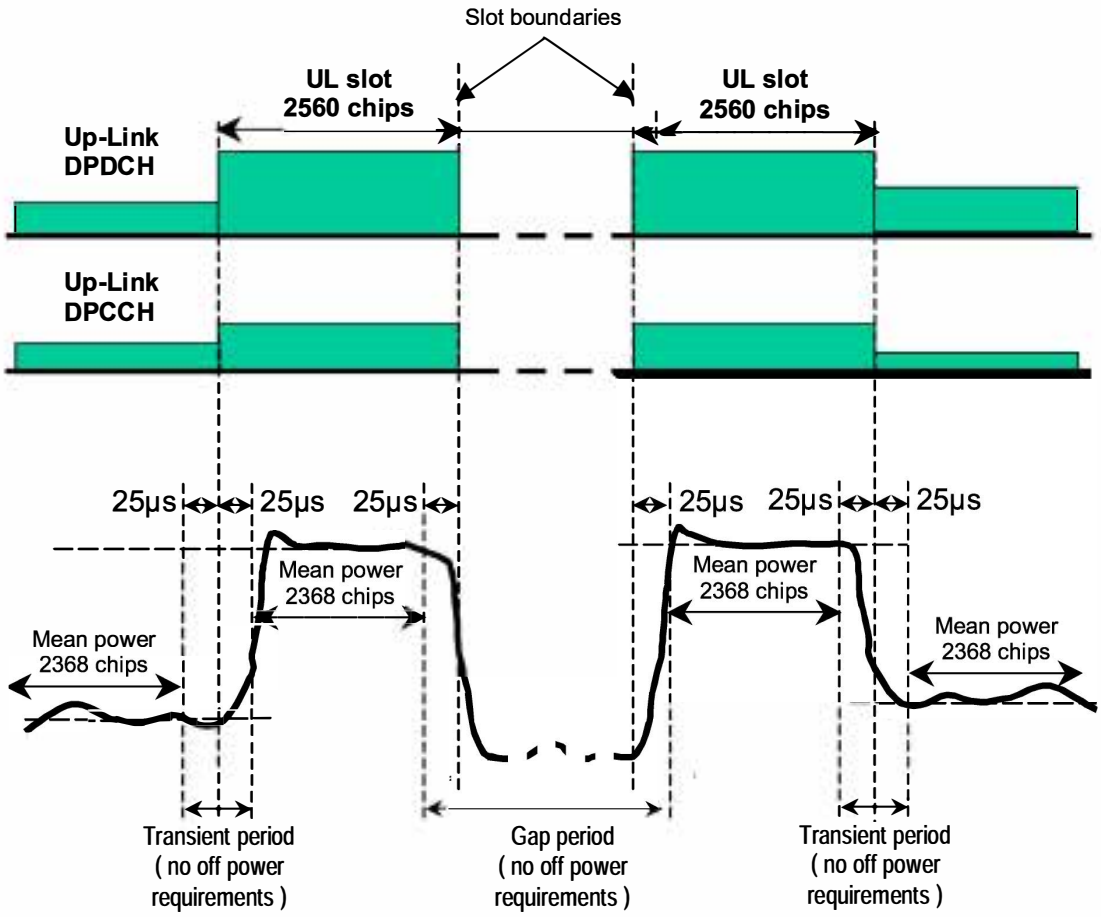



**Figure 6.5: Transmit template during Compressed mode**

## 6.5.5 HS-DPCCH

The transmission of Ack/Nack or CQI over HS-DPCCH causes the transmission power in the uplink to vary.

### 6.5.5.1 Minimum requirement

A change of output power is required when Ack/Nack or CQI is transmitted. The ratio of the amplitude between the DPCCH and the Ack/Nack and CQI respectively is signalled by the higher layers. The sum power on DPCCH+DPDCH shall not change by the transmission of Ack/Nack and CQI unless UE output power when Ack/Nack or CQI is transmitted would exceed the maximum value specified in Table 6.1a whereupon the UE shall apply additional scaling to the total transmit power as defined in section 5.1.2.6 of TS.25.214. The sum in total transmitted power (DPCCH + DPDCH+HS-DPCCH) shall then be rounded to the closest integer dB value. A power step exactly half-way between two integer values shall be rounded to the closest integer of greater magnitude. The accuracy of the power step, given the step size, is specified in Table 6.9A. The power change due to transmission of Ack/Nack or CQI is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target timeslot, not including the transient duration. The transient duration is from 25µs before the HS-DPCCH slot boundary to 25µs after the HS-DPCCH slot boundary.



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**Table 6.9A: Transmitter power step tolerance**

| Power step size (Up or down) ΔP [dB] | Transmitter power step tolerance [dB] |
|---|---|
| 0 | +/- 0.5 |
| 1 | +/- 0.5 |
| 2 | +/- 1.0 |
| 3 | +/- 1.5 |
| 4 ≤ Δ P ≤ 7 | +/- 2.0 |

The transmit power levels versus time shall meet the mask specified in Figure 6.x.

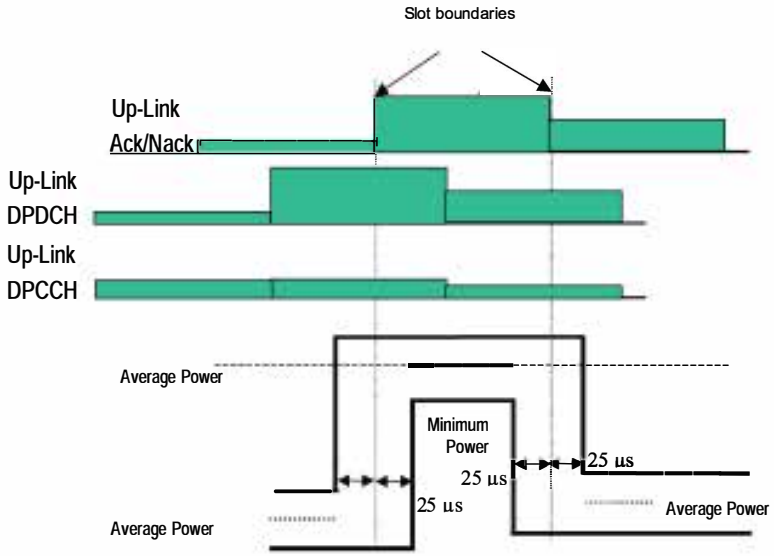



**Figure 6.5A: Transmit template during Ack/Nack transmission**



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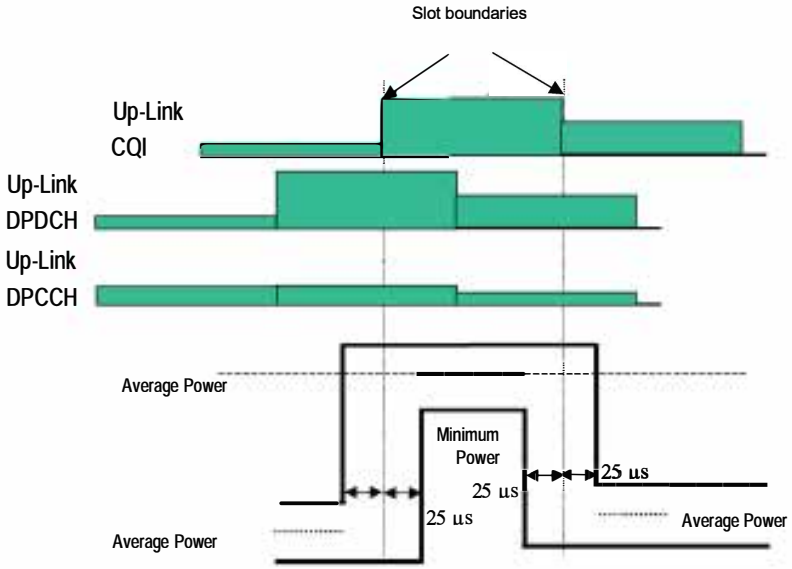



**Figure 6.5B: Transmit template during CQI transmission**

# 6.6 Output RF spectrum emissions

## 6.6.1 Occupied bandwidth

Occupied bandwidth is a measure of the bandwidth containing 99 % of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency. The occupied channel bandwidth shall be less than 5 MHz based on a chip rate of 3.84 Mcps.

## 6.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and Adjacent Channel Leakage power Ratio.

### 6.6.2.1 Spectrum emission mask

The spectrum emission mask of the UE applies to frequencies, which are between 2.5 MHz and 12.5 MHz away from the UE centre carrier frequency. The out of channel emission is specified relative to the RRC filtered mean power of the UE carrier.

#### 6.6.2.1.1 Minimum requirement

The power of any UE emission shall not exceed the levels specified in Table 6.10. The absolute requirement is based on a –50 dBm/3.84 MHz minimum power threshold for the UE. This limit is expressed for the narrower measurement bandwidths as –55.8 dBm/1 MHz and –71.1 dBm/30 kHz. The requirements are applicable for all values of $\beta_c$ , $\beta_d$ and $\beta_{hs}$ as specified in [8].



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**Table 6.10: Spectrum Emission Mask Requirement**

| Δf in MHz (Note 1) | Minimum requirement (Note 2) Band I, II, III, IV, V, VI | | Additional requirements Band II, Band IV and Band V (Note 3) | Measurement bandwidth (Note 6) |
|---|---|---|---|---|
| | Relative requirement | Absolute requirement | | |
| 2.5 - 3.5 | $\left\{-35-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}dBc$ | -71.1 dBm | -15 dBm | 30 kHz (Note 4) |
| 3.5 - 7.5 | $\left\{-35-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}dBc$ | -55.8 dBm | -13 dBm | 1 MHz (Note 5) |
| 7.5 - 8.5 | $\left\{-39-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}dBc$ | -55.8 dBm | -13 dBm | 1 MHz (Note 5) |
| 8.5 - 12.5 MHz | -49 dBc | -55.8 dBm | -13 dBm | 1 MHz (Note 5) |

Note 1: Δf is the separation between the carrier frequency and the centre of the measurement bandwidth.
Note 2: The minimum requirement for bands I, II, III, IV, V & VI is calculated from the relative requirement or the absolute requirement, whichever is the higher power.
Note 3: For operation in Band II, Band IV and Band V only, the minimum requirement is calculated from the minimum requirement calculated in Note 2 or the additional requirement for band II, whichever is the lower power.
Note 4: The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz.
Note 5: The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz.
Note 6: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

### 6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the RRC filtered mean power centered on the assigned channel frequency to the RRC filtered mean power centered on an adjacent channel frequency.

#### 6.6.2.2.1 Minimum requirement

If the adjacent channel power is greater than –50dBm then the ACLR shall be higher than the value specified in Table 6.11. The requirements are applicable for all values of $\beta_c$, $\beta_d$ and $\beta_{hs}$ as specified in [8].

**Table 6.11: UE ACLR**

| Power Class | Adjacent channel frequency relative to assigned channel frequency | ACLR limit |
|---|---|---|
| 3 | + 5 MHz or – 5 MHz | 33 dB |
| 3 | + 10 MHz or – 10 MHz | 43 dB |
| 4 | + 5 MHz or – 5 MHz | 33 dB |
| 4 | + 10 MHz or –10 MHz | 43 dB |

NOTE 1: The requirement shall still be met in the presence of switching transients.

NOTE 2: The ACLR requirements reflect what can be achieved with present state of the art technology.

NOTE 3: Requirement on the UE shall be reconsidered when the state of the art technology progresses.



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### 6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The frequency boundary and the detailed transitions of the limits between the requirement for out band emissions and spectrum emissions are based on ITU-R Recommendations SM.329 [2].

#### 6.6.3.1 Minimum requirement

These requirements are only applicable for frequencies, which are greater than 12.5 MHz away from the UE centre carrier frequency.

**Table 6.12: General spurious emissions requirements**

| Frequency Bandwidth | Measurement Bandwidth | Minimum requirement |
|---|---|---|
| 9 kHz ≤ f < 150 kHz | 1 kHz | -36 dBm |
| 150 kHz ≤ f < 30 MHz | 10 kHz | -36 dBm |
| 30 MHz ≤ f < 1000 MHz | 100 kHz | -36 dBm |
| 1 GHz ≤ f < 12.75 GHz | 1 MHz | -30 dBm |

**Table 6.13: Additional spurious emissions requirements**

| Operating Band | Frequency Bandwidth | Measurement Bandwidth | Minimum requirement |
|---|---|---|---|
| I | 875 MHz ≤ f ≤ 885 MHz | 3.84 MHz | -60 dBm |
| | 921 MHz ≤ f < 925 MHz | 100 kHz | -60 dBm * |
| | 925 MHz ≤ f ≤ 935 MHz | 100 kHz | -67 dBm * |
| | 935 MHz < f ≤ 960 MHz | 100 kHz | -79 dBm * |
| | 1805 MHz ≤ f ≤ 1880 MHz | 100 kHz | -71 dBm * |
| | 1893.5 MHz <f<1919.6 MHz | 300 kHz | -41 dBm |
| | 2110 MHz ≤ f ≤ 2170 MHz | 3.84 MHz | -60 dBm |
| II | 869 MHz ≤ f ≤ 894 MHz | 3.84 MHz | -60 dBm |
| | 1930 MHz ≤ f ≤ 1990 MHz | 3.84 MHz | -60 dBm |
| | 2110 MHz ≤ f ≤ 2155 MHz | 3.84 MHz | -60 dBm |
| III | 921 MHz ≤ f < 925 MHz | 100 kHz | -60 dBm * |
| | 925 MHz ≤ f ≤ 935 MHz | 100 kHz | -67 dBm * |
| | 935 MHz < f ≤ 960 MHz | 100 kHz | -79 dBm * |
| | 1805 MHz ≤ f ≤ 1880 MHz | 3.84 MHz | -60 dBm |
| | 2110 MHz ≤ f ≤ 2170 MHz | 3.84 MHz | -60 dBm |
| IV | 869 MHz ≤ f ≤ 894 MHz | 3.84 MHz | -60 dBm |
| | 1930 MHz ≤ f ≤ 1990 MHz | 3.84 MHz | -60 dBm |
| | 2110 MHz ≤ f ≤ 2155 MHz | 3.84 MHz | -60 dBm |
| V | 869 MHz ≤ f ≤ 894 MHz | 3.84 MHz | -60 dBm |
| | 1930 MHz ≤ f ≤ 1990 MHz | 3.84 MHz | -60 dBm |
| | 2110 MHz ≤ f ≤ 2155 MHz | 3.84 MHz | -60 dBm |
| VI | 875 MHz ≤ f ≤ 885 MHz | 3.84 MHz | -60dBm |
| | 1893.5 MHz ≤ f ≤1919.6 MHz | 300 kHz | -41 dBm |
| | 2110 MHz ≤ f ≤ 2170 MHz | 3.84 MHz | -60 dBm |
| Note * | The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 6.12 are permitted for each UARFCN used in the measurement | | |

## 6.7 Transmit intermodulation

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.



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### 6.7.1 Minimum requirement

User Equipment(s) transmitting in close vicinity of each other can produce intermodulation products, which can fall into the UE, or Node B receive band as an unwanted interfering signal. The UE intermodulation attenuation is defined by the ratio of the RRC filtered mean power of the wanted signal to the RRC filtered mean power of the intermodulation product when an interfering CW signal is added at a level below the wanted signal.

The requirement of transmitting intermodulation for a carrier spacing of 5 MHz is prescribed in Table 6.14.

**Table 6.14: Transmit Intermodulation**

| Interference Signal Frequency Offset | 5MHz | 10MHz |
|---|---|---|
| Interference CW Signal Level | -40dBc | |
| Intermodulation Product | -31dBc | -41dBc |

## 6.8 Transmit modulation

Transmit modulation defines the modulation quality for expected in-channel RF transmissions from the UE. The requirements apply to all transmissions including the PRACH/PCPCH pre-amble and message parts and all other expected transmissions. In cases where the mean power of the RF signal is allowed to change versus time e.g. PRACH, DPCH in compressed mode, change of TFC and inner loop power control, the EVM and Peak Code Domain Error requirements do not apply during the 25 us period before and after the nominal time when the power is expected to change.

### 6.8.1 Transmit pulse shape filter

The transmit pulse shaping filter is a root-raised cosine (RRC) with roll-off $\alpha$ =0.22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is:

$$RC_0(t) = \frac{\sin\left(\pi \frac{t}{T_C}(1-\alpha)\right) + 4\alpha \frac{t}{T_C}\cos\left(\pi \frac{t}{T_C}(1+\alpha)\right)}{\pi \frac{t}{T_C}\left(1-\left(4\alpha \frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor $\alpha$ =0.22 and the chip duration is

$$T = \frac{1}{chiprate} \approx 0.26042\ \mu s$$

### 6.8.2 Error Vector Magnitude

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Both waveforms pass through a matched Root Raised Cosine filter with bandwidth 3,84 MHz and roll-off $\alpha$=0,22. Both waveforms are then further modified by selecting the frequency, absolute phase, absolute amplitude and chip clock timing so as to minimise the error vector. The EVM result is defined as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %. The measurement interval is one timeslot except when the mean power between slots is expected to change whereupon the measurement interval is reduced by 25 μs at each end of the slot. For the PRACH and PCPCH preambles the measurement interval is 4096 chips less 25 μs at each end of the burst (3904 chips).

#### 6.8.2.1 Minimum requirement

The Error Vector Magnitude shall not exceed 17.5 % for the parameters specified in Table 6.15. The requirements are applicable for all values of $\beta_c$ , $\beta_d$ and $\beta_{hs}$ as specified in [8].



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**Table 6.15: Parameters for Error Vector Magnitude/Peak Code Domain Error**

| Parameter | Unit | Level |
|---|---|---|
| UE Output Power | dBm | ≥ –20 |
| Operating conditions | | Normal conditions |
| Power control step size | dB | 1 |

## 6.8.3 Peak code domain error

The Peak Code Domain Error is computed by projecting power of the error vector (as defined in 6.8.2) onto the code domain at a specific spreading factor. The Code Domain Error for every code in the domain is defined as the ratio of the mean power of the projection onto that code, to the mean power of the composite reference waveform. This ratio is expressed in dB. The Peak Code Domain Error is defined as the maximum value for the Code Domain Error for all codes. The measurement interval is one timeslot except when the mean power between slots is expected to change whereupon the measurement interval is reduced by 25 μs at each end of the slot.

The requirement for peak code domain error is only applicable for multi-code DPDCH transmission and therefore does not apply for the PRACH and PCPCH preamble and message parts.

### 6.8.3.1 Minimum requirement

The peak code domain error shall not exceed -15 dB at spreading factor 4 for the parameters specified in Table 6.15 . The requirements are defined using the UL reference measurement channel specified in subclause A.2.5.

## 6.8.4 Phase discontinuity

Phase discontinuity is the change in phase between any two adjacent timeslots. The EVM for each timeslot (excluding the transient periods of 25 us on either side of the nominal timeslot boundaries), shall be measured according to subclause 6.8.2. The frequency, absolute phase, absolute amplitude and chip clock timing used to minimise the error vector are chosen independently for each timeslot. The phase discontinuity result is defined as the difference between the absolute phase used to calculate EVM for the preceding timeslot, and the absolute phase used to calculate EVM for the succeeding timeslot.

### 6.8.4.1 Minimum requirement

The rate of occurrence of any phase discontinuity on an uplink DPCH for the parameters specified in table 6.16 shall not exceed the values specified in table 6.17. Phase shifts that are caused by changes of the UL transport format combination (TFC) and compressed mode are not included. When calculating the phase discontinuity, the requirements for frequency error and EVM in subclauses 6.3 and 6.8.2 for each timeslot shall be met.

**Table 6.16: Parameters for Phase discontinuity**

| Parameter | Unit | Level |
|---|---|---|
| Power control step size | dB | 1 |

**Table 6.17: Phase discontinuity minimum requirement**

| Phase discontinuity Δθ in degrees | Maximum allowed rate of occurrence in Hz |
|---|---|
| $\Delta\theta \leq 30$ | 1500 |
| $30 < \Delta\theta \leq 60$ | 300 |
| $\Delta\theta > 60$ | 0 |



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# 7 Receiver characteristics

## 7.1 General

Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. Receiver characteristics for UE(s) with multiple antennas/antenna connectors are FFS.

The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of the present document. It is recognised that different requirements and test methods are likely to be required for the different types of UE.

All the parameters in clause 7 are defined using the DL reference measurement channel (12.2 kbps) specified in subclause A.3.1 and unless otherwise stated with DL power control OFF.

## 7.2 Diversity characteristics

A suitable receiver structure using coherent reception in both channel impulse response estimation and code tracking procedures is assumed. Three forms of diversity are considered to be available in UTRA/FDD.

**Table 7.1: Diversity characteristics for UTRA/FDD**

| | |
|---|---|
| Time diversity | Channel coding and interleaving in both up link and down link |
| Multi-path diversity | Rake receiver or other suitable receiver structure with maximum combining. Additional processing elements can increase the delay-spread performance due to increased capture of signal energy. |
| Antenna diversity | Antenna diversity with maximum ratio combing in the Node B and optionally in the UE. Possibility for downlink transmit diversity in the Node B. |

## 7.3 Reference sensitivity level

The reference sensitivity level <REFSENS> is the minimum mean power received at the UEantenna port at which the Bit Error Ratio (BER) shall not exceed a specific value.

### 7.3.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.2.

**Table 7.2: Test parameters for reference sensitivity**

| Operating Band | Unit | DPCH_Ec <REFSENS> | <REF$\hat{I}_{or}$> |
|---|---|---|---|
| I, VI | dBm/3.84 MHz | -117 | -106.7 |
| II | dBm/3.84 MHz | -115 | -104.7 |
| III | dBm/3.84 MHz | -114 | -103.7 |
| IV | dBm/3.84 MHz | -117 | -106.7 |
| V | dBm/3.84 MHz | -115 | -104.7 |
| NOTE 1. For Power class 3 this shall be at the maximum output power<br>NOTE 2. For Power class 4 this shall be at the maximum output power | | | |

## 7.4 Maximum input level

This is defined as the maximum mean power received at the UE antenna port, at which the specified BER performance shall be met.



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### 7.4.1 Minimum requirement for DPCH reception

The BER shall not exceed 0.001 for the parameters specified in Table 7.3.

**Table 7.3: Maximum input level**

| Parameter | Unit | Level |
|---|---|---|
| $\frac{DPCH_Ec}{I_{or}}$ | dB | -19 |
| $\hat{I}_{or}$ | dBm/3.84 MHz | -25 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) |

NOTE: Since the spreading factor is large (10log(SF)=21dB), the majority of the total input signal consists of the OCNS interference. The structure of OCNS signal is defined in Annex C.3.2.

### 7.4.2 Minimum requirement for HS-PDSCH reception

#### 7.4.2.1 Minimum requirement for 16QAM

For the parameters specified in Table 7.3A, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 7.3B for the DL reference channel H-Set 1 specified in Annex A.7.1.1. with the addition of the parameters added in the end of Table 7.3A and downlink physical channel setup according to Annex C.5.

**Table 7.3A**

| Parameter | Unit | Test |
|---|---|---|
| Phase reference | | P-CPICH |
| $\hat{I}_{or}$ | dBm/3.84 MHz | -25 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) |
| DPCH | DPCH_Ec/Ior | -13 |
| HS-SCCH_1 | HS-SCCH_Ec/Ior | -13 |
| Redundancy and constellation version | | 6 |
| Maximum number of HARQ transmissions | | 1 |
| Note: The HS-DSCH shall be transmitted continuously with constant power but only every third TTI shall be sent to the UE under test. | | |

**Table 7.3B**

| HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) |
|---|---|
| -3 | 700 |

## 7.5 Adjacent Channel Selectivity (ACS)

Adjacent Channel Selectivity (ACS) is a measure of a receiver"s ability to receive a W-CDMA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).



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### 7.5.1 Minimum requirement

The UE shall fulfil the minimum requirement specified in Table 7.4 for all values of an adjacent channel interferer up to –25 dBm.

However it is not possible to directly measure the ACS, instead the lower and upper range of test parameters are chosen in Table 7.5 where the BER shall not exceed 0.001.

**Table 7.4: Adjacent Channel Selectivity**

| Power Class | Unit | ACS |
|---|---|---|
| 3 | dB | 33 |
| 4 | dB | 33 |

**Table 7.5: Test parameters for Adjacent Channel Selectivity**

| Parameter | Unit | Case 1 | Case 2 |
|---|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS> + 14 dB | <REFSENS> + 41 dB |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> + 14 dB | REF$\hat{I}_{or}$> + 41 dB |
| $I_{oac}$ mean power (modulated) | dBm | -52 | -25 |
| $F_{uw}$ (offset) | MHz | +5 or -5 | +5 or -5 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) | 20 (for Power class 3)<br>18 (for Power class 4) |

NOTE: The $I_{oac}$ (modulated) signal consists of the common channels needed for tests as specified in Table C.7 and 16 dedicated data channels as specified in Table C.6.

## 7.6 Blocking characteristics

The blocking characteristic is a measure of the receiver"s ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

### 7.6.1 Minimum requirement (In-band blocking)

The BER shall not exceed 0.001 for the parameters specified in Table 7.6. In-band blocking is defined for an unwanted interfering signal falling into the UE receive band or into the first 15 MHz below or above the UE receive band.



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**Table 7.6: In-band blocking**

| Parameter | Unit | Level | |
|---|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS>+3 dB | |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> + 3 dB | |
| $I_{blocking}$ mean power (modulated) | dBm | -56 | -44 |
| $F_{uw}$ offset | | =±10 MHz | ≤-15 MHz & ≥15 MHz |
| $F_{uw}$ (Band I operation) | MHz | 2102.4≤ f ≤2177.6 (Note 2) | 2095≤ f ≤2185 |
| $F_{uw}$ (Band II operation) | MHz | 1922.4≤ f ≤1997.6 (Note 2) | 1915≤ f ≤2005 |
| $F_{uw}$ (Band III operation) | MHz | 1797.4≤ f ≤1887.6 (Note 2) | 1790≤ f ≤1895 |
| $F_{uw}$ (Band IV operation) | MHz | 2102.4≤ f ≤2162.6 (Note 2) | 2095≤ f ≤2170 |
| $F_{uw}$ (Band V operation) | MHz | 861.4≤ f ≤901.6 (Note 2) | 854≤ f ≤909 |
| $F_{uw}$ (Band VI operation) | MHz | 867.4≤ f ≤892.6 (Note 2 and 3) | 860≤ f ≤900 (Note 3) |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) | |

Note 1: $I_{blocking}$ (modulated) consists of the common channels needed for tests as specified in Table C.7 and 16 dedicated data channels as specified in Table C.6.

Note 2: For each carrier frequency the requirement is valid for two frequencies, the carrier frequency +/- 10 MHz.

Note 3: For Band VI, the unwanted interfering signal does not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band.

## 7.6.2 Minimum requirement (Out of-band blocking)

The BER shall not exceed 0.001 for the parameters specified in Table 7.7. Out-of-band band blocking is defined for an unwanted interfering signal falling more than 15 MHz below or above the UE receive band. For Table 7.7 up to 24 exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size. For these exceptions the requirements of clause 7.7 Spurious response are applicable.



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**Table 7.7: Out of band blocking**

| Parameter | Unit | Frequency range 1 | Frequency range 2 | Frequency range 3 |
|---|---|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS>+3 dB | <REFSENS>+3 dB | <REFSENS>+3 dB |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> + 3 dB | <REF$\hat{I}_{or}$> + 3 dB | <REF$\hat{I}_{or}$> + 3 dB |
| $I_{blocking}$ (CW) | dBm | -44 | -30 | -15 |
| $F_{uw}$ (Band I operation) | MHz | 2050<f <2095<br>2185<f <2230 | 2025 <f <2050<br>2230 <f <2255 | 1< f <2025<br>2255<f<12750 |
| $F_{uw}$ (Band II operation) | MHz | 1870<f <1915<br>2005<f <2050 | 1845 <f <1870<br>2050 <f <2075 | 1< f <1845<br>2075<f<12750 |
| $F_{uw}$ (Band III operation) | MHz | 1745 <f <1790<br>1895<f <1940 | 1720 <f < 1745<br>1940<f < 1965 | 1< f <1720<br>1965<f<12750 |
| $F_{uw}$ (Band IV operation) | MHz | 2050< f <2095<br>2170< f <2215 | 2025< f <2050<br>2215< f < 2240 | 1< f <2025<br>2240<f<12750 |
| $F_{uw}$ (Band V operation) | MHz | 809< f <854<br>909< f <954 | 784< f <809<br>954< f < 979 | 1< f <784<br>979<f<12750 |
| $F_{uw}$ (Band VI operation) | MHz | 815 < f < 860<br>900 < f < 945 | 790 < f < 815<br>945 < f < 970 | 1 < f < 790<br>970 < f < 12750 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) | | |
| Band I operation | For 2095<f<2110 MHz and 2170<f<2185 MHz, the appropriate in-band blocking or adjacent channel selectivity in subclause 7.5.1 and subclause 7.6.1 shall be applied. | | | |
| Band II operation | For 1915<f<1930 MHz and 1990<f<2005 MHz, the appropriate in-band blocking or adjacent channel selectivity in subclause 7.5.1 and subclause 7.6.1 shall be applied | | | |
| Band III operation | For 1790<f<1805 MHz and 1880<f<1895 MHz, the appropriate in-band blocking or adjacent channel selectivity in subclause 7.5.1 and subclause 7.6.1 shall be applied. | | | |
| Band IV operation | For 2095<f<2110 MHz and 2155<f<2170 MHz, the appropriate in-band blocking or adjacent channel selectivity in subclause 7.5.1 and subclause 7.6.1 shall be applied. | | | |
| Band V operation | For 854<f<869 MHz and 894<f<909 MHz, the appropriate in-band blocking or adjacent channel selectivity in subclause 7.5.1 and subclause 7.6.1 shall be applied. | | | |
| Band VI operation | For 860<f<875 MHz and 885<f<900 MHz, the appropriate in-band blocking or adjacent channel selectivity in subclause 7.5.1 and subclause 7.6.1 shall be applied. | | | |

## 7.6.3 Minimum requirement (Narrow band blocking)

The BER shall not exceed 0.001 for the parameters specified in Table 7.7A. This requirement is measure of a receiver"s ability to receive a W-CDMA signal at its assigned channel frequency in the presence of an unwanted narrow band interferer at a frequency, which is less than the nominal channel spacing

**Table 7.7A: Narrow band blocking characteristics**

| Parameter | Unit | Band II, Band IV and Band V | Band III |
|---|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS> + 10 dB | <REFSENS> + 10 dB |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> + 10 dB | <REF$\hat{I}_{or}$> + 10 dB |
| $I_{blocking}$ (GMSK) | dBm | -57 | -56 |
| $F_{uw}$ (offset) | MHz | 2.7 | 2.8 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) | |

NOTE: $I_{blocking}$ (GMSK) is an interfering signal as defined in TS 45.004 [6]



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# 7.7 Spurious response

Spurious response is a measure of the receiver"s ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out of band blocking limit as specified in subclause 7.6.2 is not met.

## 7.7.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.8.

**Table 7.8: Spurious Response**

| Parameter | Unit | Level |
|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS> +3 dB |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> +3 dB |
| $I_{blocking}$ (CW) | dBm | -44 |
| $F_{uw}$ | MHz | Spurious response frequencies |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) |

# 7.8 Intermodulation characteristics

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

## 7.8.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.9.

**Table 7.9: Receive intermodulation characteristics**

| Parameter | Unit | Level | |
|---|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS> +3 dB | |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> +3 dB | |
| $I_{ouw1}$ (CW) | dBm | -46 | |
| $I_{ouw2}$ mean power (modulated) | dBm | -46 | |
| $F_{uw1}$ (offset) | MHz | 10 | -10 |
| $F_{uw2}$ (offset) | MHz | 20 | -20 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) | |

NOTE: $I_{ouw2}$ (modulated) consists of the common channels needed for tests as specified in Table C.7 and 16 dedicated data channels as specified in Table C.6.

## 7.8.2 Minimum requirement (Narrow band)

The BER shall not exceed 0.001 for the parameters specified in Table 7.9A.



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**Table 7.9A: Receive intermodulation characteristics**

| Parameter | Unit | Band II, Band IV and Band V | | Band III | |
|---|---|---|---|---|---|
| DPCH_Ec | dBm/3.84 MHz | <REFSENS>+ 10 dB | | <REFSENS>+ 10 dB | |
| $\hat{I}_{or}$ | dBm/3.84 MHz | <REF$\hat{I}_{or}$> + 10 dB | | [<REF$\hat{I}_{or}$> +10 dB | |
| $I_{ouw1}$ (CW) | dBm | -44 | | -43 | |
| $I_{ouw2}$ (GMSK) | dBm | -44 | | -43 | |
| $F_{uw1}$ (offset) | MHz | 3.5 | -3.5 | 3.6 | -3.6 |
| $F_{uw2}$ (offset) | MHz | 5.9 | -5.9 | 6.0 | -6.0 |
| UE transmitted mean power | dBm | 20 (for Power class 3)<br>18 (for Power class 4) | | | |

NOTE: $I_{ouw2}$ (GMSK) is an interfering signal as defined in TS 45.004 [6].

# 7.9 Spurious emissions

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

## 7.9.1 Minimum requirement

The power o f any narrow band CW spurious emission shall not exceed the maximum level specified in Table 7.10 and Table 7.11

**Table 7.10: General receiver spurious emission requirements**

| Frequency Band | Measurement Bandwidth | Maximum level | Note |
|---|---|---|---|
| 30MHz ≤ f < 1GHz | 100 kHz | -57 dBm | |
| 1GHz ≤ f ≤ 12.75 GHz | 1 MHz | -47 dBm | |



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**Table 7.11: Additional receiver spurious emission requirements**

| Band | Frequency Band | Measurement Bandwidth | Maximum level | Note |
|---|---|---|---|---|
| I | 875 MHz ≤ f ≤ 885 MHz | 3.84 MHz | -60 dBm | |
| | 921 MHz ≤ f < 925 MHz | 100 kHz | -60 dBm * | |
| | 925 MHz ≤ f ≤ 935 MHz | 100 kHz | -67 dBm * | |
| | 935 MHz < f ≤ 960 MHz | 100 kHz | -79 dBm * | |
| | 1805 MHz ≤ f ≤ 1880 MHz | 100 kHz | -71 dBm * | |
| | 1920 MHz ≤ f ≤ 1980 MHz | 3.84 MHz | -60 dBm | UE transmit band in URA_PCH, Cell_PCH and idle state |
| | 2110 MHz ≤ f ≤ 2170 MHz | 3.84 MHz | -60 dBm | UE receive band |
| II | 869 MHz ≤ f ≤ 894 MHz | 3.84 MHz | -60 dBm | |
| | 1850 MHz ≤ f ≤ 1910 MHz | 3.84 MHz | -60 dBm | UE transmit band in URA_PCH, Cell_PCH and idle state |
| | 1930 MHz ≤ f ≤ 1990 MHz | 3.84 MHz | -60 dBm | UE receive band |
| | 2110 MHz ≤ f ≤ 2155 MHz | 3.84 MHz | -60 dBm | |
| III | 921 MHz ≤ f < 925 MHz | 100 kHz | -60 dBm* | |
| | 925 MHz ≤ f ≤ 935 MHz | 100 kHz | -67 dBm* | |
| | 935 MHz < f ≤ 960 MHz | 100 kHz | -79 dBm* | |
| | 1710 MHz ≤ f ≤ 1785 MHz | 3.84 MHz | -60 dBm | UE transmit band in URA_PCH, Cell_PCH and idle state |
| | 1805 MHz ≤ f ≤ 1880 MHz | 3.84 MHz | -60 dBm | UE receive band |
| | 2110 MHz ≤ f ≤ 2170 MHz | 3.84 MHz | -60 dBm | |
| IV | 869 MHz ≤ f < 894 MHz | 3.84 MHz | -60 dBm | |
| | 1710 MHz ≤ f < 1755 MHz | 3.84 MHz | -60 dBm | UE transmit band in URA_PCH, Cell_PCH and idle state |
| | 1930 MHz ≤ f ≤ 1990 MHz | 3.84 MHz | -60 dBm | |
| | 2110 MHz≤ f ≤ 2155 MHz | 3.84 MHz | -60 dBm | UE receive band |
| V | 824 MHz ≤ f ≤ 849 MHz | 3.84 MHz | -60 dBm | UE transmit band in URA_PCH, Cell_PCH and idle state |
| | 869 MHz ≤ f < 894 MHz | 3.84 MHz | -60 dBm | UE receive band |
| | 1930 MHz ≤ f ≤ 1990 MHz | 3.84 MHz | -60 dBm | |
| | 2110 MHz ≤ f ≤ 2155 MHz | 3.84 MHz | -60 dBm | |
| VI | 830 MHz ≤ f ≤ 840 MHz | 3.84 MHz | -60 dBm | UE transmit band in URA_PCH, Cell_PCH and idle state |
| | 875 MHz ≤ f ≤ 885 MHz | 3.84 MHz | -60 dBm | UE receive band |
| | 2110 MHz ≤ f ≤ 2170 MHz | 3.84 MHz | -60 dBm | |
| Note * | The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 7.10 are permitted for each UARFCN used in the measurement | | | |

# 8 Performance requirement

## 8.1 General

The performance requirements for the UE in this subclause are specified for the measurement channels specified in Annex A, the propagation conditions specified in Annex B and the Down link Physical channels specified in Annex C. Unless stated DL power control is OFF.



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# 8.2 Demodulation in static propagation conditions

## 8.2.1 (void)

## 8.2.2 Demodulation of Forward Access Channel (FACH)

void

## 8.2.3 Demodulation of Dedicated Channel (DCH)

The receive characteristic of the Dedicated Channel (DCH) in the static environment is determined by the Block Error Ratio (BLER). BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

### 8.2.3.1 Minimum requirement

For the parameters specified in Table 8.5 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.6. These requirements are applicable for TFCS size 16.

**Table 8.5: DCH parameters in static propagation conditions**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |

**Table 8.6: DCH requirements in static propagation conditions**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 1 | -16.6 dB | $10^{-2}$ |
| 2 | -13.1 dB | $10^{-1}$ |
| | -12.8 dB | $10^{-2}$ |
| 3 | -9.9 dB | $10^{-1}$ |
| | -9.8 dB | $10^{-2}$ |
| 4 | -5.6 dB | $10^{-1}$ |
| | -5.5 dB | $10^{-2}$ |

# 8.3 Demodulation of DCH in multi-path fading propagation conditions

## 8.3.1 Single Link Performance

The receive characteristics of the Dedicated Channel (DCH) in different multi-path fading environments are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into in Dedicated Physical Channel (DPCH).



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### 8.3.1.1 Minimum requirement

For the parameters specified in Table 8.7, 8.9 , 8.11, 8.13 and 8.14A the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.8, 8.10, 8.12, 8.14 and 8.14B. For the parameters specified in Table 8.14C and 8.14 E the downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 8.14D and 8.14F more than 90% of the time. These requirements are applicable for TFCS size 16.

**Table 8.7: Test Parameters for DCH in multi-path fading propagation conditions (Case 1)**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 9 | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |

**Table 8.8: Test requirements for DCH in multi-path fading propagation conditions (Case 1)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 1 | -15.0 dB | $10^{-2}$ |
| 2 | -13.9 dB | $10^{-1}$ |
| | -10.0 dB | $10^{-2}$ |
| 3 | -10.6 dB | $10^{-1}$ |
| | -6.8 dB | $10^{-2}$ |
| 4 | -6.3 dB | $10^{-1}$ |
| | -2.2 dB | $10^{-2}$ |

**Table 8.9: DCH parameters in multi-path fading propagation conditions (Case 2)**

| Parameter | Unit | Test 5 | Test 6 | Test 7 | Test 8 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -3 | -3 | 3 | 6 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |

**Table 8.10: DCH requirements in multi-path fading propagation (Case 2)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 5 | -7.7 dB | $10^{-2}$ |
| 6 | -6.4 dB | $10^{-1}$ |
| | -2.7 dB | $10^{-2}$ |
| 7 | -8.1 dB | $10^{-1}$ |
| | -5.1 dB | $10^{-2}$ |
| 8 | -5.5 dB | $10^{-1}$ |
| | -3.2 dB | $10^{-2}$ |



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**Table 8.11: DCH parameters in multi-path fading propagation conditions (Case 3)**

| Parameter | Unit | Test 9 | Test 10 | Test 11 | Test 12 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -3 | -3 | 3 | 6 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |

**Table 8.12: DCH requirements in multi-path fading propagation conditions (Case 3)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 9 | -11.8 dB | $10^{-2}$ |
| 10 | -8.1 dB | $10^{-1}$ |
| | -7.4 dB | $10^{-2}$ |
| | -6.8 dB | $10^{-3}$ |
| 11 | -9.0 dB | $10^{-1}$ |
| | -8.5 dB | $10^{-2}$ |
| | -8.0 dB | $10^{-3}$ |
| 12 | -5.9 dB | $10^{-1}$ |
| | -5.1 dB | $10^{-2}$ |
| | -4.4 dB | $10^{-3}$ |

**Table 8.13: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH**

| Parameter | Unit | Test 13 | Test 14 | Test 15 | Test 16 |
|---|---|---|---|---|---|
| Phase reference | | S-CPICH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 9 | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |

**Table 8.14: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 13 | -15.0 dB | $10^{-2}$ |
| 14 | -13.9 dB | $10^{-1}$ |
| | -10.0 dB | $10^{-2}$ |
| 15 | -10.6 dB | $10^{-1}$ |
| | -6.8 dB | $10^{-2}$ |
| 16 | -6.3 dB | $10^{-1}$ |
| | -2.2 dB | $10^{-2}$ |

**Table 8.14A: DCH parameters in multi-path fading propagation conditions (Case 6)**

| Parameter | Unit | Test 17 | Test 18 | Test 19 | Test 20 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -3 | -3 | 3 | 6 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |



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**Table 8.14B: DCH requirements in multi-path fading propagation conditions (Case 6)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 17 | -8.8 dB | $10^{-2}$ |
| 18 | -5.1 dB | $10^{-1}$ |
| | -4.4 dB | $10^{-2}$ |
| | -3.8 dB | $10^{-3}$ |
| 19 | -6.0 dB | $10^{-1}$ |
| | -5.5 dB | $10^{-2}$ |
| | -5.0 dB | $10^{-3}$ |
| 20 | -2.9 dB | $10^{-1}$ |
| | -2.1 dB | $10^{-2}$ |
| | -1.4 dB | $10^{-3}$ |

**Table 8.14C: DCH parameters in multi-path fading propagation conditions (Case 7)**

| Parameter | Unit | Test 21 | Test 22 | Test 23 | Test 24 |
|---|---|---|---|---|---|
| Phase reference | | DPCCH | | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 0 | 0 | 6 | 12 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |
| Target quality value on DTCH | BLER | 0.01 | 0.01 | 0.01 | 0.1 |
| Maximum_DL_Power | dB | 3 (Note) | | | |
| Minimum_DL_Power | dB | -18 | | | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | | | |
| Limited Power Increase | - | 'Not used' | | | |
| NOTE: The fraction of the total Node B transmit power that is transmitted in the beam used for the UE under test, is set to 20% according to Annex C.3.5 | | | | | |

**Table 8.14D: DCH requirements in multi-path fading propagation conditions (Case 7)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ |
|---|---|
| 21 | -14.0 dB |
| 22 | -9.1 dB |
| 23 | -9.4 dB |
| 24 | -7.4 dB |

**Table 8.14E: DCH parameters in multi-path fading propagation conditions (Case 7)**

| Parameter | Unit | Test 25 |
|---|---|---|
| Phase reference | | DPCCH |
| $\hat{I}_{or}/I_{oc}$ | dB | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| Information Data Rate | kbps | 12.2 |
| Target quality value on DTCH | BLER | 0.01 |
| Maximum_DL_Power | dB | 3 (Note) |
| Minimum_DL_Power | dB | -18 |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 |
| Limited Power Increase | - | 'Not used' |
| NOTE: The fraction of the total Node B transmit power that is transmitted in the beam used for the UE under test, is set to 20% according to Annex C.3.5 | | |



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**Table 8.14F: DCH requirements in multi-path fading propagation conditions (Case 7)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ |
|---|---|
| 25 | -12.5 dB |

NOTE: The reference channel used for Test Number 25 is described in section A.4A

# 8.4 Demodulation of DCH in moving propagation conditions

## 8.4.1 Single link performance

The receive single link performance of the Dedicated Channel (DCH) in dynamic moving propagation conditions are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

### 8.4.1.1 Minimum requirement

For the parameters specified in Table 8.15 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.16.

**Table 8.15: DCH parameters in moving propagation conditions**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | | P-CPICH | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Information Data Rate | kbps | 12.2 | 64 |

**Table 8.16: DCH requirements in moving propagation conditions**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 1 | -14.5 dB | $10^{-2}$ |
| 2 | -10.9 dB | $10^{-2}$ |

# 8.5 Demodulation of DCH in birth-death propagation conditions

## 8.5.1 Single link performance

The receive single link performance of the Dedicated Channel (DCH) in dynamic birth-death propagation conditions are determined by the Block Error Ratio (BLER) values. BER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

### 8.5.1.1 Minimum requirement

For the parameters specified in Table 8.17 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.18.



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**Table 8.17: DCH parameters in birth-death propagation conditions**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | | P-CPICH | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Information Data Rate | kbps | 12.2 | 64 |

**Table 8.18: DCH requirements in birth-death propagation conditions**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 1 | -12.6 dB | $10^{-2}$ |
| 2 | -8.7 dB | $10^{-2}$ |

# 8.6 Demodulation of DCH in downlink Transmit diversity modes

## 8.6.1 Demodulation of DCH in open-loop transmit diversity mode

The receive characteristic of the Dedicated Channel (DCH) in open loop transmit diversity mode is determined by the Block Error Ratio (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).

### 8.6.1.1 Minimum requirement

For the parameters specified in Table 8.19 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.20.

**Table 8.19: Test parameters for DCH reception in an open loop transmit diversity scheme. (Propagation condition: Case 1)**

| Parameter | Unit | Test 1 |
|---|---|---|
| Phase reference | | P-CPICH |
| $\hat{I}_{or}/I_{oc}$ | dB | 9 |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| Information data rate | kbps | 12.2 |

**Table 8.20: Test requirements for DCH reception in open loop transmit diversity scheme**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ (antenna 1/2) | BLER |
|---|---|---|
| 1 | -16.8 dB | $10^{-2}$ |

## 8.6.2 Demodulation of DCH in closed loop transmit diversity mode

The receive characteristic of the dedicated channel (DCH) in closed loop transmit diversity mode is determined by the Block Error Ratio (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).



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### 8.6.2.1 Minimum requirement

For the parameters specified in Table 8.21 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.22.

**Table 8.21: Test Parameters for DCH Reception in closed loop transmit diversity mode (Propagation condition: Case 1)**

| Parameter | Unit | Test 1 (Mode 1) | Test 2 (Mode 2) |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | 9 | 9 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | -60 |
| Information data rate | kbps | 12.2 | 12.2 |
| Feedback error rate | % | 4 | 4 |
| Closed loop timing adjustment mode | - | 1 | 1 |

**Table 8.22: Test requirements for DCH reception in closed loop transmit diversity mode**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ (see note) | BLER |
|---|---|---|
| 1 | -18.0 dB | $10^{-2}$ |
| 2 | -18.3 dB | $10^{-2}$ |
| NOTE: This is the total power from both antennas. Power sharing between antennas are feedback mode dependent as specified in TS25.214. | | |

## 8.6.3 Demodulation of DCH in Site Selection Diversity Transmission Power Control mode

The bit error characteristics of UE receiver is determined in Site Selection Diversity Transmission power control (SSDT) mode. Two Node B emulators are required for this performance test. The delay profiles of signals received from different Node Bs are assumed to be the same but time shifted by 10 chip periods (2604 ns).

### 8.6.3.1 Minimum requirements

The downlink physical channels and their relative power to Ior are the same as those specified in clause C.3.2 irrespective of Node Bs and the test cases. DPCH_Ec/Ior value applies whenever DPDCH in the cell is transmitted. In Test 1 and Test 3, the received powers at UE from two Node Bs are the same, while 3dB offset is given to one that comes from one of Node Bs for Test 2 and Test 4 as specified in Table 8.23.

For the parameters specified in Table 8.23 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.24.



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**Table 8.23: DCH parameters in multi-path propagation conditions during SSDT mode (Propagation condition: Case 1)**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or1}/I_{oc}$ | dB | 0 | -3 | 0 | 0 |
| $\hat{I}_{or2}/I_{oc}$ | dB | 0 | 0 | 0 | -3 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 12.2 | 12.2 | 12.2 |
| Cell ID code word error ratio in uplink | % | 1 | 1 | 1 | 1 |
| Number of FBI bits assigned to "S" Field | | 1 | 1 | 2 | 2 |
| Code word Set | | Long | Long | Short | Short |
| UL DPCCH slot Format | | #2 | | #5 | |

NOTE: The code word errors are introduced independently in both uplink channels.

**Table 8.24: DCH requirements in multi-path propagation conditions during SSDT Mode**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 1 | -6.0 dB | $10^{-2}$ |
| 2 | -5.0 dB | $10^{-2}$ |
| 3 | -10.5 dB | $10^{-2}$ |
| 4 | -9.2 dB | $10^{-2}$ |

# 8.7 Demodulation in Handover conditions

## 8.7.1 Demodulation of DCH in Inter-Cell Soft Handover

The bit error rate characteristics of UE is determined during an inter-cell soft handover. During the soft handover a UE receives signals from different cells. A UE has to be able to demodulate two PCCPCH channels and to combine the energy of DCH channels. Delay profiles of signals received from different cells are assumed to be the same but time shifted by 10 chips.

The receive characteristics of the different channels during inter-cell handover are determined by the average Block Error Ratio (BLER) values.

### 8.7.1.1 Minimum requirement

For the parameters specified in Table 8.25 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.26.

**Table 8.25: DCH parameters in multi-path propagation conditions during Soft Handoff (Case 3)**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $\hat{I}_{or1}/I_{oc}$ and $\hat{I}_{or2}/I_{oc}$ | dB | 0 | 0 | 3 | 6 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information data Rate | kbps | 12.2 | 64 | 144 | 384 |



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**Table 8.26: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER |
|---|---|---|
| 1 | -15.2 dB | $10^{-2}$ |
| 2 | -11.8 dB | $10^{-1}$ |
| | -11.3 dB | $10^{-2}$ |
| 3 | -9.9 dB | $10^{-1}$ |
| | -9.5 dB | $10^{-2}$ |
| 4 | -6.3 dB | $10^{-1}$ |
| | -5.8 dB | $10^{-2}$ |

## 8.7.2 Combining of TPC commands from radio links of different radio link sets

### 8.7.2.1 Minimum requirement

Test parameters are specified in Table 8.27. The delay profiles of the signals received from the different cells are the same but time-shifted by 10 chips.

For Test 1, the sequence of uplink power changes between adjacent slots shall be as shown in Table 8.28 over the 4 consecutive slots more than 99% of the time. Note that this case is without an additional noise source $I_{oc}$.

For Test 2, the Cell1 and Cell2 TPC patterns are repeated a number of times. If the transmitted power of a given slot is increased compared to the previous slot, then a variable "Transmitted power UP" is increased by one, otherwise a variable "Transmitted power DOWN" is increased by one. The requirements for "Transmitted power UP" and "Transmitted power DOWN" are shown in Table 8.28A.

**Table 8.27: Parameters for TPC command combining**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| DPCH_Ec/Ior | dB | -12 | |
| $\hat{I}_{or1}$ and $\hat{I}_{or2}$ | dBm/3.84 MHz | -60 | |
| $I_{oc}$ | dBm/3.84 MHz | - | -60 |
| Power-Control-Algorithm | - | Algorithm 1 | |
| Cell 1 TPC commands over 4 slots | - | {0,0,1,1} | |
| Cell 2 TPC commands over 4 slots | - | {0,1,0,1} | |
| Information data Rate | kbps | 12.2 | |
| Propagation condition | - | Static without AWGN source $I_{oc}$ | Multi-path fading case 3 |

**Table 8.28: Test requirements for Test 1**

| Test Number | Required power changes over the 4 consecutive slots |
|---|---|
| 1 | Down, Down, Down, Up |

**Table 8.28A: Requirements for Test 2**

| Test Number | Ratio (Transmitted power UP) / (Total number of slots) | Ratio (Transmitted power DOWN) / (Total number of slots) |
|---|---|---|
| 2 | ≥0.25 | ≥0.5 |



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## 8.7.3 Combining of reliable TPC commands from radio links of different radio link sets

### 8.7.3.1 Minimum requirement

Test 1 verifies that the UE follows only the reliable TPC commands in soft handover. Test 2 verifies that the UE follows all the reliable TPC commands in soft handover.

Test parameters are specified in Table 8.28B. Before the start of the tests, the UE transmit power shall be initialised to -15 dBm. An actual UE transmit power may vary from the target level of -15 dBm due to inaccurate UE output power step.

During tests 1 and 2 the UE transmit power samples, which are defined as the mean power over one timeslot, shall stay 90% of the time within the range defined in Table 8.28C.

**Table 8.28B: Parameters for reliable TPC command combining**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| DPCH_Ec/Ior1 | dB | Note 1 | Note 1 & Note 3 |
| DPCH_Ec/Ior2 | dB | DPCH_Ec/Ior1 - 10 | DPCH_Ec/Ior1 + 6 |
| DPCH_Ec/Ior3 | dB | DPCH_Ec/Ior1 - 10 | - |
| $\hat{I}_{or1}/I_{oc}$ | dB | -1 | -1 |
| $\hat{I}_{or2}/I_{oc}$ | dB | -1 | -1 |
| $\hat{I}_{or3}/I_{oc}$ | dB | -1 | - |
| $I_{OC}$ | dBm/3.84 MHz | -60 | |
| Power-Control-Algorithm | - | Algorithm 1 | |
| UL Power Control step size, $\Delta_{TPC}$ | dB | 1 | |
| Cell 1 TPC commands | - | Note 2 | Note 2 |
| Cell 2 TPC commands | - | '1' | '1' |
| Cell 3 TPC commands | - | '1' | - |
| Information data Rate | kbps | 12.2 | |
| Propagation condition | - | Static | |
| Note 1: The DPCH_Ec/Ior1 is set at the level corresponding to 5% TPC error rate.<br>Note 2: The uplink power control from cell1 shall be such that the UE transmit power would stay at -15 dBm.<br>Note 3: The maximum DPCH_Ec/Ior1 level in cell1 is -9 dB. | | | |

**Table 8.28C: Test requirements for reliable TPC command combining**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| UE output power | dBm | -15 ± 5 dB | -15 ± 3 dB |

# 8.8 Power control in downlink

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink . If a BLER target has been assigned to a DCCH (See Annex A.3), then it has to be such that outer loop is based on DTCH and not on DCCH.

## 8.8.1 Power control in the downlink, constant BLER target

### 8.8.1.1 Minimum requirements

For the parameters specified in Table 8.29 the downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 8.30 more than 90% of the time. BLER shall be as shown in Table 8.30. Power control in downlink is ON during the test.



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**Table 8.29: Test parameter for downlink power control**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | 9 | -1 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Information Data Rate | kbps | 12.2 | |
| Target quality value on DTCH | BLER | 0.01 | |
| Propagation condition | | Case 4 | |
| Maximum_DL_Power * | dB | 7 | |
| Minimum_DL_Power * | dB | -18 | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | |
| Limited Power Increase | - | "Not used" | |

NOTE: Power is compared to P-CPICH as specified in [4].

**Table 8.30: Requirements in downlink power control**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| $\frac{DPCH_E_c}{I_{or}}$ | dB | -16.0 | -9.0 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% |

## 8.8.2 Power control in the downlink, initial convergence

This requirement verifies that DL power control works properly during the first seconds after DPCH connection is established

### 8.8.2.1 Minimum requirements

For the parameters specified in Table 8.31 the downlink DPCH_Ec/Ior power ratio measured values, which are averaged over 50 ms, shall be within the range specified in Table 8.32 more than 90% of the time. T1 equals to 500 ms and it starts 10 ms after the DPDCH physical channel is considered established and the first uplink frame is transmitted. T2 equals to 500 ms and it starts when T1 has expired. Power control is ON during the test.

The first 10 ms shall not be used for averaging, ie the first sample to be input to the averaging filter is at the beginning of T1. The averaging shall be performed with a sliding rectangular window averaging filter. The window size of the averaging filter is linearly increased from 0 up to 50 ms during the first 50 ms of T1, and then kept equal to 50ms.

**Table 8.31: Test parameters for downlink power control**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Target quality value on DTCH | BLER | 0.01 | 0.01 | 0.1 | 0.1 |
| Initial DPCH_Ec/Ior | dB | -5.9 | -25.9 | -3 | -22.8 |
| Information Data Rate | kbps | 12.2 | 12.2 | 64 | 64 |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Propagation condition | | Static | | | |
| Maximum_DL_Power | dB | 7 | | | |
| Minimum_DL_Power | dB | -18 | | | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | | | |
| Limited Power Increase | - | "Not used" | | | |



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**Table 8.32: Requirements in downlink power control**

| Parameter | Unit | Test 1 and Test 2 | Test 3 and Test 4 |
|---|---|---|---|
| $\frac{DPCH_E_c}{I_{or}}$ during T1 | dB | -18.9 ≤ DPCH_Ec/Ior ≤ -11.9 | -15.1 ≤ DPCH_Ec/Ior ≤ -8.1 |
| $\frac{DPCH_E_c}{I_{or}}$ during T2 | dB | -18.9 ≤ DPCH_Ec/Ior ≤ -14.9 | -15.1 ≤ DPCH_Ec/Ior ≤ -11.1 |

## 8.8.3 Power control in downlink, wind up effects

### 8.8.3.1 Minimum requirements

This test is run in three stages where stage 1 is for convergence of the power control loop, in stage two the maximum downlink power for the dedicated channel is limited not to be higher than the parameter specified in Table 8.33. All parameters used in the three stages are specified in Table 8.33. The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, during stage 3 shall be lower than the value specified in Table 8.34 more than 90% of the time.

Power control of the UE is ON during the test.

**Table 8.33: Test parameter for downlink power control, wind-up effects**

| Parameter | Unit | Test 1 | | |
|---|---|---|---|---|
| | | Stage 1 | Stage 2 | Stage 3 |
| Time in each stage | s | >15 | 5 | 0.5 |
| $\hat{I}_{or}/I_{oc}$ | dB | 5 | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | | |
| Quality target on DTCH | BLER | 0.01 | | |
| Propagation condition | | Case 4 | | |
| Maximum_DL_Power | dB | 7 | -6.2 | 7 |
| Minimum_DL_Power | dB | -18 | | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | | |
| Limited Power Increase | - | 'Not used' | | |

**Table 8.34: Requirements in downlink power control, wind-up effects**

| Parameter | Unit | Test 1, stage 3 |
|---|---|---|
| $\frac{DPCH_E_c}{I_{or}}$ | dB | -13.3 |

# 8.9 Downlink compressed mode

Downlink compressed mode is used to create gaps in the downlink transmission, to allow the UE to make measurements on other frequencies.

## 8.9.1 Single link performance

The receiver single link performance of the Dedicated Traffic Channel (DCH) in compressed mode is determined by the Block Error Ratio (BLER) and transmitted DPCH_Ec/Ior power ratio in the downlink.



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The compressed mode parameters are given in clause A.5. Tests 1 and 2 are using Set 1 compressed mode pattern parameters from Table A.21 in clause A.5 while tests 3 and 4 are using Set 2 compressed mode patterns from the same table.

### 8.9.1.1 Minimum requirements

For the parameters specified in Table 8.35 the downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 8.36 more than 90% of the time. The measured quality on DTCH shall be as required in Table 8.36.

Downlink power control is ON during the test. Uplink TPC commands shall be error free.

**Table 8.35: Test parameter for downlink compressed mode**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Delta SIR1 | dB | 0 | 3 | 0 | 3 |
| Delta SIR after1 | dB | 0 | 3 | 0 | 3 |
| Delta SIR2 | dB | 0 | 0 | 0 | 0 |
| Delta SIR after2 | dB | 0 | 0 | 0 | 0 |
| $\hat{I}_{or}/I_{oc}$ | dB | 9 | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | | | |
| Propagation condition | | Case 2 | | | |
| Target quality value on DTCH | BLER | 0.01 | | | |
| Maximum_DL_Power | dB | 7 | | | |
| Minimum_DL_Power | dB | -18 | | | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | | | |
| Limited Power Increase | - | "Not used" | | | |

**Table 8.36: Requirements in downlink compressed mode**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| $\frac{DPCH_E_c}{I_{or}}$ | dB | -14.6 | No requirements | -15.2 | No requirements |
| Measured quality of compressed and recovery frames | BLER | No requirements | <0.001 | No requirements | <0.001 |
| Measured quality on DTCH | BLER | 0.01 ± 30 % | | | |

## 8.10 Blind transport format detection

Performance of Blind transport format detection is determined by the Block Error Ratio (BLER) values and by the measured average transmitted DPCH_Ec/Ior value.

### 8.10.1 Minimum requirement

For the parameters specified in Table 8.37 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.38.



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**Table 8.37: Test parameters for Blind transport format detection**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 | Test 5 | Test 6 |
|---|---|---|---|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | | -3 | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | | | |
| Information Data Rate | kbps | 12.2 (rate 1) | 7.95 (rate 2) | 1.95 (rate 3) | 12.2 (rate 1) | 7.95 (rate 2) | 1.95 (rate 3) |
| propagation condition | - | static | | | multi-path fading case 3 | | |
| TFCI | - | off | | | | | |

**Table 8.38: The Requirements for DCH reception in Blind transport format detection**

| Test Number | $\frac{DPCH_E_c}{I_{or}}$ | BLER | FDR |
|---|---|---|---|
| 1 | -17.7 dB | $10^{-2}$ | $10^{-4}$ |
| 2 | -17.8 dB | $10^{-2}$ | $10^{-4}$ |
| 3 | -18.4 dB | $10^{-2}$ | $10^{-4}$ |
| 4 | -13.0 dB | $10^{-2}$ | $10^{-4}$ |
| 5 | -13.2 dB | $10^{-2}$ | $10^{-4}$ |
| 6 | -13.8 dB | $10^{-2}$ | $10^{-4}$ |

* The value of DPCH_Ec/Ior, Ioc, and Ior/Ioc are defined in case of DPCH is transmitted

NOTE: In this test, 9 different Transport Format Combinations (Table 8.39) are sent during the call set up procedure, so that the UE has to detect the correct transport format from these 9 candidates.

**Table 8.39: Transport format combinations informed during the call set up procedure in the test**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| DTCH | 12.2k | 10.2k | 7.95k | 7.4k | 6.7k | 5.9k | 5.15k | 4.75k | 1.95k |
| DCCH | 2.4k | | | | | | | | |

# 8.11 Detection of Broadcast channel (BCH)

The receiver characteristics of Broadcast Channel (BCH) are determined by the Block Error Ratio (BLER) values. BCH is mapped into the primary common control physical channel (P-CCPCH).

## 8.11.1 Minimum requirement without transmit diversity

For the parameters specified in Table 8.40 the average downlink power P-CCPCH_Ec/Ior shall be below the specified value for the BLER shown in Table 8.41. (The Down link Physical channels are specified in Annex C).

This requirement doesn"t need to be tested.

**Table 8.40: Parameters for BCH detection**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| Propagation condition | | Static | Case 3 |



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**Table 8.41: Test requirements for BCH detection**

| Test Number | P-CCPCH_Ec/Ior | BLER |
|---|---|---|
| 1 | -18.5 dB | 0.01 |
| 2 | -12.8 dB | 0.01 |

### 8.11.2 Minimum requirement with open loop transmit diversity

For the parameters specified in Table 8.41 A the average downlink power P-CCPCH_Ec/Ior shall be below the specified value for the BLER shown in Table 8.41B. (The Down link Physical channels are specified in Annex C).

This requirement doesn"t need to be tested.

**Table 8.41A: Test parameters for BCH detection in an open loop transmit diversity scheme (STTD). (Propagation condition: Case 1)**

| Parameter | Unit | Test 3 |
|---|---|---|
| Phase reference | - | P-CPICH |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| $\hat{I}_{or}/I_{oc}$ | dB | 9 |

**Table 8.41B: Test requirements for BCH detection in open loop transmit diversity scheme**

| Test Number | P-CCPCH_Ec/Ior (Total power from antenna 1 and 2) | BLER |
|---|---|---|
| 3 | -18.5 | 0.01 |

## 8.12 Demodulation of Paging Channel (PCH)

The receiver characteristics of paging channel are determined by the probability of missed paging message (Pm-p). PCH is mapped into the S-CCPCH and it is associated with the transmission of Paging Indicators (PI) to support efficient sleep-mode procedures.

### 8.12.1 Minimum requirement

For the parameters specified in Table 8.42 the average probability of missed paging (Pm-p) shall be below the specified value in Table 8.43. Power of downlink channels other than S-CCPCH and PICH are as defined in Table C.3 of Annex C. S-CCPCH structure is as defined in Annex A.6.

**Table 8.42: Parameters for PCH detection**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Number of paging indicators per frame (Np) | - | 72 | |
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| Propagation condition | | Static | Case 3 |



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**Table 8.43: Test requirements for PCH detection**

| Test Number | S-CCPCH_Ec/Ior | PICH_Ec/Ior | Pm-p |
|---|---|---|---|
| 1 | -14.8 | -19 | 0.01 |
| 2 | -9.8 | -12 | 0.01 |

# 8.13 Detection of Acquisition Indicator (AI)

The receiver characteristics of Acquisition Indicator (AI) are determined by the probability of false alarm Pfa and probability of correct detection Pd. Pfa is defined as a conditional probability of detection of AI signature given that a AI signature was not transmitted. Pd is defined as a conditional probability of correct detection of AI signature given that the AI signature is transmitted.

## 8.13.1 Minimum requirement

For the parameters specified in Table8.44 the Pfa and 1-Pd shall not the exceed the specified values in Table 8.45. Power of downlink channels other than AICH is as defined in Table C.3 of Annex C.

**Table 8.44: Parameters for AI detection**

| Parameter | Unit | Test 1 |
|---|---|---|
| Phase reference | - | P-CPICH |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| Number of other transmitted AI signatures on AICH | - | 0 |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 |
| AICH_Ec/Ior | dB | -22.0 |
| AICH Power Offset | dB | -12.0 |
| Propagation condition | - | Static |

Note that AICH_Ec/Ior can not be set. Its value is calculated from other parameters and it is given for information only. (AICH_Ec/Ior = AICH Power Offset + CPICH_Ec/Ior)

**Table 8.45: Test requirements for AI detection**

| Test Number | Pfa | 1-Pd |
|---|---|---|
| 1 | 0.01 | 0.01 |

# 8.14 Detection of Access Preamble Acquisition Indicator Channel (AP-AICH)

The requirement for detection of the AP-AICH for CPCH is the same as the requirement for detection of the AI which is described in section 8.13 of this specification.

# 8.15 Detection of Collision Detection/Channel Assignment Indicator Channel (CD/CA-ICH)

The requirement for detection of the CD/CA-ICH for CPCH is the same as the requirement for detection of the AI which is described in section 8.13 of this specification.



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# 8.16 Demodulation of CPCH Status Indicator Channel (CSICH)

The receive characteristics of the CPCH Status Indicator Channel (CSICH) when CA is not active are determined by the average message error Ratio (MER). Under the test conditions described in 8.16.1, a CSICH message demodulation error will cause the UE to transmit a CPCH message when there is pending UL data to transmit. MER is measured at the message rate listed for the conditions in Table 8.46.

The receive characteristics of the CSICH when CA is active are determined by the error rate of demodulation of Minium Available Spreading Factor (MASF). Under the test conditions described in 8.16.2, the demodulation error of MASF bits transmitted over CSICH will cause that the UE transmits wrong CPCH Access Preamble to UTRAN. MASF Error rate is measured under the condition in Table 8.50

## 8.16.1 Minimum requirement when CA is not active

For the parameters and conditions specified in Tables 8.46, 8.47 and 8.48 the MER shall not exceed the values listed in table 8.49.

Other downlink channels which are present in this test are P-CPICH, P-CCPCH, and PICH, and their powers are as specified in Annex C.3.2.

**Table 8.46: CPCH test parameters and conditions for CSICH performance when CA is not active**

| Parameter | Test 1 | Test 2 |
|---|---|---|
| CPCH mode | UE Channel Selection (PCPCH availability is broadcast in CSICH) | |
| Number of PCPCHs in CPCH set | 15 | |
| Number of SIs per CSICH frame | 15 (one SI message per PCPCH) | |
| Number of CSICH bits per SI message | 8 (CSICH bit repeated 8 times in each SI message) | |
| CSICH Message Rate | 750 per second (15 messages in 20 msec frame) | |
| AP preamble signatures | 15 PCPCHs are given 1 signature each; 1 signature is unused. | |
| AP preamble slot subchannels | All slot subchannels are available for access without delay. | |
| CD preamble signatures | 16 (all signatures used) | |
| CD preamble slot subchannels | All slot subchannels are available for access without delay. | |
| Persistency value for all PCPCHs | 1 (full access, no delay) | |
| CSICH broadcast | N=15 SIs. For each PCPCH SI, SI=0 (PCPCH not available) | |
| AP-AICH broadcast | In each access slot, Node B transmits 15 AP-AICH-ACKs, one for each PCPCH. | |
| Channel Assignment (CA) | Not active | |
| CD/CA-ICH broadcast | In each access slot, Node B transmits 16 CD/CA-ICH ACKs, one for each possible signature. | |
| Power control preamble length for all PCPCHs | 0 slots | |
| Message length for all PCPCHs | 10 ms (1 TTI) (Nfmax = 1) | |
| Spreading factor for all PCPCHs | 64 | |
| Propagation condition | Static | Case 3 |

**Table 8.47: AP-AICH test parameters for CSICH performance when CA is not active**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Number of transmitted AI signatures on AP-AICH | - | 15 (all ACK) | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| AP-AICH_Ec/Ior | dB | -10.0 | |
| AP-AICH Power Offset | dB | 0 | |
| Propagation condition | | Static | Case 3 |

Note that AP-AICH_Ec/Ior cannot be set. Its value is calculated from other parameters and it is given for information only. (AP-AICH_Ec/Ior = AP-AICH Power Offset + CPICH_Ec/Ior)



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**Table 8.48: CD/CA-ICH test parameters for CSICH performance when CA is not active**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Number of transmitted CD signatures on CD/CA-ICH | - | 16 (all ACK) | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| CD/CA-ICH_Ec/Ior | dB | -10.0 | |
| CD/CA-ICH Power Offset | dB | 0 | |
| Propagation condition | | Static | Case 3 |

Note that CD/CA-ICH_Ec/Ior cannot be set. Its value is calculated from other parameters and it is given for information only. (CD/CA-ICH_Ec/Ior = CD/CA-ICH Power Offset + CPICH_Ec/Ior)

**Table 8.49: CSICH demodulation requirements when CA is not active**

| Test Number | CSICH power offset | CSICH MER |
|---|---|---|
| 1 | -10.5 dB | 0.001 |
| 2 | -3.0 dB | 0.001 |

## 8.16.2 Minimum requirement when CA is active

For the parameters and conditions specified in Tables 8.50 and 8.51, the MASF Error rate shall not exceed the values listed in table 8.52.

Other downlink channels, which are present in this test, are P-CPICH, P-CCPCH, and PICH, and their powers are as specified in Annex C.3.2.

**Table 8.50: CPCH test parameters and conditions for CSICH performance when CA is active**

| Parameter | Test 1 | Test 2 |
|---|---|---|
| CPCH mode | Channel Assignment is active (PCPCH availability as well as Minimum Available Spreading Factor are broadcast in CSICH) | |
| Number of PCPCHs in CPCH set | 9 | |
| Number of SIs per CSICH frame | 15 (9 Sis for the availability of 9 PCPCH and 6 Sis for the transmission of MASF bits) | |
| Number of CSICH bits per SI message | 8 (CSICH bit repeated 8 times in each SI message) | |
| CSICH Message Rate | 750 per second (15 messages in 20 msec frame) | |
| AP preamble signatures | 2 signatures are given to each data rate and 2 signatures are unused.<br>Where: Signature number 0 and 1 correspond to MASF 256.<br>Signature number 2 and 3 correspond to MASF 128.<br>Signature number 4 and 5 correspond to MASF 64.<br>Signature number 6 and 7 correspond to MASF 32.<br>Signature number 8 and 9 correspond to MASF 16.<br>Signature number 10 and 11 correspond to MASF 8.<br>Signature number 12 and 13 correspond to MASF 4. | |
| AP preamble slot subchannels | All slot subchannels are available for access without delay. | |
| CSICH broadcast | The pattern of SIs is '000000000000000'<br>Where: MASF bits value is '000'<br>For each PCPCH SI, SI=0<br>(All PCPCH are not available) | |
| PCPCH data rate expected by the UE | More than 15 kbps | |
| AP-AICH broadcast | In each access slot, Node B transmits 14 AP-AICH-NACKs | |
| Propagation condition | Static | Case 3 |



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**Table 8.51: AP-AICH test parameters for CSICH performance when CA is active**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Number of transmitted AI signatures on AP-AICH | - | 14 | |
| $\hat{I}_{or}/I_{oc}$ | DB | -1 | -3 |
| AP-AICH_Ec/Ior | DB | -10.0 | |
| AP-AICH Power Offset | DB | 0 | |
| Propagation condition | | Static | Case 3 |

Note that AP-AICH_Ec/Ior cannot be set. Its value is calculated from other parameters and it is given for information only. (AP-AICH_Ec/Ior = AP-AICH Power Offset + CPICH_Ec/Ior)

**Table 8.52: CSICH demodulation requirements when CA is active**

| Test Number | CSICH power offset | CSICH MER |
|---|---|---|
| 1 | -12.55 db | 0.001 |
| 2 | -6.15 db | 0.001 |

Note that CSICH_Ec/Ior = CSICH power_Offset + CPICH_Ec/Ior

# 9 Performance requirement (HSDPA)

## 9.1 General

The performance requirements for the UE in this subclause apply for the reference measurement channels specified in Annex A.7, the propagation conditions specified in table B.1B of Annex B and the Down link Physical channels specified in Annex C.5.

## 9.2 Demodulation of HS-DSCH (Fixed Reference Channel)

The performance requirement for a particular UE belonging to certain HS-DSCH category are determined according to Table 9.1.

**Table 9.1: Mapping between HS-DSCH category and FRC**

| HS-DSCH category | Corresponding requirement |
|---|---|
| Category 1 | H-Set 1 |
| Category 2 | H-Set 1 |
| Category 3 | H-Set 2 |
| Category 4 | H-Set 2 |
| Category 5 | H-Set 3 |
| Category 6 | H-Set 3 |
| Category 7 | H-Set 6 |
| Category 8 | H-Set 6 |
| Category 11 | H-Set 4 |
| Category 12 | H-Set 5 |

During the Fixed Reference Channel tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.1A:



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**Table 9.1A: Node-B Emulator Behaviour in response to ACK/NACK/DTX**

| HS-DPCCH ACK/NACK Field State | Node-B Emulator Behaviour |
|---|---|
| ACK | ACK: new transmission using 1st redundancy and constellation version (RV) |
| NACK | NACK: retransmission using the next RV (up to the maximum permitted number or RV"s) |
| DTX | DTX: retransmission using the RV previously transmitted to the same H-ARQ process |

NOTE: Performance requirements in this section assume a sufficient power allocation to HS-SCCH_1 so that probability of reporting DTX is very low.

## 9.2.1 Single Link performance

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R

### 9.2.1.1 Requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

For the parameters specified in Table 9.2, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.3 and Table 9.3A for the DL reference channels specified in Annex A.7.1. Enhanced performance requirements specified in Table 9.3A are based on receiver diversity.

**Table 9.2: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Redundancy and constellation version coding sequence | | {0,2,5,6} | | | |
| Maximum number of HARQ transmission | | 4 | | | |

**Table 9.3: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 65 | 309 |
| | | -3 | N/A | 423 |
| 2 | PB3 | -6 | 23 | 181 |
| | | -3 | 138 | 287 |
| 3 | VA30 | -6 | 22 | 190 |
| | | -3 | 142 | 295 |
| 4 | VA120 | -6 | 13 | 181 |
| | | -3 | 140 | 275 |

* Notes: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1
2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)
3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)



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**Table 9.3A: Enhanced requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -12 | N/A | TBD |
| | | -9 | N/A | TBD |
| | | -6 | TBD | N/A |
| | | -3 | TBD | N/A |
| 2 | PB3 | -9 | N/A | 195 |
| | | -6 | 156 | 316 |
| | | -3 | 263 | N/A |
| 3 | VA30 | -9 | N/A | 212 |
| | | -6 | 171 | 329 |
| | | -3 | 273 | N/A |
| 4 | VA120 | -9 | N/A | 191 |
| | | -6 | 168 | 293 |
| | | -3 | 263 | N/A |
| * Notes: | 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | | |

### 9.2.1.2 Requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

For the parameters specified in Table 9.4, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.5 and Table 9.5A for the DL reference channels specified in Annex A.7.1. Enhanced performance requirements specified in Table 9.5A are based on receiver diversity.

**Table 9.4: Test Parameters for Testing 16-QAM FRCs H-Set 1/H-Set 2/H-Set 3**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Redundancy and constellation version coding sequence | | {6,2,1,5} | | | |
| Maximum number of HARQ transmission | | 4 | | | |

**Table 9.5: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 198 |
| | | -3 | 368 |
| 2 | PB3 | -6 | 34 |
| | | -3 | 219 |
| 3 | VA30 | -6 | 47 |
| | | -3 | 214 |
| 4 | VA120 | -6 | 28 |
| | | -3 | 167 |



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| | |
|---|---|
| * Notes: | 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) |

**Table 9.5A: Enhanced requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -9 | TBD |
| | | -6 | TBD |
| 2 | PB3 | -6 | 275 |
| | | -3 | 408 |
| 3 | VA30 | -6 | 296 |
| | | -3 | 430 |
| 4 | VA120 | -6 | 271 |
| | | -3 | 392 |
| * Notes: | 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | |

### 9.2.1.3 Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4/5

For the parameters specified in Table 9.6, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.7 and 9.8 for the DL reference channels specified in Annex A.7.1.4 and A.7.1.5.

**Table 9.6: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Redundancy and constellation version coding sequence | | {0,2,5,6} | | | |
| Maximum number of HARQ transmission | | 4 | | | |

**Table 9.7: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 72 | 340 |
| | | -3 | N/A | 439 |
| 2 | PB3 | -6 | 24 | 186 |
| | | -3 | 142 | 299 |
| 3 | VA30 | -6 | 19 | 183 |
| | | -3 | 148 | 306 |
| 4 | VA120 | -6 | 11 | 170 |
| | | -3 | 144 | 284 |
| * Note: | The reference value R is for the Fixed Reference Channel (FRC) H-Set 4 | | | |



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**Table 9.8: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 98 | 464 |
| | | -3 | N/A | 635 |
| 2 | PB3 | -6 | 35 | 272 |
| | | -3 | 207 | 431 |
| 3 | VA30 | -6 | 33 | 285 |
| | | -3 | 213 | 443 |
| 4 | VA120 | -6 | 20 | 272 |
| | | -3 | 210 | 413 |
| * Note: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5 | | | | |

### 9.2.1.4 Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 6

For the parameters specified in Table 9.8A, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.8B for the DL reference channels specified in Annex A.7.1.6.

**Table 9.8A: Test Parameters for Testing QPSK FRCs H-Set 6**

| Parameter | Unit | Test 1 |
|---|---|---|
| Phase reference | | P-CPICH |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| Redundancy and constellation version coding sequence | | {0,2,5,6} |
| Maximum number of HARQ transmission | | 4 |

**Table 9.8B: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 6**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 1407 |
| | | -3 | 2090 |

### 9.2.1.5 Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 6

For the parameters specified in Table 9.8C, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.8D for the DL reference channels specified in Annex A.7.1.6.

**Table 9.8C: Test Parameters for Testing 16-QAM FRCs H-Set 6**

| Parameter | Unit | Test 1 |
|---|---|---|
| Phase reference | | P-CPICH |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| Redundancy and constellation version coding sequence | | {6,2,1,5} |
| Maximum number of HARQ transmission | | 4 |



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**Table 9.8D: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 6**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 887 |
| | | -3 | 1664 |

## 9.2.2 Open Loop Diversity performance

The receiver single open loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

### 9.2.2.1 Requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

For the parameters specified in Table 9.9, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.10 and Table 9.10A for the DL reference channels specified in Annex A.7.1. Enhanced performance requirements specified in Table 9.10A are based on receiver diversity.

**Table 9.9: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| Phase reference | | P-CPICH | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Redundancy and constellation version coding sequence | | {0,2,5,6} | | |
| Maximum number of HARQ transmission | | 4 | | |

**Table 9.10: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 77 | 375 |
| | | -3 | 180 | 475 |
| 2 | PB3 | -6 | 20 | 183 |
| | | -3 | 154 | 274 |
| 3 | VA30 | -6 | 15 | 187 |
| | | -3 | 162 | 284 |
| * Notes: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | | | |



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**Table 9.10A: Enhanced requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -12 | N/A | TBD |
| | | -9 | N/A | TBD |
| | | -6 | TBD | N/A |
| | | -3 | TBD | N/A |
| 2 | PB3 | -9 | N/A | 183 |
| | | -6 | 152 | 288 |
| | | -3 | 251 | N/A |
| 3 | VA30 | -9 | N/A | 197 |
| | | -6 | 164 | 307 |
| | | -3 | 261 | N/A |
| * Notes: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | | | |

### 9.2.2.2 Requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

For the parameters specified in Table 9.11, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.12 and Table 9.12A for the DL reference channels specified in Annex A.7.1. Enhanced performance requirements specified in Table 9.12A are based on receiver diversity.

**Table 9.11: Test Parameters for Testing 16-QAM FRCs H-Set 1/H-Set 2/H-Set 3**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| Phase reference | | P-CPICH | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Redundancy and constellation version coding sequence | | {6,2,1,5} | | |
| Maximum number of HARQ transmission | | 4 | | |

**Table 9.12: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 295 |
| | | -3 | 463 |
| 2 | PB3 | -6 | 24 |
| | | -3 | 243 |
| 3 | VA30 | -6 | 35 |
| | | -3 | 251 |
| * Notes: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | | |



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**Table 9.12A: Enhanced requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -9 | TBD |
| | | -6 | TBD |
| 2 | PB3 | -6 | 251 |
| | | -3 | 374 |
| 3 | VA30 | -6 | 280 |
| | | -3 | 398 |
| * Notes: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | | |

### 9.2.2.3 Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4/5

For the parameters specified in Table 9.13, the requirements are specified in terms of a minimum information bit throughput R as shown in Tables 9.14 and 9.15 for the DL reference channels specified in Annex A.7.1.4 and A.7.1.5 respectively.

**Table 9.13: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5**

| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Phase reference | | P-CPICH | | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | | |
| Redundancy and constellation version coding sequence | | {0,2,5,6} | | | |
| Maximum number of HARQ transmission | | 4 | | | |

**Table 9.14: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 70 | 369 |
| | | -3 | 171 | 471 |
| 2 | PB3 | -6 | 14 | 180 |
| | | -3 | 150 | 276 |
| 3 | VA30 | -6 | 11 | 184 |
| | | -3 | 156 | 285 |
| * Note: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4 | | | | |



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**Table 9.15: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 116 | 563 |
| | | -3 | 270 | 713 |
| 2 | PB3 | -6 | 30 | 275 |
| | | -3 | 231 | 411 |
| 3 | VA30 | -6 | 23 | 281 |
| | | -3 | 243 | 426 |
| * Note: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5 | | | | |

## 9.2.3 Closed Loop Diversity Performance

The closed loop transmit diversity (Mode 1) performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

### 9.2.3.1 Requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

For the parameters specified in Table 9.16, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.17 and Table 9.17A for the DL reference channels specified in Annex A.7.1. Enhanced performance requirements specified in Table 9.17A are based on receiver diversity.

**Table 9.16: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| Phase reference | | P-CPICH | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| DPCH frame offset ($\tau_{DPCH,n}$) | Chip | 0 | | |
| Redundancy and constellation version coding sequence | | {0,2,5,6} | | |
| Maximum number of HARQ transmission | | 4 | | |
| Feedback Error Rate | % | 4 | | |
| Closed loop timing adjustment mode | | 1 | | |

**Table 9.17: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 118 | 399 |
| | | -3 | 225 | 458 |
| 2 | PB3 | -6 | 50 | 199 |
| | | -3 | 173 | 301 |
| 3 | VA30 | -6 | 47 | 204 |
| | | -3 | 172 | 305 |
| * Notes: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)s<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | | | |



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**Table 9.17A: Enhanced requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -12 | N/A | TBD |
| | | -9 | N/A | TBD |
| | | -6 | TBD | N/A |
| | | -3 | TBD | N/A |
| 2 | PB3 | -9 | N/A | 194 |
| | | -6 | 170 | 308 |
| | | -3 | 272 | N/A |
| 3 | VA30 | -9 | N/A | 204 |
| | | -6 | 172 | 315 |
| | | -3 | 270 | N/A |
| * Notes: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to I+1, i integer) | | | | |

### 9.2.3.2 Requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

For the parameters specified in Table 9.18, the requirements are specified in terms of a minimum information bit throughput R as shown in Table 9.19 and Table 9.19A for the DL reference channels specified in Annex A.7.1. Enhanced performance requirements specified in Table 9.19A are based on receiver diversity.

**Table 9.18: Test Parameters for Testing 16-QAM FRCs H-Set 1/H-Set 2/H-Set 3**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| Phase reference | | P-CPICH | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| DPCH frame offset ($\tau_{DPCH,n}$) | Chip | 0 | | |
| Redundancy and constellation version coding sequence | | {6,2,1,5} | | |
| Maximum number of HARQ transmission | | 4 | | |
| Feedback Error Rate | % | 4 | | |
| Closed loop timing adjustment mode | | 1 | | |



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**Table 9.19: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 361 |
| | | -3 | 500 |
| 2 | PB3 | -6 | 74 |
| | | -3 | 255 |
| 3 | VA30 | -6 | 84 |
| | | -3 | 254 |
| * Notes: | 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | |

**Table 9.19A: Enhanced requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3**

| Test Number | Propagation Conditions | Reference value | |
|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -9 | TBD |
| | | -6 | TBD |
| 2 | PB3 | -6 | 267 |
| | | -3 | 393 |
| 3 | VA30 | -6 | 279 |
| | | -3 | 404 |
| * Notes: | 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1<br>2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)<br>3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) | | |

### 9.2.3.3 Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4/5

For the parameters specified in Table 9.20, the requirements are specified in terms of a minimum information bit throughput R as shown in Tables 9.21 and 9.22 for the DL reference channels specified in Annex A.7.1.4 and A.7.1.5 respectively.

**Table 9.20: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| Phase reference | | P-CPICH | | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| DPCH frame offset ($\tau_{DPCH,n}$) | Chip | 0 | | |
| Redundancy and constellation version coding sequence | | {0,2,5,6} | | |
| Maximum number of HARQ transmission | | 4 | | |
| Feedback Error Rate | % | 4 | | |
| Closed loop timing adjustment mode | | 1 | | |



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**Table 9.21: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 114 | 398 |
| | | -3 | 223 | 457 |
| 2 | PB3 | -6 | 43 | 196 |
| | | -3 | 167 | 292 |
| 3 | VA30 | -6 | 40 | 199 |
| | | -3 | 170 | 305 |
| * Notes: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 4 | | | | |

**Table 9.22: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-PDSCH $E_c / I_{or}$ (dB) | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB | T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB |
| 1 | PA3 | -6 | 177 | 599 |
| | | -3 | 338 | 687 |
| 2 | PB3 | -6 | 75 | 299 |
| | | -3 | 260 | 452 |
| 3 | VA30 | -6 | 71 | 306 |
| | | -3 | 258 | 458 |
| * Note: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5 | | | | |

# 9.3 Reporting of Channel Quality Indicator

## 9.3.1 Single Link Performance

### 9.3.1.1 AWGN propagation conditions

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

#### 9.3.1.1.1 Minimum Requirement – UE capability categories 1-8 and 11, 12

For the parameters specified in Table 9.23, the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH BLER using transport format indicated by median CQI is less than 0.1, BLER using transport format indicated by (median CQI +2) shall be larger than 0.1. If the HS-PDSCH BLER using transport format indicated by median CQI is larger than 0.1, BLER using transport format indicated by (median CQI -1) shall be less than 0.1.



JCI Ex. 1021-0069

**Table 9.23: Test Parameter for CQI**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| $\hat{I}_{or} / I_{oc}$ | dB | 0 | 5 | 10 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Phase reference | - | P-CPICH | | |
| HS-PDSCH $E_c / I_{or}$ (*) | dB | -3 | | |
| HS-SCCH_1 $E_c / I_{or}$ | dB | -10 | | |
| DPCH $E_c / I_{or}$ | dB | -10 | | |
| Maximum number of H-ARQ transmission | - | 1 | | |
| Number of HS-SCCH set to be monitored | - | 1 | | |
| CQI feedback cycle | ms | 2 | | |
| CQI repetition factor | - | 1 | | |
| HS-DSCH transmission pattern | - | 'XOOXOOX' to incorporate inter-TTI=3 UEs, where 'X' indicates TTI in which HS-PDSCH is allocated to the UE, and 'O' indicates TTI, in which HS-PDSCH is not allocated to the UE. The HS-DSCH shall be transmitted continuously with constant power. | | |

Note1: Measurement power offset 'Γ' is configured by RRC accordingly and as defined in [7]

Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214

Note3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214

### 9.3.1.2 Fading propagation conditions

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

In calculating BLER, for an HARQ process, if an odd number of consecutive DTXs are reported, the corresponding packets and one subsequent packet shall be discarded from BLER calculation. If an even number of consecutive DTXs are reported, the corresponding packets shall be discarded from BLER calculation.

The specified requirements may be subject to further simulations to verify assumptions.

#### 9.3.1.2.1 Minimum Requirement – UE capability categories 1-8 and 11, 12

For the parameters specified in Table 9.26, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.27. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.



JCI Ex. 1021-0070

**Table 9.26: Test Parameters for CQI test in fading**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| HS-PDSCH $E_c / I_{or}$ (*) | dB | -8 | -4 |
| $\hat{I}_{or} / I_{oc}$ | dB | 0 | 5 |
| $I_{OC}$ | dBm/3.84 MHz | -60 | |
| Phase reference | - | P-CPICH | |
| HS-SCCH_1 $E_c / I_{or}$ | dB | -8.5 | |
| DPCH $E_c / I_{or}$ | dB | -6 | |
| Maximum number of H-ARQ transmission | - | 1 | |
| Number of HS-SCCH set to be monitored | - | 1 | |
| CQI feedback cycle | ms | 2 | |
| CQI repetition factor | - | 1 | |
| HS-DSCH transmission pattern | - | '....XOOXOOX....' to incorporate inter-TTI=3 UEs, where 'X' indicates TTI in which HS-PDSCH is allocated to the UE, and 'O' indicates TTI, in which HS-PDSCH is not allocated to the UE. The HS-DSCH shall be transmitted continuously with constant power. | |
| Propagation Channel | | Case 8 | |

Note1: Measurement power offset 'Γ' is configured by RRC accordingly and as defined in [7]

Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214

Note3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214

**Table 9.27: Minimum requirement for CQI test in fading**

| Reported CQI | Maximum BLER | |
|---|---|---|
| | Test 1 | Test2 |
| CQI median | 60% | 60% |
| CQI median + 3 | 15% | 15% |

## 9.3.2 Open Loop Diversity Performance

### 9.3.2.1 AWGN propagation conditions

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

#### 9.3.2.1.1 Minimum Requirement - UE capability categories 1-8 and 11, 12

For the parameters specified in Table 9.32, the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH (BLER) using transport format indicated by median CQI is less than 0.1, BLER using transport format indicated by (median CQI +2) shall be larger than 0.1. If the HS-PDSCH (BLER) using transport format indicated by median CQI is larger than 0.1, BLER using transport format indicated by (median CQI -1) shall be less than 0.1.



JCI Ex. 1021-0071

**Table 9.32: Test Parameter for CQI**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| $\hat{I}_{or} / I_{oc}$ | dB | 0 | 5 | 10 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Phase reference | - | P-CPICH | | |
| HS-PDSCH $E_c / I_{or}$ (*) | dB | -3 | | |
| HS-SCCH _1 $E_c / I_{or}$ | dB | -10 | | |
| DPCH $E_c / I_{or}$ | dB | -10 | | |
| Maximum number of H-ARQ transmission | - | 1 | | |
| Number of HS-SCCH set to be monitored | - | 1 | | |
| CQI feedback cycle | ms | 2 | | |
| CQI repetition factor | - | 1 | | |
| HS-DSCH transmission pattern | - | 'XOOXOOX' to incorporate inter-TTI=3 UEs, where 'X' indicates TTI in which HS-PDSCH is allocated to the UE, and 'O' indicates TTI, in which HS-PDSCH is not allocated to the UE. The HS-DSCH shall be transmitted continuously with constant power. | | |

Note1: Measurement power offset 'Γ' is configured by RRC accordingly and as defined in [7]

Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214

Note3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214

### 9.3.2.2 Fading propagation conditions

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The specified requirements may be subject to further simulations to verify assumptions.

#### 9.3.2.2.1 Minimum Requirement – UE capability categories 1-8 and 11, 12

For the parameters specified in Table 9.35, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.36. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.



JCI Ex. 1021-0072

**Table 9.35: Test Parameters for CQI test in fading**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| HS-PDSCH $E_c / I_{or}$ (*) | dB | -8 | -4 |
| $\hat{I}_{or} / I_{oc}$ | dB | 0 | 5 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Phase reference | - | P-CPICH | |
| HS-SCCH_1 $E_c / I_{or}$ | dB | -8.5 | |
| DPCH $E_c / I_{or}$ | dB | -6 | |
| Maximum number of H-ARQ transmission | - | 1 | |
| Number of HS-SCCH set to be monitored | - | 1 | |
| CQI feedback cycle | ms | 2 | |
| CQI repetition factor | - | 1 | |
| HS-DSCH transmission pattern | - | '....XOOXOOX....' to incorporate inter-TTI=3 UEs, where 'X' indicates TTI in which HS-PDSCH is allocated to the UE, and 'O' indicates TTI, in which HS-PDSCH is not allocated to the UE. The HS-DSCH shall be transmitted continuously with constant power. | |
| Propagation Channel | | Case 8 | |

Note1: Measurement power offset 'Γ' is configured by RRC accordingly and as defined in [7]

Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214

Note3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214

**Table 9.36: Minimum requirement for CQI test in fading**

| Reported CQI | Maximum BLER | |
|---|---|---|
| | Test 1 | Test2 |
| CQI median | 60% | 60% |
| CQI median + 3 | 15% | 15% |

## 9.3.3 Closed Loop Diversity Performance

### 9.3.3.1 AWGN propagation conditions

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

#### 9.3.3.1.1 Minimum Requirement - UE capability categories 1-8 and 11, 12

For the parameters specified in Table 9.41, the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH (BLER) using transport format indicated by median CQI is less than 0.1, BLER using transport format indicated by (median CQI +2) shall be larger than 0.1. If the HS-PDSCH (BLER) using transport format indicated by median CQI is larger than 0.1, BLER using transport format indicated by (median CQI -1) shall be less than 0.1.



JCI Ex. 1021-0073

**Table 9.41: Test Parameter for CQI**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| $\hat{I}_{or} / I_{oc}$ | dB | 0 | 5 | 10 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Phase reference | - | P-CPICH | | |
| HS-PDSCH $E_c / I_{or}$ (*) | dB | -3 | | |
| HS-SCCH _1 $E_c / I_{or}$ | dB | -10 | | |
| DPCH $E_c / I_{or}$ | dB | -10 | | |
| Maximum number of H-ARQ transmission | - | 1 | | |
| Number of HS-SCCH set to be monitored | - | 1 | | |
| CQI feedback cycle | ms | 2 | | |
| CQI repetition factor | - | 1 | | |
| Feedback Error Rate | % | 0 | | |
| Closed loop timing adjustment mode | | 1 | | |
| HS-DSCH transmission pattern | - | 'XOOXOOX' to incorporate inter-TTI=3 UEs, where 'X' indicates TTI in which HS-PDSCH is allocated to the UE, and 'O' indicates TTI, in which HS-PDSCH is not allocated to the UE. The HS-DSCH shall be transmitted continuously with constant power. | | |

Note1: Measurement power offset 'Γ' is configured by RRC accordingly and as defined in [7]
Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214
Note3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214

### 9.3.3.2 Fading propagation conditions

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The specified requirements may be subject to further simulations to verify assumptions.

#### 9.3.3.2.1 Minimum Requirement – UE capability categories 1-8 and 11, 12

For the parameters specified in Table 9.44, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.45. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.



JCI Ex. 1021-0074

**Table 9.44: Test Parameters for CQI test in fading**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| HS-PDSCH $E_c / I_{or}$ (*) | dB | -8 | -4 |
| $\hat{I}_{or} / I_{oc}$ | dB | 0 | 5 |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Phase reference | - | P-CPICH | |
| HS-SCCH_1 $E_c / I_{or}$ | dB | -8.5 | |
| DPCH $E_c / I_{or}$ | dB | -6 | |
| Maximum number of H-ARQ transmission | - | 1 | |
| Number of HS-SCCH set to be monitored | - | 1 | |
| CQI feedback cycle | ms | 2 | |
| CQI repetition factor | - | 1 | |
| Feedback Error Rate | % | 0 | |
| Closed loop timing adjustment mode | | 1 | |
| HS-DSCH transmission pattern | - | '....XOOXOOX....' to incorporate inter-TTI=3 UEs, where 'X' indicates TTI in which HS-PDSCH is allocated to the UE, and 'O' indicates TTI, in which HS-PDSCH is not allocated to the UE. The HS-DSCH shall be transmitted continuously with constant power. | |
| Propagation Channel | | Case 8 | |
| Note1: Measurement power offset 'T' is configured by RRC accordingly and as defined in [7]<br>Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214<br>Note3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 | | | |

**Table 9.45: Minimum requirement for CQI test in fading**

| Reported CQI | Maximum BLER | |
|---|---|---|
| | Test 1 | Test2 |
| CQI median | 60% | 60% |
| CQI median + 3 | 15% | 15% |

## 9.4 HS-SCCH Detection Performance

The detection performance of the HS-SCCH is determined by the probability of event $E_m$, which is declared when the UE is signaled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event $E_m$ is denoted $P(E_m)$.

### 9.4.1 Single Link Performance

For the test parameters specified in Table 9.50, for each value of HS-SCCH-1 $E_c/I_{or}$ specified in Table 9.51 and Table 9.51A the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. Enhanced performance requirements specified in Table 9.51A are based on receiver diversity.



JCI Ex. 1021-0075

**Table 9.50: Test parameters for HS-SCCH detection**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Phase reference | - | P-CPICH | | |
| P-CPICH $E_c / I_{or}$ (*) | dB | -10 | | |
| HS-SCCH UE Identity ( $x_{ue,1}$ , $x_{ue,2}$ , …, $x_{ue,16}$ ) | | HS-SCCH-1: 1010101010101010<br>(UE under test addressed solely via HS-SCCH-1)<br>HS-SCCH-2: 0001001010101010<br>HS-SCCH-3: 0001101010101010<br>HS-SCCH-4: 0001111110101010 | | |
| HS-DSCH TF of UE1 | | TF corresponding to CQI1 | | |
| HS-SCCH-1 TTI Transmission Pattern | - | '…XOOXOOX…', where 'X' indicates TTI in which HS-SCCH-1 signals the UE, and 'O' indicates no signalling | | |

**Table 9.51: Minimum requirement for HS-SCCH detection**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-SCCH-1 $E_c / I_{or}$ (dB) | $\hat{I}_{or} / I_{oc}$ (dB) | $P(E_m)$ |
| 1 | PA3 | -9 | 0 | 0.05 |
| 2 | PA3 | -9.9 | 5 | 0.01 |
| 3 | VA30 | -10 | 0 | 0.01 |

**Table 9.51A: Enhanced requirement for HS-SCCH detection**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-SCCH-1 $E_c / I_{or}$ (dB) | $\hat{I}_{or} / I_{oc}$ (dB) | $P(E_m)$ |
| 1 | PA3 | -15.2 | 0 | 0.05 |
| 2 | PA3 | -16.3 | 5 | 0.01 |
| 3 | VA30 | -15.6 | 0 | 0.01 |

## 9.4.2 Open Loop Diversity Performance

For the test parameters specified in Table 9.52, for each value of HS-SCCH-1 $E_c/I_{or}$ specified in Table 9.53 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

**Table 9.52: Test parameters for HS-SCCH detection**

| Parameter | Unit | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|
| $I_{oc}$ | dBm/3.84 MHz | -60 | | |
| Phase reference | - | P-CPICH | | |
| P-CPICH $E_c / I_{or}$ (*) | dB | -10 | | |
| HS-SCCH UE Identity ( $x_{ue,1}$ , $x_{ue,2}$ , …, $x_{ue,16}$ ) | | HS-SCCH-1: 1010101010101010<br>(UE under test addressed solely via HS-SCCH-1)<br>HS-SCCH-2: 0001001010101010<br>HS-SCCH-3: 0001101010101010<br>HS-SCCH-4: 0001111110101010 | | |
| HS-DSCH TF of UE1 | | TF corresponding to CQI1 | | |
| HS-SCCH-1 TTI Transmission Pattern | - | '…XOOXOOX…', where 'X' indicates TTI in which HS-SCCH-1 signals the UE, and 'O' indicates no signalling | | |



JCI Ex. 1021-0076

**Table 9.53: Minimum requirement for HS-SCCH detection**

| Test Number | Propagation Conditions | Reference value | | |
|---|---|---|---|---|
| | | HS-SCCH-1 $E_c / I_{or}$ (dB) | $\hat{I}_{or} / I_{oc}$ (dB) | $P(E_m)$ |
| 1 | PA3 | -11.6 | 0 | 0.05 |
| 2 | PA3 | -13.4 | 5 | 0.01 |
| 3 | VA30 | -11.5 | 0 | 0.01 |



JCI Ex. 1021-0077

# Annex A (normative): Measurement channels

## A.1 General

The measurement channels in this annex are defined to derive the requirements in clauses 6, 7 and 8. The measurement channels represent example configuration of radio access bearers for different data rates.

The measurement channel for 12.2 kbps shall be supported by any UE both in up- and downlink. Support for other measurement channels is depending on the UE Radio Access capabilities.

## A.2 UL reference measurement channel

### A.2.1 UL reference measurement channel (12.2 kbps)

The parameters for the 12.2 kbps UL reference measurement channel are specified in Table A.1 and Table A.2. The channel coding for information is shown in figure A.1.

**Table A.1: UL reference measurement channel physical parameters (12.2 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 12.2 |
| DPDCH | kbps | 60 |
| DPCCH | kbps | 15 |
| DPCCH Slot Format #i | - | 0 |
| DPCCH/DPDCH power ratio | dB | -5.46 |
| TFCI | - | On |
| Repetition | % | 23 |
| NOTE: Slot Format #2 is used for closed loop tests in subclause 8.6.2. Slot Format #2 and #5 are used for site selection diversity transmission tests in subclause 8.6.3 | | |

**Table A.2: UL reference measurement channel, transport channel parameters (12.2 kbps)**

| Parameters | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 244 | 100 |
| Transport Block Set Size | 244 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Convolution Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |



JCI Ex. 1021-0078

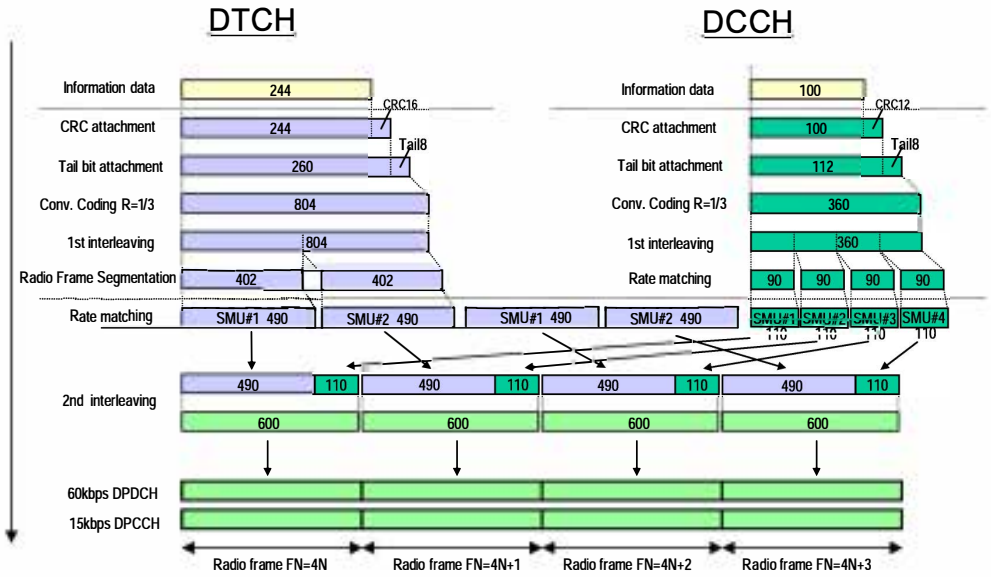



**Figure A.1 (Informative): Channel coding of UL reference measurement channel (12.2 kbps)**

## A.2.2 UL reference measurement channel (64 kbps)

The parameters for the 64 kbps UL reference measurement channel are specified in Table A.3 and Table A.4. The channel coding for information is shown in figure A.2. This measurement channel is not currently used in TS 25.101 but can be used for future requirements.

**Table A.3: UL reference measurement channel (64 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 64 |
| DPDCH | kbps | 240 |
| DPCCH | kbps | 15 |
| DPCCH Slot Format #i | - | 0 |
| DPCCH/DPDCH power ratio | dB | -9.54 |
| TFCI | - | On |
| Repetition | % | 18 |

**Table A.4: UL reference measurement channel, transport channel parameters (64 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 1280 | 100 |
| Transport Block Set Size | 1280 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |



JCI Ex. 1021-0079

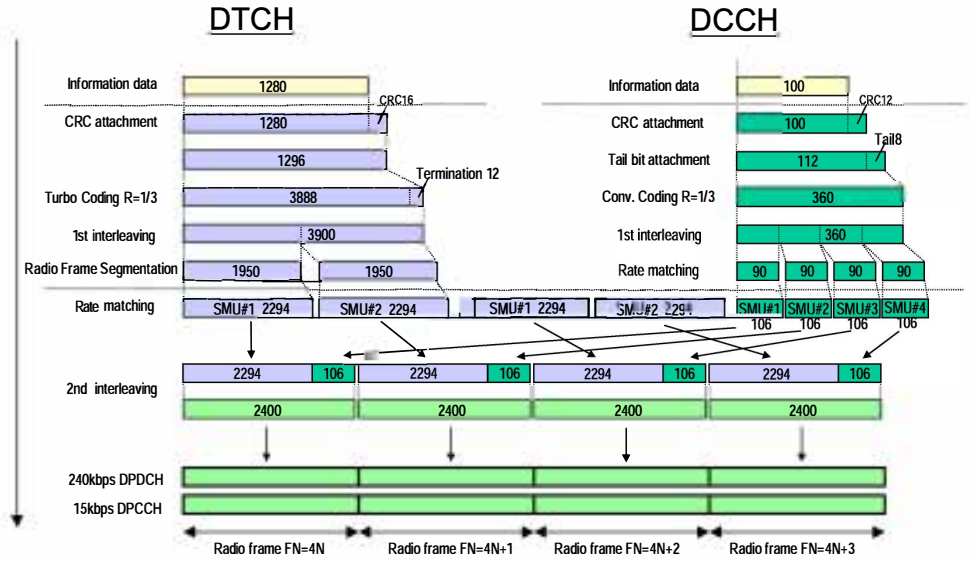



**Figure A.2 (Informative): Channel coding of UL reference measurement channel (64 kbps)**

## A.2.3 UL reference measurement channel (144 kbps)

The parameters for the 144 kbps UL reference measurement channel are specified in Table A.5 and Table A.6. The channel coding for information is shown in Figure A.3. This measurement channel is not currently used in the present document but can be used for future requirements.

**Table A.5: UL reference measurement channel (144 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 144 |
| DPDCH | kbps | 480 |
| DPCCH | kbps | 15 |
| DPCCH Slot Format #i | - | 0 |
| DPCCH/DPDCH power ratio | dB | -11.48 |
| TFCI | - | On |
| Repetition | % | 8 |

**Table A.6: UL reference measurement channel, transport channel parameters (144kbps)**

| Parameters | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 2880 | 100 |
| Transport Block Set Size | 2880 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |



JCI Ex. 1021-0080

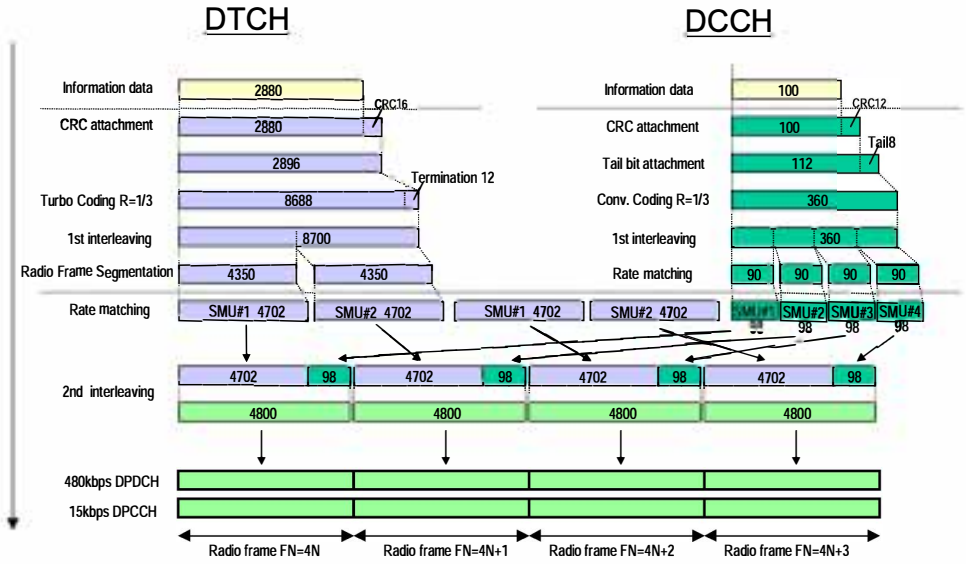



**Figure A.3 (Informative): Channel coding of UL reference measurement channel (144 kbps)**

## A.2.4 UL reference measurement channel (384 kbps)

The parameters for the 384 kbps UL reference measurement channel are specified in Table A.7 and Table A.8. The channel coding for information is shown in Figure A.4. This measurement channel is not currently used in TS 25.101 but can be used for future requirements.

**Table A.7: UL reference measurement channel (384 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 384 |
| DPDCH | kbps | 960 |
| DPCCH | kbps | 15 |
| DPCCH Slot Format #I | - | 0 |
| DPCCH/DPDCH power ratio | dB | -11.48 |
| TFCI | - | On |
| Puncturing | % | 18 |

**Table A.8: UL reference measurement channel, transport channel parameters (384 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 3840 | 100 |
| Transport Block Set Size | 3840 | 100 |
| Transmission Time Interval | 10 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |



JCI Ex. 1021-0081

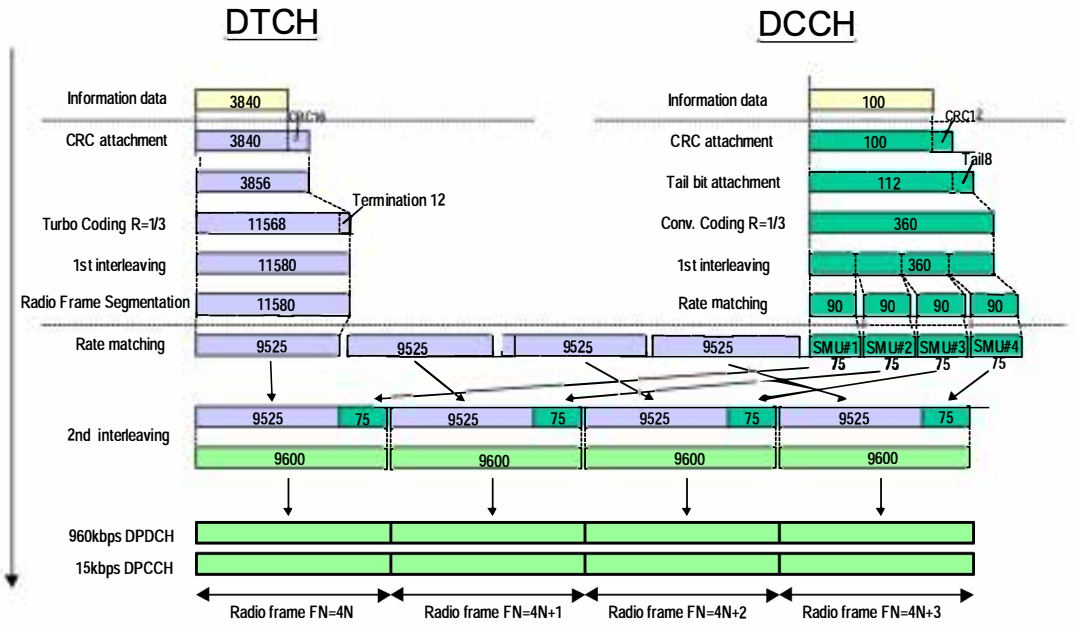



**Figure A.4 (Informative): Channel coding of UL reference measurement channel (384 kbps)**

## A.2.5 UL reference measurement channel (768 kbps)

The parameters for the UL measurement channel for 768 kbps are specified in Table A.9 and Table A.10.

**Table A.9: UL reference measurement channel, physical parameters (768 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 2*384 |
| $DPDCH_1$ | kbps | 960 |
| $DPDCH_2$ | kbps | 960 |
| DPCCH | kbps | 15 |
| DPCCH Slot Format #i | - | 0 |
| DPCCH/DPDCH power ratio | dB | -11.48 |
| TFCI | - | On |
| Puncturing | % | 18 |

**Table A.10: UL reference measurement channel, transport channel parameters (768 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 3840 | 100 |
| Transport Block Set Size | 7680 | 100 |
| Transmission Time Interval | 10 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |



JCI Ex. 1021-0082

# A.3 DL reference measurement channel

## A.3.1 DL reference measurement channel (12.2 kbps)

The parameters for the 12.2 Kbps DL reference measurement channel are specified in Table A.11 and Table A.12. The channel coding is shown for information in figure A.5.

**Table A.11: DL reference measurement channel physical parameters (12.2 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 12.2 |
| DPCH | ksps | 30 |
| Slot Format #i | - | 11 |
| TFCI | - | On |
| Power offsets PO1, PO2 and PO3 | dB | 0 |
| Puncturing | % | 14.7 |

**Table A.12: DL reference measurement channel, transport channel parameters (12.2 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 244 | 100 |
| Transport Block Set Size | 244 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Convolution Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |
| Position of TrCH in radio frame | fixed | fixed |

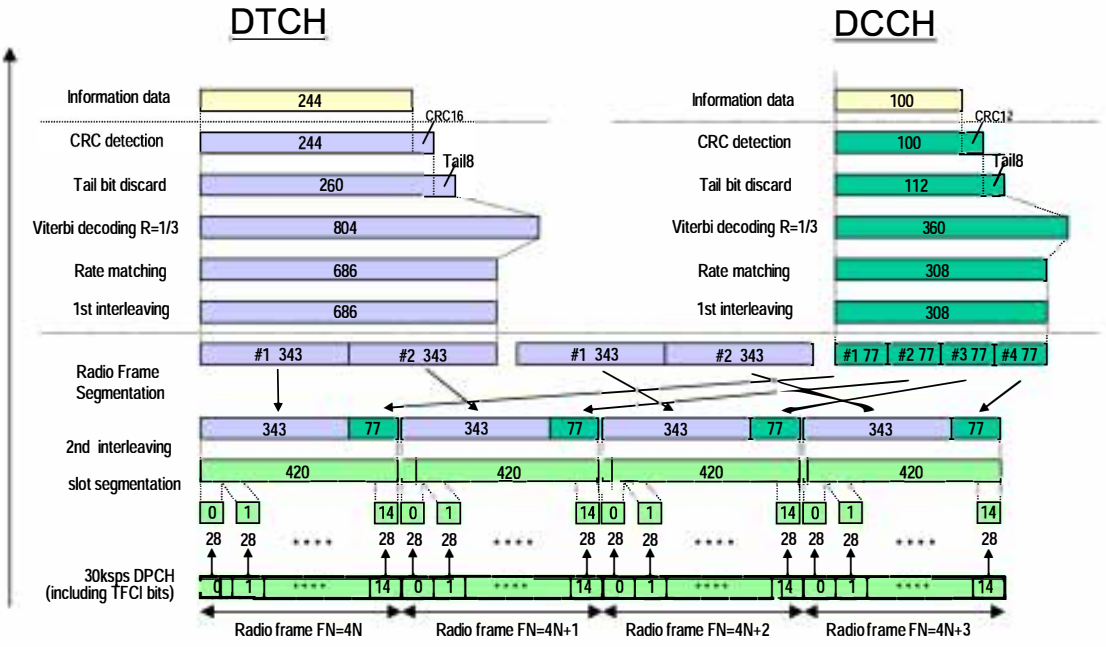



**Figure A.5 (Informative): Channel coding of DL reference measurement channel (12.2 kbps)**



JCI Ex. 1021-0083

## A.3.2 DL reference measurement channel (64 kbps)

The parameters for the DL reference measurement channel for 64 kbps are specified in Table A.13 and Table A.14. The channel coding is shown for information in Figure A.6.

**Table A.13: DL reference measurement channel physical parameters (64 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 64 |
| DPCH | ksps | 120 |
| Slot Format #i | - | 13 |
| TFCI | - | On |
| Power offsets PO1, PO2 and PO3 | dB | 0 |
| Repetition | % | 2.9 |

**Table A.14: DL reference measurement channel, transport channel parameters (64 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 1280 | 100 |
| Transport Block Set Size | 1280 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |
| Position of TrCH in radio frame | fixed | fixed |

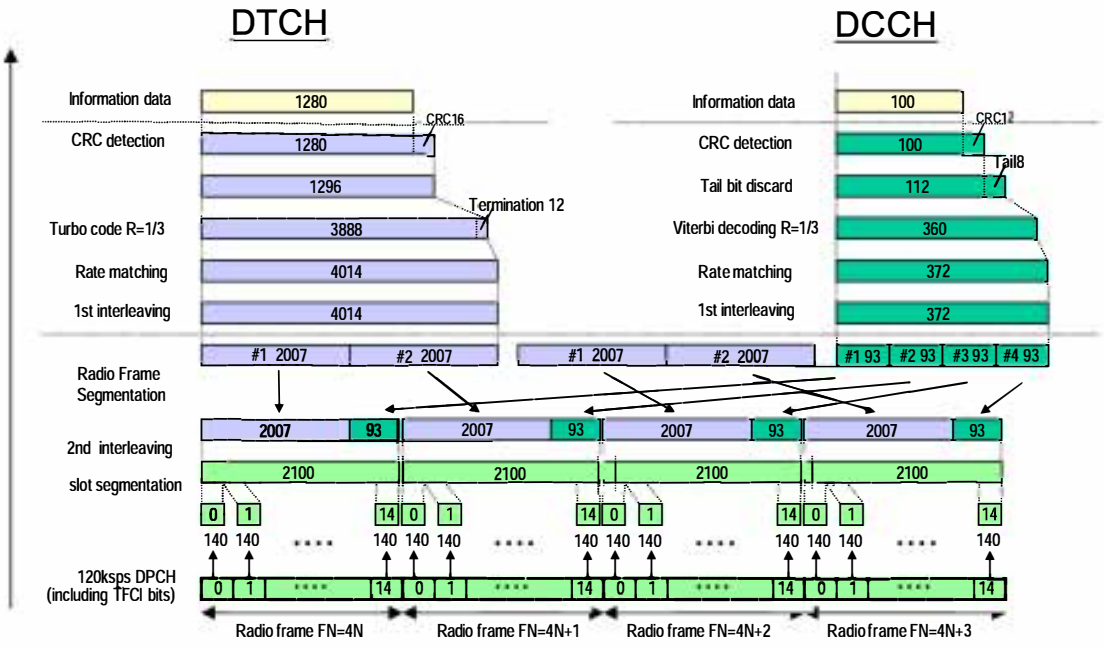



**Figure A.6 (Informative): Channel coding of DL reference measurement channel (64 kbps)**



JCI Ex. 1021-0084

## A.3.3 DL reference measurement channel (144 kbps)

The parameters for the DL measurement channel for 144 kbps are specified in Table A.15 and Table A.16. The channel coding is shown for information in Figure A.7.

**Table A.15: DL reference measurement channel physical parameters (144 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 144 |
| DPCH | ksps | 240 |
| Slot Format #i | - | 14 |
| TFCI | - | On |
| Power offsets PO1, PO2 and PO3 | dB | 0 |
| Puncturing | % | 2.7 |

**Table A.16: DL reference measurement channel, transport channel parameters (144 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 2880 | 100 |
| Transport Block Set Size | 2880 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |
| Position of TrCH in radio frame | fixed | fixed |

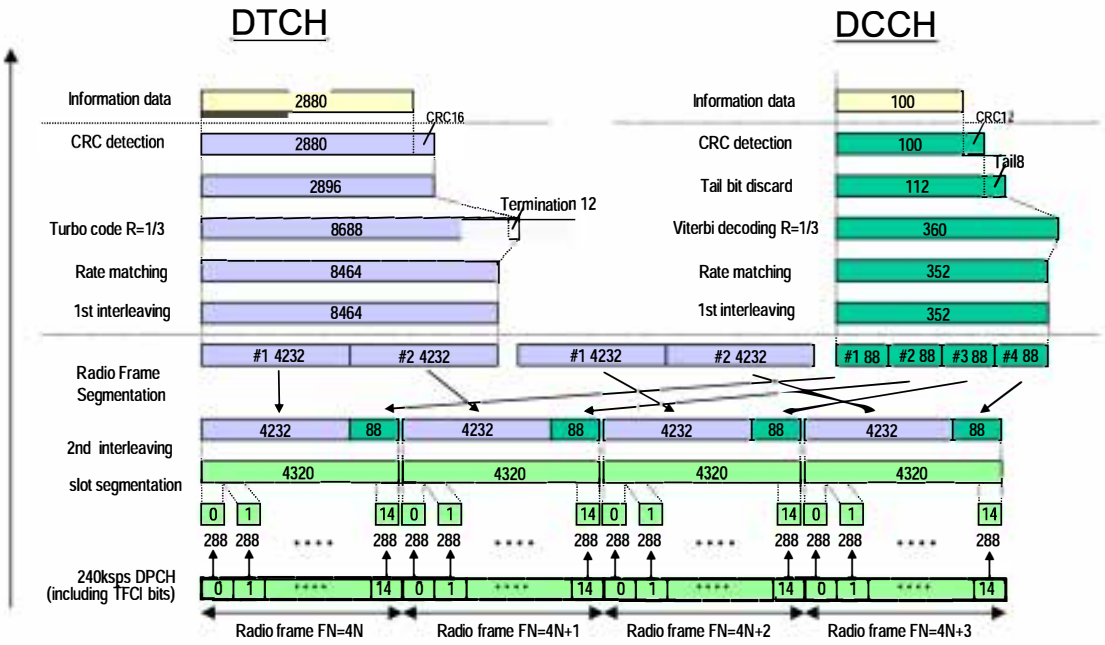



**Figure A.7 (Informative): Channel coding of DL reference measurement channel (144 kbps)**



JCI Ex. 1021-0085

## A.3.4 DL reference measurement channel (384 kbps)

The parameters for the DL measurement channel for 384 kbps are specified in Table A.17 and Table A.18. The channel coding is shown for information in Figure A.8

**Table A.17: DL reference measurement channel, physical parameters (384 kbps)**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 384 |
| DPCH | ksps | 480 |
| Slot Format # i | - | 15 |
| TFCI | | On |
| Power offsets PO1, PO2 and PO3 | dB | 0 |
| Puncturing | % | 22 |

**Table A.18: DL reference measurement channel, transport channel parameters (384 kbps)**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 3840 | 100 |
| Transport Block Set Size | 3840 | 100 |
| Transmission Time Interval | 10 ms | 40 ms |
| Type of Error Protection | Turbo Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CRC | 16 | 12 |
| Position of TrCH in radio frame | fixed | Fixed |

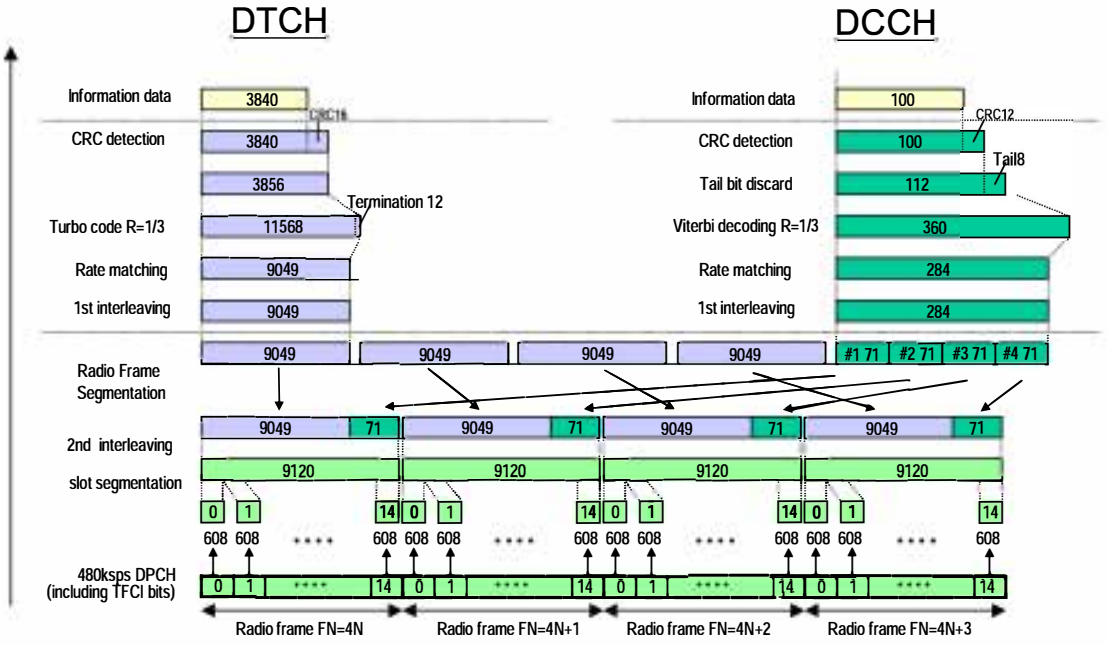



**Figure A.8 (Informative): Channel coding of DL reference measurement channel (384 kbps)**



JCI Ex. 1021-0086

# A.4 DL reference measurement channel for BTFD performance requirements

The parameters for DL reference measurement channel for BTFD are specified in Table A.19 and Table A.20. The channel coding for information is shown in figures A.9, A.10, and A11.

**Table A.19: DL reference measurement channel physical parameters for BTFD**

| Parameter | Unit | Rate 1 | Rate 2 | Rate 3 |
|---|---|---|---|---|
| Information bit rate | kbps | 12.2 | 7.95 | 1.95 |
| DPCH | ksps | 30 | | |
| Slot Format # i | - | 8 | | |
| TFCI | - | Off | | |
| Power offsets PO1, PO2 and PO3 | dB | 0 | | |
| Repetition | % | 5 | | |

**Table A.20: DL reference measurement channel, transport channel parameters for BTFD**

| Parameter | DTCH | | | DCCH |
|---|---|---|---|---|
| | Rate 1 | Rate 2 | Rate 3 | |
| Transport Channel Number | 1 | | | 2 |
| Transport Block Size | 244 | 159 | 39 | 100 |
| Transport Block Set Size | 244 | 159 | 39 | 100 |
| Transmission Time Interval | 20 ms | | | 40 ms |
| Type of Error Protection | Convolution Coding | | | Convolution Coding |
| Coding Rate | 1/3 | | | 1/3 |
| Rate Matching attribute | 256 | | | 256 |
| Size of CRC | 12 | | | 12 |
| Position of TrCH in radio frame | fixed | | | fixed |

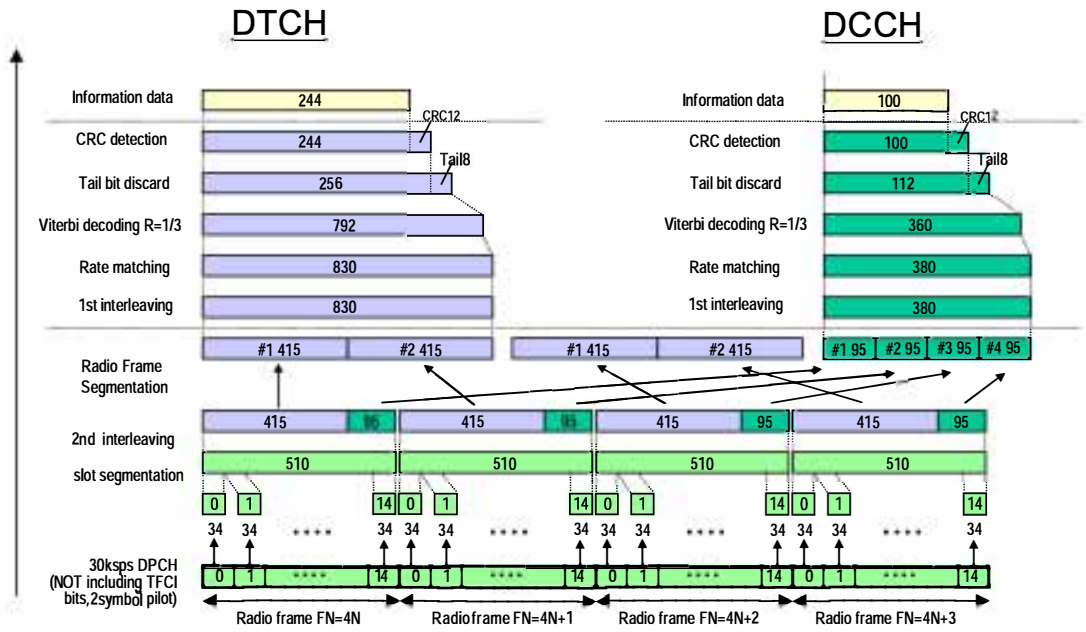



**Figure A.9 (Informative): Channel coding of DL reference measurement channel for BTFD (Rate 1)**



JCI Ex. 1021-0087

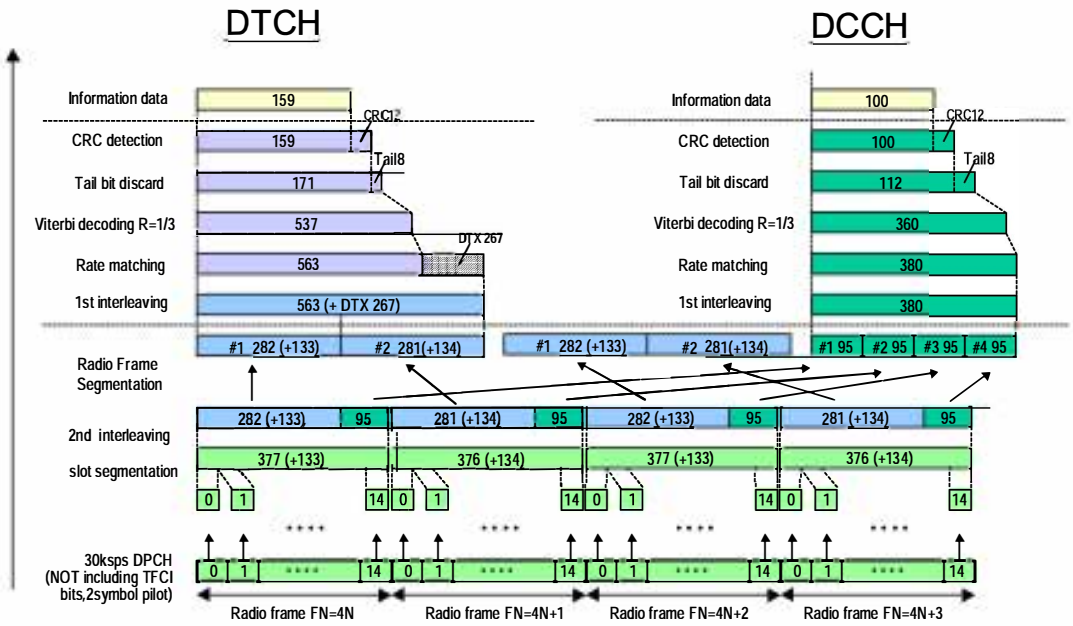



**Figure A.10 (Informative): Channel coding of DL reference measurement channel for BTFD (Rate 2)**

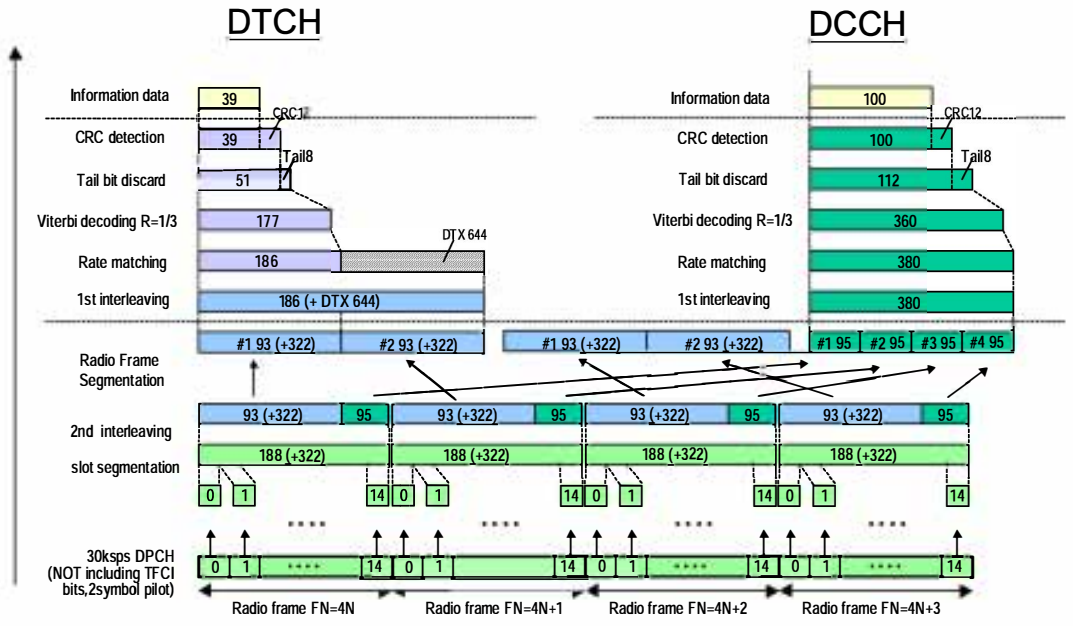



**Figure A.11 (Informative): Channel coding of DL reference measurement channel for BTFD (Rate 3)**



JCI Ex. 1021-0088

# A.4A DL reference measurement channel for requirements using DPCCH with 4 pilot bits as phase reference

## A.4A.1 DL reference measurement channel (12.2 kbps)

The parameters for the 12.2 Kbps DL reference measurement channel are specified in Table A.20A and Table A.20B. The channel coding is shown for information in figure A.11A.

**Table A.20A: DL reference measurement channel physical parameters for DPCCH used as phase reference**

| Parameter | Unit | Level |
|---|---|---|
| Information bit rate | kbps | 12.2 |
| DPCH | ksps | 30 |
| Slot Format #i | - | 9 |
| TFCI | - | On |
| Power offsets PO1, PO2 and PO3 | dB | 0 |
| Puncturing | % | 2.5 |

**Table A.20B: DL reference measurement channel, transport channel parameters for DPCCH used as phase reference**

| Parameter | DTCH | DCCH |
|---|---|---|
| Transport Channel Number | 1 | 2 |
| Transport Block Size | 244 | 100 |
| Transport Block Set Size | 244 | 100 |
| Transmission Time Interval | 20 ms | 40 ms |
| Type of Error Protection | Convolution Coding | Convolution Coding |
| Coding Rate | 1/3 | 1/3 |
| Rate Matching attribute | 256 | 256 |
| Size of CR C | 16 | 12 |
| Position of TrCH in radio frame | fixed | fixed |



JCI Ex. 1021-0089

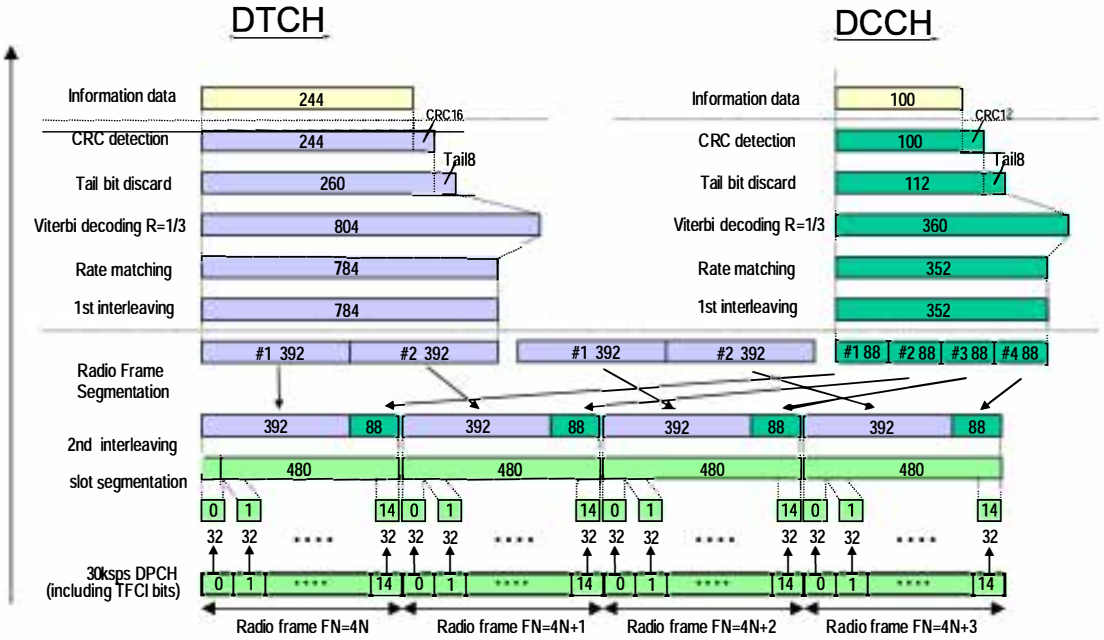



**Figure A.11A (Informative): Channel coding of DL reference measurement channel for requirements using DPCCH with 4 channel bits (12.2 kbps)**

## A.5 DL reference compressed mode parameters

Parameters described in Table A.21 are used in some test specified in TS 25.101 while parameters described in Table A.22 are used in some tests specified in TS 25.133.

Set 1 parameters in Table A.21 are applicable when compressed mode by spreading factor reduction is used in downlink. Set 2 parameters in Table A.21 are applicable when compressed mode by puncturing is used in downlink.

**Table A.21: Compressed mode reference pattern 1 parameters**

| Parameter | Set 1 | Set 2 | Note |
|---|---|---|---|
| TGSN (Transmission Gap Starting Slot Number) | 11 | 11 | |
| TGL1 (Transmission Gap Length 1) | 7 | 7 | |
| TGL2 (Transmission Gap Length 2) | - | - | Only one gap in use. |
| TGD (Transmission Gap Distance) | 0 | 0 | Only one gap in use. |
| TGPL1 (Transmission Gap Pattern Length) | 4 | 4 | |
| TGPL2 (Transmission Gap Pattern Length) | - | - | Only one pattern in use. |
| TGPRC (Transmission Gap Pattern Repetition Count) | NA | NA | Defined by higher layers |
| TGCFN (Transmission Gap Connection Frame Number): | NA | NA | Defined by higher layers |
| UL/DL compressed mode selection | DL & UL | DL & UL | 2 configurations possible DL &UL / DL |
| UL compressed mode method | SF/2 | SF/2 | |
| DL compressed mode method | SF/2 | Puncturing | |
| Downlink frame type and Slot format | 11B | 11A | |
| Scrambling code change | No | No | |
| RPP ( Recovery period power control mode) | 0 | 0 | |
| ITP ( Initial transmission power control mode) | 0 | 0 | |



JCI Ex. 1021-0090

**Table A.22: Compressed mode reference pattern 2 parameters**

| Parameter | Set 1 | Set 2 | Set 3 | Set 4 | Note |
|---|---|---|---|---|---|
| TGSN (Transmission Gap Starting Slot Number) | 4 | 4 | 10 | 8 | |
| TGL1 (Transmission Gap Length 1) | 7 | 7 | 10 | 14 | |
| TGL2 (Transmission Gap Length 2) | - | - | - | - | Only one gap in use. |
| TGD (Transmission Gap Distance) | 0 | 0 | 0 | 0 | |
| TGPL1 (Transmission Gap Pattern Length) | 3 | 12 | 11 | 4 | |
| TGPL2 (Transmission Gap Pattern Length) | - | - | - | | Only one pattern in use. |
| TGPRC (Transmission Gap Pattern Repetition Count) | NA | NA | NA | NA | Defined by higher layers |
| TGCFN (Transmission Gap Connection Frame Number): | NA | NA | NA | NA | Defined by higher layers |
| UL/DL compressed mode selection | DL & UL | DL & UL | DL & UL | DL & UL | 2 configurations possible. DL & UL / DL |
| UL compressed mode method | SF/2 | SF/2 | SF/2 | SF/2 | |
| DL compressed mode method | SF/2 | SF/2 | Puncturing | SF/2 | |
| Downlink frame type and Slot format | 11B | 11B | 11A | 11B | |
| Scrambling code change | No | No | No | No | |
| RPP (Recovery period power control mode) | 0 | 0 | 0 | 0 | |
| ITP (Initial transmission power control mode) | 0 | 0 | 0 | 0 | |

# A.6 DL reference parameters for PCH tests

The parameters for the PCH demodulation tests are specified in Table A.23 and Table A.24.

**Table A.23: Physical channel parameters for S-CCPCH**

| Parameter | Unit | Level |
|---|---|---|
| Channel bit rate | kbps | 60 |
| Channel symbol rate | ksps | 30 |
| Slot Format #i | - | 4 |
| TFCI | - | OFF |
| Power offsets of TFCI and Pilot fields relative to data field | dB | 0 |

**Table A.24: Transport channel parameters for S-CCPCH**

| Parameter | PCH |
|---|---|
| Transport Channel Number | 1 |
| Transport Block Size | 240 |
| Transport Block Set Size | 240 |
| Transmission Time Interval | 10 ms |
| Type of Error Protection | Convolution Coding |
| Coding Rate | 1/2 |
| Rate Matching attribute | 256 |
| Size of CRC | 16 |
| Position of TrCH in radio frame | fixed |



JCI Ex. 1021-0091

# A.7 DL reference channel parameters for HSDPA tests

## A.7.1 Fixed Reference Channel (FRC)

### A.7.1.1 Fixed Reference Channel Definition H-Set 1

**Table A.25: Fixed Reference Channel H-Set 1**

| Parameter | Unit | Value | |
|---|---|---|---|
| Nominal Avg. Inf. Bit Rate | kbps | 534 | 777 |
| Inter-TTI Distance | TTI"s | 3 | 3 |
| Number of HARQ Processes | Proces ses | 2 | 2 |
| Information Bit Payload ( $N_{INF}$ ) | Bits | 3202 | 4664 |
| Number Code Blocks | Blocks | 1 | 1 |
| Binary Channel Bits Per TTI | Bits | 4800 | 7680 |
| Total Available SML"s in UE | SML"s | 19200 | 19200 |
| Number of SML"s per HARQ Proc. | SML"s | 9600 | 9600 |
| Coding Rate | | 0.67 | 0.61 |
| Number of Physical Channel Codes | Codes | 5 | 4 |
| Modulation | | QPSK | 16QAM |
| Note: The HS-DSCH shall be transmitted continuously with constant power but only every third TTI shall be allocated to the UE under test. | | | |

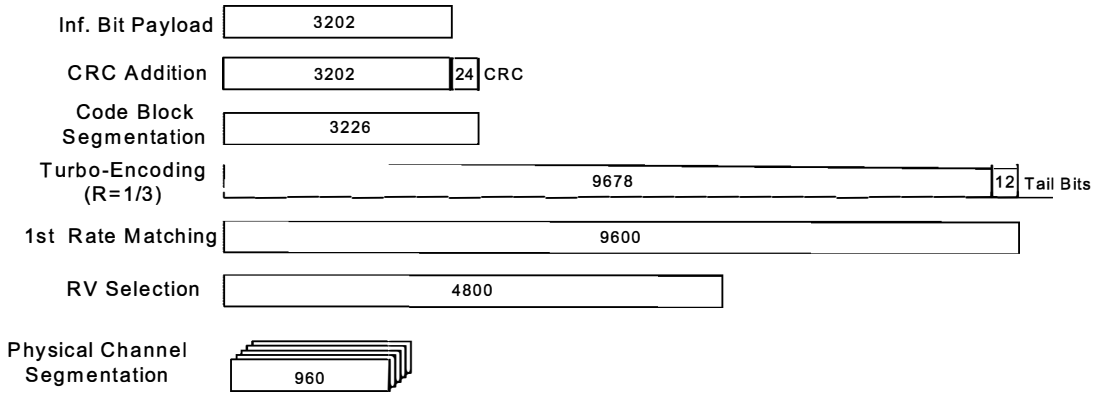



**Figure A.12: Coding rate for Fixed reference Channel H-Set 1 (QPSK)**



JCI Ex. 1021-0092

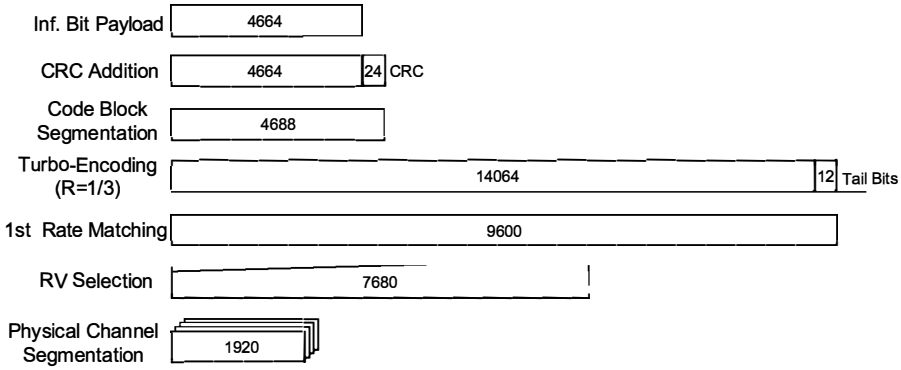



**Figure A.13: Coding rate for Fixed reference Channel H-Set 1 (16 QAM)**

## A.7.1.2 Fixed Reference Channel Definition H-Set 2

**Table A.26: Fixed Reference Channel H-Set 2**

| Parameter | Unit | Value | |
|---|---|---|---|
| Nominal Avg. Inf. Bit Rate | kbps | 801 | 1166 |
| Inter-TTI Distance | TTI"s | 2 | 2 |
| Number of HARQ Processes | Processes | 3 | 3 |
| Information Bit Payload ( $N_{INF}$ ) | Bits | 3202 | 4664 |
| Number Code Blocks | Blocks | 1 | 1 |
| Binary Channel Bits Per TTI | Bits | 4800 | 7680 |
| Total Available SML"s in UE | SML"s | 28800 | 28800 |
| Number of SML"s per HARQ Proc. | SML"s | 9600 | 9600 |
| Coding Rate | | 0.67 | 0.61 |
| Number of Physical Channel Codes | Codes | 5 | 4 |
| Modulation | | QPSK | 16QAM |
| Note: The HS-DSCH shall be transmitted continuously with constant power but only every second TTI shall be allocated to the UE under test. | | | |

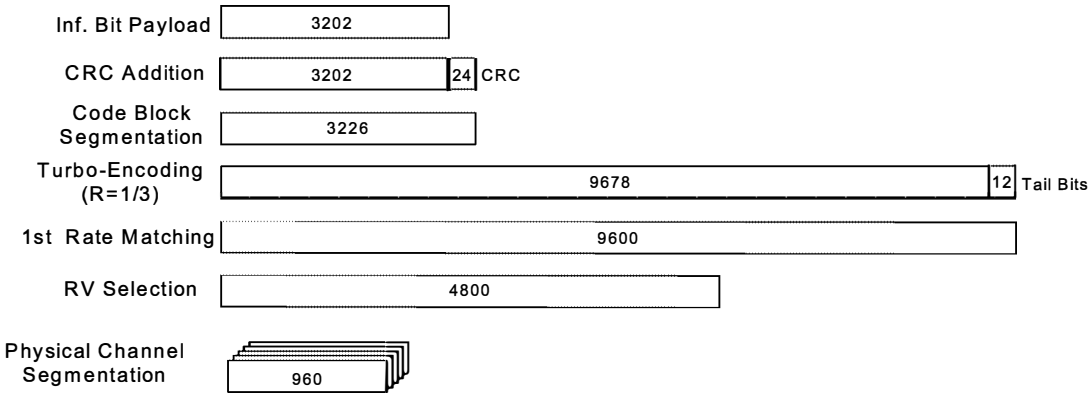



**Figure A.14: Coding rate for Fixed Reference Channel H-Set 2 (QPSK)**



JCI Ex. 1021-0093

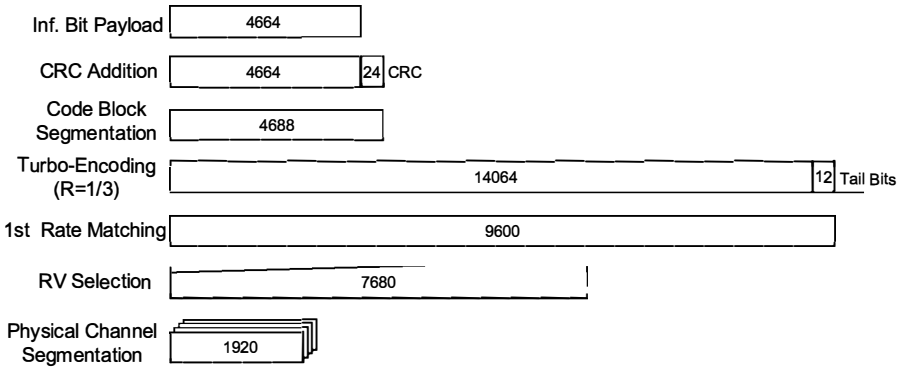



**Figure A.15: Coding rate for Fixed Reference Channel H-Set 2 (16QAM)**

## A.7.1.3 Fixed Reference Channel Definition H-Set 3

**Table A.27: Fixed Reference Channel H-Set 3**

| Parameter | Unit | Value | |
|---|---|---|---|
| Nominal Avg. Inf. Bit Rate | kbps | 1601 | 2332 |
| Inter-TTI Distance | TTI"s | 1 | 1 |
| Number of HARQ Processes | Processes | 6 | 6 |
| Information Bit Payload ( $N_{INF}$ ) | Bits | 3202 | 4664 |
| Number Code Blocks | Blocks | 1 | 1 |
| Binary Channel Bits Per TTI | Bits | 4800 | 7680 |
| Total Available SML"s,in UE | SML"s | 57600 | 57600 |
| Number of SML"s per HARQ Proc. | SML"s | 9600 | 9600 |
| Coding Rate | | 0.67 | 0.61 |
| Number of Physical Channel Codes | Codes | 5 | 4 |
| Modulation | | QPSK | 16QAM |

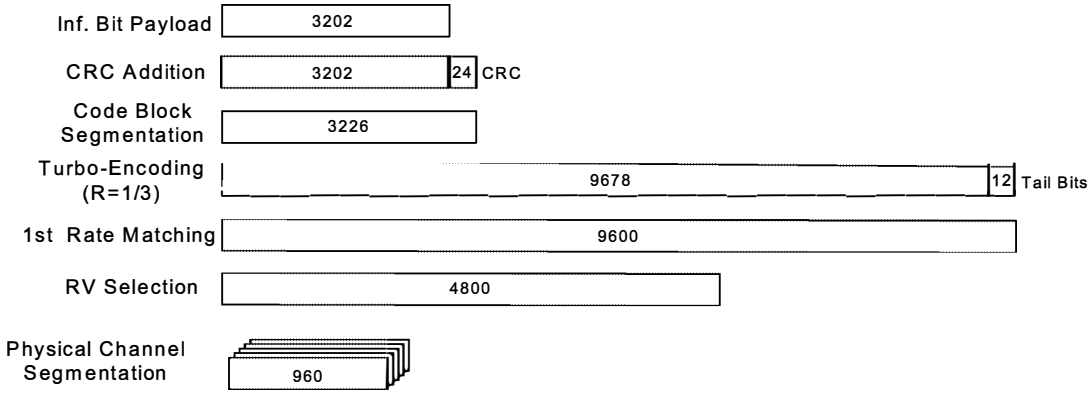



**Figure A.16: Coding rate for Fixed reference Channel H-Set 3 (QPSK)**



JCI Ex. 1021-0094

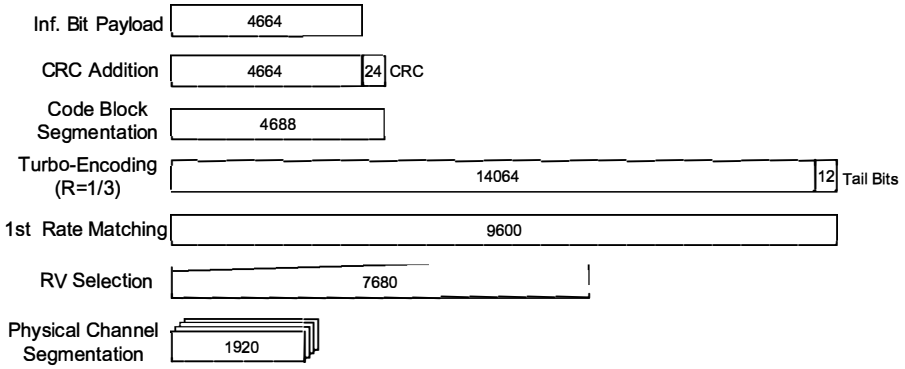



**Figure A.17: Coding rate for Fixed reference Channel H-Set 3 (16QAM)**

## A.7.1.4 Fixed Reference Channel Definition H-Set 4

**Table A.28: Fixed Reference Channel H-Set 4**

| Parameter | Unit | Value |
|---|---|---|
| Nominal Avg. Inf. Bit Rate | kbps | 534 |
| Inter-TTI Distance | TTI"s | 2 |
| Number of HARQ Processes | Processes | 2 |
| Information Bit Payload ( $N_{INF}$ ) | Bits | 3202 |
| Number Code Blocks | Blocks | 1 |
| Binary Channel Bits Per TTI | Bits | 4800 |
| Total Available SML"s in UE | SML"s | 14400 |
| Number of SML"s per HARQ Proc. | SML"s | 7200 |
| Coding Rate | | 0.67 |
| Number of Physical Channel Codes | Codes | 5 |
| Modulation | | QPSK |
| Note: This test case verifies the minimum inter-TTI distance and therefore HS-PDSCH transmission shall be as follows: ...00X0X000X0X..., where "X" marks TTI in which HS-PDSCH is allocated to the UE and "0" marks TTI, in which HS-PDSCH is not allocated to the UE..The HS-DSCH shall be transmitted continuously with constant power.. | | |

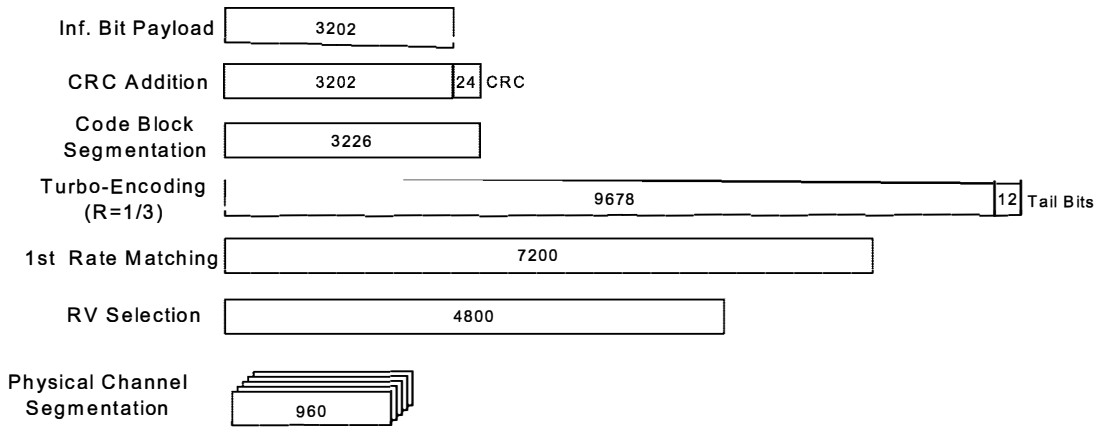



**Figure A.18: Coding rate for Fixed Reference Channel H-Set 4**



JCI Ex. 1021-0095

## A.7.1.5 Fixed Reference Channel Definition H-Set 5

**Table A.29: Fixed Reference Channel H-Set 5**

| Parameter | Unit | Value |
|---|---|---|
| Nominal Avg. Inf. Bit Rate | kbps | 801 |
| Inter-TTI Distance | TTI"s | 1 |
| Number of HARQ Processes | Processes | 3 |
| Information Bit Payload ( $N_{INF}$ ) | Bits | 3202 |
| Number Code Blocks | Blocks | 1 |
| Binary Channel Bits Per TTI | Bits | 4800 |
| Total Available SML"s in UE | SML"s | 28800 |
| Number of SML"s per HARQ Proc. | SML"s | 9600 |
| Coding Rate | | 0.67 |
| Number of Physical Channel Codes | Codes | 5 |
| Modulation | | QPSK |
| Note: This test case verifies the minimum inter-TTI distance and therefore HS-PDSCH transmission shall be as follows: …00XXX000XXX…, where "X" marks TTI in which HS-PDSCH is allocated to the UE and "0" marks TTI, in which HS-PDSCH is not allocated to the UE..The HS-DSCH shall be transmitted continuously with constant power.. | | |

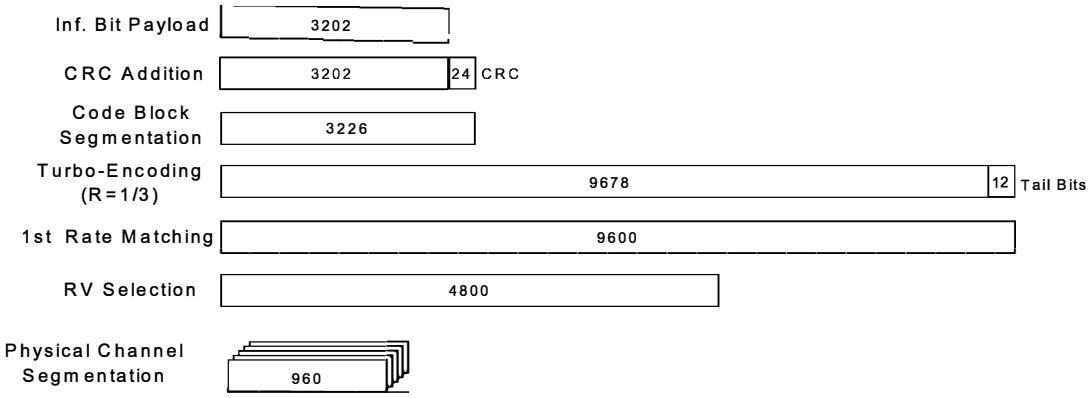



**Figure A.19: Coding rate for Fixed Reference Channel H-Set 5**

## A.7.1.6 Fixed Reference Channel Definition H-Set 6

**Table A.30: Fixed Reference Channel H-Set 6**

| Parameter | Unit | Value | |
|---|---|---|---|
| Nominal Avg. Inf. Bit Rate | kbps | 3219 | 4689 |
| Inter-TTI Distance | TTI"s | 1 | 1 |
| Number of HARQ Processes | Processes | 6 | 6 |
| Information Bit Payload ( $N_{INF}$ ) | Bits | 6438 | 9377 |
| Number Code Blocks | Blocks | 2 | 2 |
| Binary Channel Bits Per TTI | Bits | 9600 | 15360 |
| Total Available SML"s in UE | SML"s | 115200 | 115200 |
| Number of SML"s per HARQ Proc. | SML"s | 19200 | 19200 |
| Coding Rate | | 0.67 | 0.61 |
| Number of Physical Channel Codes | Codes | 10 | 8 |
| Modulation | | QPSK | 16QAM |



JCI Ex. 1021-0096

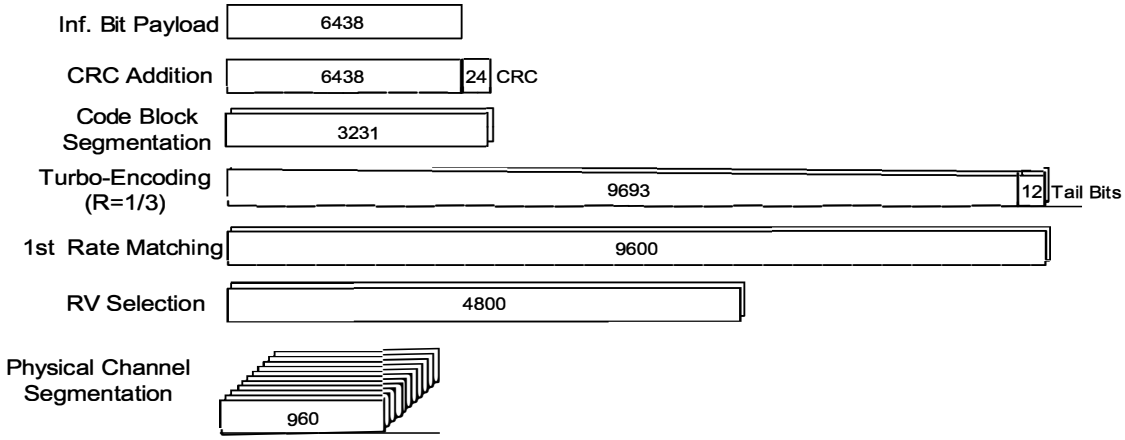



**Figure A.20: Coding rate for Fixed reference Channel H-Set 6 (QPSK)**

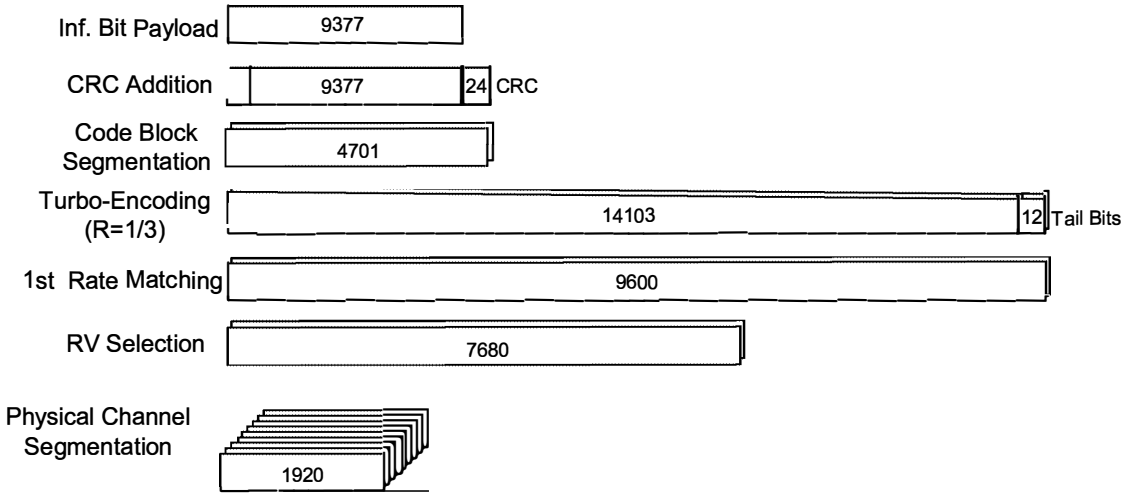



**Figure A.21: Coding rate for Fixed reference Channel H-Set 6 (16 QAM)**



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# Annex B (normative): Propagation conditions

## B.1 General

Void

## B.2 Propagation Conditions

### B.2.1 Static propagation condition

The propagation for the static performance measurement is an Additive White Gaussian Noise (AWGN) environment. No fading and multi-paths exist for this propagation model.

### B.2.2 Multi-path fading propagation conditions

Table B1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

**Table B.1: Propagation Conditions for Multi path Fading Environments (Cases 1 to 6)**

| Case 1 | | Case 2 | | Case 3 | | Case 4 | | Case 5 (Note 1) | | Case 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Speed for Band I, II, III and IV: 3 km/h | | Speed for Band I, II, III and IV: 3 km/h | | Speed for Band I, II, III and IV: 120 km/h | | Speed for Band I, II, III and IV: 3 km/h | | Speed for Band I, II, III and IV: 50 km/h | | Speed for Band I, II, III and IV: 250 km/h | |
| Speed for Band V and VI: 7 km/h | | Speed for Band V and VI: 7 km/h | | Speed for Band V and VI: 282 km/h (Note 2) | | Speed for Band V and VI: 7 km/h | | Speed for Band V and VI: 118 km/h | | Speed for Band V and VI: 583 km/h (Note 2) | |
| | | | | | | | | | | | |
| Relative Delay [ns] | Relative mean Power [dB] | Relative Delay [ns] | Relative mean Power [dB] | Relative Delay [ns] | Relative mean Power [dB] | Relative Delay [ns] | Relative mean Power [dB] | Relative Delay [ns] | Relative mean Power [dB] | Relative Delay [ns] | Relative mean Power [dB] |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 976 | -10 | 976 | 0 | 260 | -3 | 976 | 0 | 976 | -10 | 260 | -3 |
| | | 20000 | 0 | 521 | -6 | | | | | 521 | -6 |
| | | | | 781 | -9 | | | | | 781 | -9 |

NOTE 1: Case 5 is only used in TS25.133.

NOTE 2: Speed above 250km/h is applicable to demodulation performance requirements only.

Table B.1A shows propagation conditions that are used for the performance measurements in multi-path environment when UE is informed by higher layer signalling that only DPCCH exists for channel estimation. All taps have classical Doppler spectrum. Taps are normalized to the strongest tap in the beam/sector. The actual power relation between the sector and the beam is determined by the test case.



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**Table B.1A: Propagation Conditions for Multi path Fading Environments (Case 7)**

| Case 7 | | |
|---|---|---|
| Speed for Band I, II, III and IV: 50 km/h | | |
| Speed for Band V, VI: 118 km/h | | |
| **Relative Delay [ns]** | **Average Power [dB]** | |
| | **Sector** | **Beam** |
| 0 | 0.0 | - |
| 260 | -4.3 | - |
| 1040 | -6.6 | - |
| 4690 | -2.0 | 0.0 |
| 7290 | -7.0 | -0.3 |
| 14580 | -7.5 | -0.9 |

Table B.1B shows propagation conditions that are used for HSDPA performance measurements in multi-path fading environment. For HSDPA enhanced performance requirements, the fading of the signals and the AWGN signals provided in each receiver antenna port shall be independent.

**Table B.1B: Propagation Conditions for Multi-Path Fading Environments for HSDPA Performance Requirements**

| **ITU Pedestrian A Speed 3km/h (PA3)** | | **ITU Pedestrian B Speed 3km/h (PB3)** | | **ITU vehicular A Speed 30km/h (VA30)** | | **ITU vehicular A Speed 120km/h (VA120)** | |
|---|---|---|---|---|---|---|---|
| Speed for Band I, II, III and IV 3 km/h | | Speed for Band I, II, III and IV 3 km/h | | Speed for Band I, II, III and IV 30 km/h | | Speed for Band I, II, III and IV 120 km/h | |
| Speed for Band V, VI 7 km/h | | Speed for Band V, VI 7 km/h | | Speed for Band V, VI 71 km/h | | Speed for Band V, VI 282 km/h (Note 1) | |
| **Relative Delay [ns]** | **Relative Mean Power [dB]** | **Relative Delay [ns]** | **Relative Mean Power [dB]** | **Relative Delay [ns]** | **Relative Mean Power [dB]** | **Relative Delay [ns]** | **Relative Mean Power [dB]** |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | -9.7 | 200 | -0.9 | 310 | -1.0 | 310 | -1.0 |
| 190 | -19.2 | 800 | -4.9 | 710 | -9.0 | 710 | -9.0 |
| 410 | -22.8 | 1200 | -8.0 | 1090 | -10.0 | 1090 | -10.0 |
| | | 2300 | -7.8 | 1730 | -15.0 | 1730 | -15.0 |
| | | 3700 | -23.9 | 2510 | -20.0 | 2510 | -20.0 |

NOTE 1: Speed above 120km/h is applicable to demodulation performance requirements only.

Table B.1C shows propagation conditions that are used for CQI test in multi-path fading. For HSDPA enhanced performance requirements, the fading of the signals and the AWGN signals provided in each receiver antenna port shall be independent.

**Table B.1C: Propagation Conditions for CQI test in multi-path fading**

| **Case 8, speed 30km/h** | |
|---|---|
| Relative Delay [ns] | Relative mean Power [dB] |
| 0 | 0 |
| 976 | -10 |



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## B.2.3 Moving propagation conditions

The dynamic propagation conditions for the test of the baseband performance are non fading channel models with two taps. The moving propagation condition has two tap, one static, Path0, and one moving, Path1. The time difference between the two paths is according Equation (B.1). The taps have equal strengths and equal phases.

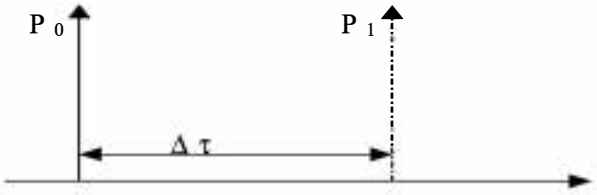



**Figure B.1: The moving propagation conditions**

$$\Delta\tau = B + \frac{A}{2}\left(1 + \sin(\Delta\omega \cdot t)\right) \quad \text{(B.1)}$$

The parameters in the equation are shown in the following table.

**Table B.2**

| Parameter | Value |
|---|---|
| A | 5 μs |
| B | 1 μs |
| Δω | $40*10^{-3}$ $s^{-1}$ |

## B.2.4 Birth-Death propagation conditions

The dynamic propagation conditions for the test of the base band performance is a non fading propagation channel with two taps. The moving propagation condition has two taps, Path1 and Path2 which alternate between 'birth' and 'death'. The positions the paths appear are randomly selected with an equal probability rate and is shown in Figure B.2.

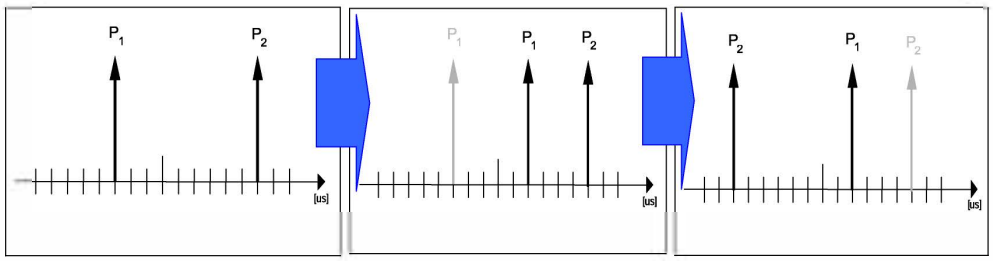



**Figure B.2: Birth death propagation sequence**

1. Two paths, Path1 and Path2 are randomly selected from the group[-5,-4,-3,-2,-1,0,1,2,3,4,5] μs. The paths have equal magnitudes and equal phases.
2. After 191 ms, Path1 vanishes and reappears immediately at a new location randomly selected from the group [-5,-4,-3,-2,-1,0,1,2,3,4,5] μs but excludes the point Path 2. The magnitudes and the phases of the tap coefficients of Path 1 and Path 2 shall remain unaltered.
3. After an additional 191 ms, Path2 vanishes and reappears immediately at a new location randomly selected from the group [-5,-4,-3,-2,-1,0,1,2,3,4,5] μs but excludes the point Path 1. The magnitudes and the phases of the tap coefficients of Path 1 and Path 2 shall remain unaltered.



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The sequence in 2) and 3) is repeated.



JCI Ex. 1021-0101

# Annex C (normative): Downlink Physical Channels

## C.1 General

This annex specifies the downlink physical channels that are needed for setting a connection and channels that are needed during a connection.

## C.2 Connection Set-up

Table C.1 describes the downlink Physical Channels that are required for connection set up.

**Table C.1: Downlink Physical Channels required for connection set-up**

| Physical Channel |
|---|
| P-CPICH |
| P-CCPCH |
| SCH |
| S-CCPCH |
| PICH |
| AICH |
| DPCH |

## C.3 During connection

The following clauses, describes the downlink Physical Channels that are transmitted during a connection i.e., when measurements are done. For these measurements the offset between DPCH and SCH shall be zero chips at Node B meaning that SCH is overlapping with the first symbols in DPCH in the beginning of DPCH slot structure.

### C.3.1 Measurement of Rx Characteristics

Table C.2 is applicable for measurements on the Receiver Characteristics (clause 7) with the exception of subclause 7.4 (Maximum input level).

**Table C.2: Downlink Physical Channels transmitted during a connection**

| Physical Channel | Power ratio |
|---|---|
| P-CPICH | P-CPICH_Ec / DPCH_Ec = 7 dB |
| P-CCPCH | P-CCPCH_Ec / DPCH_Ec = 5 dB |
| SCH | SCH_Ec / DPCH_Ec = 5 dB |
| PICH | PICH_Ec / DPCH_Ec = 2 dB |
| DPCH | Test dependent power |



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## C.3.2 Measurement of Performance requirements

Table C.3 is applicable for measurements on the Performance requirements (clause 8), including subclause 7.4 (Maximum input level) and subclause 6.4.4 (Out-of-synchronization handling of output power).

**Table C.3: Downlink Physical Channels transmitted during a connection[1]**

| Physical Channel | Power ratio | NOTE |
|---|---|---|
| P-CPICH | P-CPICH_Ec/Ior = -10 dB | Use of P-CPICH or S-CPICH as phase reference is specified for each requirement and is also set by higher layer signalling. |
| S-CPICH | S-CPICH_Ec/Ior = -10 dB | When S-CPICH is the phase reference in a test condition, the phase of S-CPICH shall be 180 degrees offset from the phase of P-CPICH. When S-CPICH is not the phase reference, it is not transmitted. |
| P-CCPCH | P-CCPCH_Ec/Ior = -12 dB | When BCH performance is tested the P-CCPCH_Ec/Ior is test dependent |
| SCH | SCH_Ec/Ior = -12 dB | This power shall be divided equally between Primary and Secondary Synchronous channels |
| PICH | PICH_Ec/Ior = -15 dB | |
| DPCH | Test dependent power | When S-CPICH is the phase reference in a test condition, the phase of DPCH shall be 180 degrees offset from the phase of P-CPICH.<br>When BCH performance is tested the DPCH is not transmitted. |
| OCNS | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one[1] | OCNS interference consists of 16 dedicated data channels as specified in table C.6. |

NOTE 1 For dynamic power correction required to compensate for the presence of transient channels, e.g. control channels, a subset of the DPCH channels may be used.



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## C.3.3 Connection with open-loop transmit diversity mode

Table C.4 is applicable for measurements for subclause 8.6.1 (Demodulation of DCH in open loop transmit diversity mode).

**Table C.4: Downlink Physical Channels transmitted during a connection[1]**

| Physical Channel | Power ratio | NOTE |
|---|---|---|
| P-CPICH (antenna 1) | P-CPICH_Ec1/Ior = -13 dB | 1. Total P-CPICH_Ec/Ior = -10 dB |
| P-CPICH (antenna 2) | P-CPICH_Ec2/Ior = -13 dB | |
| P-CCPCH (antenna 1) | P-CCPCH_Ec1/Ior = -15 dB | 1. STTD applied<br>2. Total P-CCPCH_Ec/Ior = -12 dB |
| P-CCPCH (antenna 2) | P-CCPCH_Ec2/Ior = -15 dB | |
| SCH (antenna 1 / 2) | SCH_Ec/Ior = -12 dB | 1. TSTD applied.<br>2. This power shall be divided equally between Primary and Secondary Synchronous channels<br>3. When BCH performance is tested the P-CCPCH_Ec/Ior is test dependent |
| PICH (antenna 1) | PICH_Ec1/Ior = -18 dB | 1. STTD applied<br>2. Total PICH_Ec/Ior = -15 dB |
| PICH (antenna 2) | PICH_Ec2/Ior = -18 dB | |
| DPCH | Test dependent power | 1. STTD applied<br>2. Total power from both antennas |
| OCNS | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one[1] | 1.This power shall be divided equally between antennas<br>2.OCNS interference consists of 16 dedicated data channels as specified in Table C.6. |

NOTE 1 For dynamic power correction required to compensate for the presence of transient channels, e.g. control channels, a subset of the DPCH channels may be used.

## C.3.4 Connection with closed loop transmit diversity mode

Table C.5 is applicable for measurements for subclause 8.6.2 (Demodulation of DCH in closed loop transmit diversity mode).

**Table C.5: Downlink Physical Channels transmitted during a connection[1]**

| Physical Channel | Power ratio | NOTE |
|---|---|---|
| P-CPICH (antenna 1) | P-CPICH_Ec1/Ior = -13 dB | 1. Total P-CPICH_Ec/Ior = -10 dB |
| P-CPICH (antenna 2) | P-CPICH_Ec2/Ior = -13 dB | |
| P-CCPCH (antenna 1) | P-CCPCH_Ec1/Ior = -15 dB | 1. STTD applied |
| P-CCPCH (antenna 2) | P-CCPCH_Ec2/Ior = -15 dB | 1. STTD applied,<br>2. total P-CCPCH_Ec/Ior = -12 dB |
| SCH (antenna 1 / 2) | SCH_Ec/Ior = -12 dB | 1. TSTD applied |
| PICH (antenna 1) | PICH_Ec1/Ior = -18 dB | 1. STTD applied<br>2. STTD applied, total PICH_Ec/Ior = -15 dB |
| PICH (antenna 2) | PICH_Ec2/Ior = -18 dB | |
| DPCH | Test dependent power | 1. Total power from both antennas |
| OCNS | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one[1] | 1.This power shall be divided equally between antennas<br>2. OCNS interference consists of 16 dedicated data channels. as specified in Table C.6. |

NOTE 1 For dynamic power correction required to compensate for the presence of transient channels, e.g. control channels, a subset of the DPCH channels may be used.



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**Table C.6: DPCH Channelization Code and relative level settings for OCNS signal**

| Channelization Code at SF=128 | Relative Level setting (dB) (Note 1) | DPCH Data |
|---|---|---|
| 2 | -1 | The DPCH data for each channelization code shall be uncorrelated with each other and with any wanted signal over the period of any measurement. |
| 11 | -3 | |
| 17 | -3 | |
| 23 | -5 | |
| 31 | -2 | |
| 38 | -4 | |
| 47 | -8 | |
| 55 | -7 | |
| 62 | -4 | |
| 69 | -6 | |
| 78 | -5 | |
| 85 | -9 | |
| 94 | -10 | |
| 125 | -8 | |
| 113 | -6 | |
| 119 | 0 | |

NOTE 1: The relative level setting specified in dB refers only to the relationship between the OCNS channels. The level of the OCNS channels relative to the Ior of the complete signal is a function of the power of the other channels in the signal with the intention that the power of the group of OCNS channels is used to make the total signal add up to 1.

NOTE: The DPCH Channelization Codes and relative level settings are chosen to simulate a signal with realistic Peak to Average Ratio.

## C.3.5 Connection with tests having DPCCH as a phase reference

Table C.6A is applicable for measurements for tests 21, 22, 23, 24 and 25 in subclause 8.3.1.

**Table C.6A: Downlink Physical Channels transmitted during a connection**

| Physical Channel | Antenna (gain) | Power | NOTE |
|---|---|---|---|
| P-CPICH | Sector (0 dB) | P-CPICH_Ec/Ior = -10 dB | UE is informed by higher layer signalling that P-CPICH shall not be used as a phase reference |
| P-CCPCH | | P-CCPCH_Ec/Ior = -12 dB | |
| SCH | | SCH_Ec/Ior = -12 dB | This power shall be divided equally between Primary and Secondary Synchronous channels |
| PICH | | PICH_Ec/Ior = -15 dB | |
| DPCH | Beam (6.0dB) | Test dependent power | DPCH phase shall be uncorrelated with the phase of P-CPICH (different propagation in sector and beam) |
| OCNS | | Necessary power so that Beam total transmit power is 20 % of Node B total transmit power | 1) OCNS interference consists of 16 dedicated data channels as specified in Table C.6.<br>2) 60% of the power from Node B (Ior) is not involved in the tests, but is still counted as a part of the transmitted power. |



JCI Ex. 1021-0105

# C.4 W-CDMA Modulated Interferer

Table C.7 describes the downlink Channels that are transmitted as part of the W-CDMA modulated interferer.

**Table C.7: Spreading Code, Timing offsets and relative level settings for W-CDMA Modulated Interferer signal channels**

| Channel Type | Spreading Factor | Channelization Code | Timing offset ($x256T_{chip}$) | Power | NOTE |
|---|---|---|---|---|---|
| P-CCPCH | 256 | 1 | 0 | P-CCPCH_Ec/Ior = -10 dB | |
| SCH | 256 | - | 0 | SCH_Ec/Ior = -10 dB | The SCH power shall be divided equally between Primary and Secondary Synchronous channels |
| P-CPICH | 256 | 0 | 0 | P-CPICH_Ec/Ior = -10 dB | |
| PICH | 256 | 16 | 16 | PICH_Ec/Ior = -15 dB | |
| OCNS | See table C.6 | | | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one | OCNS interference consists of the dedicated data channels. as specified in Table C.6. |

# C.5 HSDPA DL Physical channels

## C.5.1 Downlink Physical Channels connection set-up

Table C.8 is applicable for the measurements for tests in subclause 7.4.2, 9.2.1 and 9.3. Table C.9 is applicable for the measurements for tests in subclause 9.2.2. Table C.10 is applicable for the measurements for tests in subclause 9.2.3. Table C.11 is applicable for the measurements for tests in subclause 9.4.1. Table C.12 is applicable for the measurements in subclause 9.4.2



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**Table C.8: Downlink physical channels for HSDPA receiver testing for Single Link performance.**

| Physical Channel | Parameter | Value | Note |
|---|---|---|---|
| P-CPICH | P-CPICH_Ec/Ior | -10dB | |
| P-CCPCH | P-CCPCH_Ec/Ior | -12dB | Mean power level is shared with SCH. |
| SCH | SCH_Ec/Ior | -12dB | Mean power level is shared with P-CCPCH – SCH includes P- and S-SCH, with power split between both.<br>P-SCH code is S_dl,0 as per TS25.213<br>S-SCH pattern is scrambling code group 0 |
| PICH | PICH_Ec/Ior | -15dB | |
| DPCH | DPCH_Ec/Ior | Test-specific | 12.2 kbps DL reference measurement channel as defined in Annex A.3.1 |
| HS-SCCH_1 | HS-SCCH_Ec/Ior | Test-specific | Specifies fraction of Node-B radiated power transmitted when TTI is active (i.e. due to minimum inter-TTI interval). |
| HS-SCCH_2 | HS-SCCH_Ec/Ior | DTX"d | No signalling scheduled, or power radiated, on this HS-SCCH, but signalled to the UE as present. |
| HS-SCCH_3 | HS-SCCH_Ec/Ior | DTX"d | As HS-SCCH_2. |
| HS-SCCH_4 | HS-SCCH_Ec/Ior | DTX"d | As HS-SCCH_2. |
| HS-PDSCH | HS-PDSCH_Ec/Ior | Test-specific | . |
| OCNS | | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one | OCNS interference consists of 6 dedicated data channels as specified in table C.13. |



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**Table C.9: Downlink physical channels for HSDPA receiver testing for Open Loop Transmit Diversity performance.**

| Physical Channel | Parameter | Value | Note |
|---|---|---|---|
| P-CPICH (antenna 1) | P-CPICH_Ec1/Ior | -13dB | 1. Total P-CPICH_Ec/Ior = -10dB |
| P-CPICH (antenna 2) | P-CPICH_Ec2/Ior | -13dB | |
| P-CCPCH (antenna 1) | P-CCPCH_Ec1/Ior | -15dB | 1. STTD applied.<br>2. Total P-CCPCH Ec/Ior is –12dB. |
| P-CCPCH (antenna 2) | P-CCPCH_Ec2/Ior | -15dB | |
| SCH (antenna 1/2) | SCH_Ec/Ior | -12dB | 1. TSTD applied.<br>2. Power divided equally between primary and secondary SCH. |
| PICH (antenna 1) | PICH_Ec1/Ior | -18dB | 1. STTD applied.<br>2. Total PICH Ec/Ior is –15dB. |
| PICH (antenna 2) | PICH_Ec2/Ior | -18dB | |
| DPCH | DPCH_Ec/Ior | Test-specific | 1. STTD applied. |
| HS-SCCH_1 | HS-SCCH_Ec/Ior | Test-specific | 1. STTD applied.<br>2. Specifies fraction of Node-B radiated power transmitted when TTI is active (i.e. due to minimum inter-TTI interval). |
| HS-SCCH_2 | HS-SCCH_Ec/Ior | DTX"d | 1. UE assumes STTD applied.<br>2. No signalling scheduled, or power radiated, on this HS-SCCH, but signalled to the UE as present. |
| HS-SCCH_3 | HS-SCCH_Ec/Ior | DTX"d | 1. As HS-SCCH_2. |
| HS-SCCH_4 | HS-SCCH_Ec/Ior | DTX"d | 2. As HS-SCCH_2. |
| HS-PDSCH | HS-PDSCH_Ec/Ior | Test-specific | 1. STTD applied. |
| OCNS | | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one | 1. STTD applied.<br>2. Balance of power $I_{or}$ of the Node-B is assigned to OCNS.<br>3. Power divided equally between antennas.<br>4. OCNS interference consists of 6 dedicated data channels as specified in table C.13. |



JCI Ex. 1021-0108

**Table C.10: Downlink physical channels for HSDPA receiver testing for Closed Loop. Transmit Diversity (Mode-1) performance.**

| Physical Channel | Parameter | Value | Note |
|---|---|---|---|
| P-CPICH (antenna 1) | P-CPICH_Ec1/Ior | -13dB | 1. Total P-CPICH_Ec/Ior = -10dB |
| P-CPICH (antenna 2) | P-CPICH_Ec2/Ior | -13dB | |
| P-CCPCH (antenna 1) | P-CCPCH_Ec1/Ior | -15dB | 1. STTD applied.<br>2. Total P-CCPCH Ec/Ior is –12dB. |
| P-CCPCH (antenna 2) | P-CCPCH_Ec2/Ior | -15dB | |
| SCH (antenna 1/2) | SCH_Ec/Ior | -12dB | 1. TSTD applied.<br>2. Power divided equally between primary and secondary SCH. |
| PICH (antenna 1) | PICH_Ec1/Ior | -18dB | 1. STTD applied.<br>2. Total PICH Ec/Ior is –15dB. |
| PICH (antenna 2) | PICH_Ec2/Ior | -18dB | |
| DPCH | DPCH_Ec/Ior | Test-specific | 1. CL1 applied. |
| HS-SCCH_1 | HS-SCCH_Ec/Ior | Test-specific | 1. STTD applied.<br>2. Specifies fraction of Node-B radiated power transmitted when TTI is active (i.e. due to minimum inter-TTI interval). |
| HS-SCCH_2 | HS-SCCH_Ec/Ior | DTX"d | 1. UE assumes STDD] applied.<br>2. No signalling scheduled, or power radiated, on this HS-SCCH, but signalled to the UE as present. |
| HS-SCCH_3 | HS-SCCH_Ec/Ior | DTX"d | 1. As HS-SCCH_2. |
| HS-SCCH_4 | HS-SCCH_Ec/Ior | DTX"d | 2. As HS-SCCH_2. |
| HS-PDSCH | HS-PDSCH_Ec/Ior | Test-specific | 1. CL1 applied. |
| OCNS | | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one | 1. STTD applied.<br>2. Balance of power $I_{or}$ of the Node-B is assigned to OCNS.<br>3. Power divided equally between antennas.<br>4. OCNS interference consists of 6 dedicated data channels as specified in table C.13. |



JCI Ex. 1021-0109

**Table C.11: Downlink physical channels for HSDPA receiver testing for HS-SCCH detection performance**

| Parameter | Units | Value | Comment |
|---|---|---|---|
| CPICH $E_c / I_{or}$ | dB | -10 | |
| P-CCPCH $E_c / I_{or}$ | dB | -12 | Mean power level is shared with SCH. |
| SCH $E_c / I_{or}$ | dB | -12 | Mean power level is shared with P-CCPCH – SCH includes P- and S-SCH, with power split between both. P-SCH code is S_dl,0 as per TS25.213 S-SCH pattern is scrambling code group 0 |
| PICH $E_c / I_{or}$ | dB | -15 | |
| HS-DSCH-1 $E_c / I_{or}$ | dB | -10 | HS-DSCH associated with HS-SCCH-1. The HS-DSCH shall be transmitted continuously with constant power. |
| HS-DSCH-2 $E_c / I_{or}$ | dB | DTX | HS-DSCH associated with HS-SCCH-2 |
| HS-DSCH-3 $E_c / I_{or}$ | dB | DTX | HS-DSCH associated with HS-SCCH-3 |
| HS-DSCH-4 $E_c / I_{or}$ | dB | DTX | HS-DSCH associated with HS-SCCH-4 |
| DPCH $E_c / I_{or}$ | dB | -8 | 12.2 kbps DL reference measurement channel as defined in Annex A.3.1 |
| HS-SCCH-1 $E_c / I_{or}$ | dB | Test Specific | All HS-SCCH"s allocated equal $E_c / I_{or}$. Specifies $E_c / I_{or}$ when TTI is active. |
| HS-SCCH-2 $E_c / I_{or}$ | dB | | |
| HS-SCCH-3 $E_c / I_{or}$ | dB | | |
| HS-SCCH-4 $E_c / I_{or}$ | dB | | |
| OCNS $E_c / I_{or}$ | dB | Necessary power so that total transmit power spectral density of Node B (Ior) adds to one | OCNS interference consists of 6 dedicated data channels as specified in table C.13. |



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**Table C.12: Downlink physical channels for HSDPA receiver testing for HS-SCCH detection performance in Open Loop Diversity**

| Parameter | Units | Value | Comment |
|---|---|---|---|
| P-CPICH $E_c / I_{or}$ (antenna 1) | dB | -13 | 1. Total P-CPICH $E_c / I_{or}$ = -10dB |
| P-CPICH $E_c / I_{or}$ (antenna 2) | dB | -13 | |
| P-CCPCH $E_c / I_{or}$ (antenna 1) | dB | -15 | 1. STTD applied<br>2. Total P-CCPCH $E_c / I_{or}$ = -12dB |
| P-CCPCH $E_c / I_{or}$ (antenna 2) | dB | -15 | |
| SCH $E_c / I_{or}$ (antenna 1/2) | dB | -12 | 1. TSTD applied<br>2. Mean power level is shared with P-CCPCH – SCH includes P- and S-SCH, with power split between both.<br>3. P-SCH code is S_dl,0 as per TS25.213<br>4. S-SCH pattern is scrambling code group 0 |
| PICH $E_c / I_{or}$ (antenna 1) | dB | -15 | 1. STTD applied<br>2. Total PICH $E_c / I_{or}$ = -12dB |
| PICH $E_c / I_{or}$ (antenna 2) | dB | -15 | |
| HS-DSCH-1 $E_c / I_{or}$ | dB | -10 | 1. STTD applied<br>2. HS-DSCH assoc. with HS-SCCH-1 |
| HS-DSCH-2 $E_c / I_{or}$ | dB | DTX | 1. STTD applied<br>2. HS-DSCH assoc. with HS-SCCH-2 |
| HS-DSCH-3 $E_c / I_{or}$ | dB | DTX | 1. STTD applied<br>2. HS-DSCH assoc. with HS-SCCH-3 |
| HS-DSCH-4 $E_c / I_{or}$ | dB | DTX | 1. STTD applied<br>2. HS-DSCH assoc. with HS-SCCH-4 |
| DPCH $E_c / I_{or}$ | dB | -8 | 1. STTD applied<br>2. 12.2 kbps DL reference measurement channel as defined in Annex A.3.1 |
| HS-SCCH-1 $E_c / I_{or}$ | dB | Test Specific | 1. STTD applied<br>2. All HS-SCCH"s allocated equal $E_c / I_{or}$.<br>3. Specifies $E_c / I_{or}$ when TTI is active. |
| HS-SCCH-2 $E_c / I_{or}$ | dB | | |
| HS-SCCH-3 $E_c / I_{or}$ | dB | | |
| HS-SCCH-4 $E_c / I_{or}$ | dB | | |
| OCNS $E_c / I_{or}$ | dB | Remaining power at Node-B (including HS-SCCH power allocation when HS-SCCH"s inactive). | 1. STTD applied<br>2. OCNS interference consists of 6 dedicated data channels as specified in table C.13.<br>3. Power divided equally between antennas |

## C.5.2 OCNS Definition

The selected channelization codes and relative power levels for OCNS transmission during for HSDPA performance assessment are defined in Table C.13. The selected codes are designed to have a single length-16 parent code.

**Table C.13: OCNS definition for HSDPA receiver testing.**

| Channelization Code at SF=128 | Relative Level setting (dB) (Note 1) | DPCH Data |
|---|---|---|
| 122 | 0 | The DPCH data for each channelization code shall be uncorrelated with each other and with any wanted signal over the period of any measurement. |
| 123 | -2 | |
| 124 | -2 | |
| 125 | -4 | |
| 126 | -1 | |
| 127 | -3 | |

Note 1 The relative level setting specified in dB refers only to the relationship between the OCNS channels. The level of the OCNS channels relative to the Ior of the complete signal is a function of the power of the other channels in the signal with the intention that the power of the group of OCNS channels is used to make the total signal add up to 1.



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# Annex D (normative): Environmental conditions

## D.1 General

This normative annex specifies the environmental requirements of the UE. Within these limits the requirements of the present documents shall be fulfilled.

## D.2 Environmental requirements

The requirements in this clause apply to all types of UE(s).

### D.2.1 Temperature

The UE shall fulfil all the requirements in the full temperature range of:

**Table D.1**

| | |
|---|---|
| +15°C to +35°C | for normal conditions (with relative humidity of 25 % to 75 %) |
| -10°C to +55°C | for extreme conditions (see IEC publications 68-2-1 and 68-2-2) |

Outside this temperature range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 25.101 for extreme operation.

### D.2.2 Voltage

The UE shall fulfil all the requirements in the full voltage range, i.e. the voltage range between the extreme voltages.

The manufacturer shall declare the lower and higher extreme voltages and the approximate shutdown voltage. For the equipment that can be operated from one or more of the power sources listed below, the lower extreme voltage shall not be higher, and the higher extreme voltage shall not be lower than that specified below.

**Table D.2**

| Power source | Lower extreme voltage | Higher extreme voltage | Normal conditions voltage |
|---|---|---|---|
| AC mains | 0,9 * nominal | 1,1 * nominal | nominal |
| Regulated lead acid battery | 0,9 * nominal | 1,3 * nominal | 1,1 * nominal |
| Non regulated batteries:<br>Leclanché / lithium<br>Mercury/nickel & cadmium | <br>0,85 * nominal<br>0,90 * nominal | <br>Nominal<br>Nominal | <br>Nominal<br>Nominal |

Outside this voltage range the UE if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 25.101 for extreme operation. In particular, the UE shall inhibit all RF transmissions when the power supply voltage is below the manufacturer declared shutdown voltage.



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## D.2.3 Vibration

The UE shall fulfil all the requirements when vibrated at the following frequency/amplitudes.

**Table D.3**

| Frequency | ASD (Acceleration Spectral Density) random vibration |
|---|---|
| 5 Hz to 20 Hz | 0,96 $m^2/s^3$ |
| 20 Hz to 500 Hz | 0,96 $m^2/s^3$ at 20 Hz, thereafter –3 dB/Octave |

Outside the specified frequency range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 25.101 for extreme operation



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# Annex E (informative): Change history

**Table E.1: Inclusion of CRs approved by TSG-RAN#6**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-99772 | 25.101 | 001 | 2 | R99 | Correction of UE Measurement Channels Rev.2 | F | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 003 | | R99 | Modifications for Receiver Characteristics | F | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 004 | | R99 | Corrections to Tx Diversity testing assumptions | F | 3.0.0 | 3.1.0 |
| RP-99771 | 25.101 | 005 | | R99 | UE DL performance requirements | D | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 006 | 1 | R99 | Corrections to Annex C Down link Physical Channels | F | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 007 | | R99 | Proposal for ACLR/ACS specifications for class 3 | F | 3.0.0 | 3.1.0 |
| RP-99773 | 25.101 | 008 | | R99 | Addition of propagation condition to inner and outer loop PC tests in downlink | B | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 009 | | R99 | Clarification of Uplink inner loop power control requirements | C | 3.0.0 | 3.1.0 |
| RP-99773 | 25.101 | 010 | | R99 | Modifications to demodulation test parameters and requirements in inter-cell soft handover | B | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 011 | | R99 | Power setting of DPCH | C | 3.0.0 | 3.1.0 |
| RP-99771 | 25.101 | 012 | | R99 | Editorial changes to 25.101v3.0.0 | D | 3.0.0 | 3.1.0 |
| RP-99826 | 25.101 | 013 | | R99 | Update of UE RF capabilities | F | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 014 | | R99 | Update of ITU Region 2 Specific Specifications and proposed universal channel numbering | C | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 015 | | R99 | Performance requirements for demodulation of DCH in Site Selection Diversity Transmission mode for Subclause 8.6.3 of 25.101v3.0.0 | F | 3.0.0 | 3.1.0 |
| RP-99830 | 25.101 | 016 | 1 | R99 | Change of propagation conditions | F | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 017 | | R99 | CR for minimum requirements for UE power class 1 and 2 in 25.101 | F | 3.0.0 | 3.1.0 |
| RP-99772 | 25.101 | 018 | | R99 | Downlink Inner loop power control | C | 3.0.0 | 3.1.0 |
| RP-99773 | 25.101 | 019 | | R99 | Performance requirements in downlink compressed mode | B | 3.0.0 | 3.1.0 |

**Table E.2: Inclusion of CRs approved by TSG-RAN#7**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-000015 | 25.101 | 020 | | R99 | Clarifications to measurement channels | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 021 | | R99 | Power measurement definitions for wanted signal (in-channel signal) | D | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 022 | | R99 | Change of propagation conditions for Case 2 | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 023 | | R99 | Editorial corrections | D | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 024 | | R99 | Birth-Death tap delays | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 025 | | R99 | Out-of-synchronization handling of the UE | C | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 026 | | R99 | UE Modulation performance requirements | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 027 | | R99 | Measurement channel for UE PCDE test | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 028 | | R99 | CR for performance requirement of BTFD | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 029 | | R99 | CPCH | B | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 030 | | R99 | Clarification of ACLR | D | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 031 | | R99 | Correction for reference measurement channel in TS 25.101 | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 032 | | R99 | Modifications to requirements for power control steps in uplink | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 033 | | R99 | Performance requirement | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 034 | | R99 | Power Control in downlink, constant BLER target | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 035 | | R99 | UE Minimum TX power change | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 036 | | R99 | Performance requirements for demodulation of DCH in Site Selection Diversity Transmission mode | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 037 | | R99 | Reference compressed mode patterns | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 038 | | R99 | 384kbps measurement channel is replaced with 10ms TTI | F | 3.1.0 | 3.2.0 |
| RP-000015 | 25.101 | 039 | | R99 | Modification to the handling of measurement equipment uncertainty | F | 3.1.0 | 3.2.0 |
| | | | | | Correction to figure A6 | | 3.2.0 | 3.2.1 |
| | | | | | Correction to version number in title/header (April 2000) | | 3.2.1 | 3.2.2 |



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**Table E.3: Inclusion of CRs approved by TSG-RAN#8**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-000204 | 25.101 | 040 | 1 | R99 | A test for UE's SIR target setting in a call set up | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 041 | 1 | R99 | Reception of TPC commands in a soft handover | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 042 | | R99 | DCH requirement for 64 kbps measurement channel in birth-death propagation condition | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 043 | | R99 | Power control in the downlink, constant BLER target | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 044 | | R99 | Value update for 384 kbps measurement channel requirements | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 045 | 1 | R99 | CR for demodulation of DCH | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 046 | | R99 | Correction for measurement channel in TS 25.101 | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 047 | | R99 | Editorial CR on section 8.6.3 of TS25.101 v3.2.0 | D | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 048 | | R99 | Correction of frequency numbering scheme | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 049 | | R99 | Correction - Propagation conditions | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 050 | | R99 | Compressed mode tests | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 051 | | R99 | Correction of Out-of-sync criteria | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 052 | | R99 | Editorial corrections for TS25.101. | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 053 | | R99 | Clarification of the specification on Peak Code Domain Error (PCDE) | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 054 | | R99 | Transients for uplink power steps | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 055 | | R99 | Power setting for uplink compressed mode and RACH preambles | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 056 | | R99 | UE interfering signal definition | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 057 | | R99 | Downlink Power Control, wind up effects | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 058 | | R99 | Use of P-CPICH and S-CPICH for performance requirements | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 059 | | R99 | Performance of Closed Loop Diversity mode 2 and Mode 1 | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 060 | | R99 | Removal of brackets from Inter-Cell SHO test case | F | 3.2.2 | 3.3.0 |
| RP-000204 | 25.101 | 061 | | R99 | Editorial corrections on moving propagation conditions | F | 3.2.2 | 3.3.0 |
| | | | | | Correct page numbering problem and other minor editorials | | 3.3.0 | 3.3.1 |

**Table E.4: Inclusion of CRs approved by TSG-RAN#9**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-000394 | 25.101 | 71 | | R99 | Downlink power control, wind up effects | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 72 | | R99 | Inclusion of OCNS definition for performance tests | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 63 | | R99 | Corrections to DL compressed mode tests in TS 25.101 | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 64 | | R99 | Combining of TPC commands in soft handover | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 65 | | R99 | Clarifications for power steps in RACH/CPCH message transmission | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 66 | | R99 | Editorial corrections for TS 25.101 | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 67 | | R99 | Corrections to power control | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 68 | | R99 | Corrections for compressed mode patterns | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 69 | | R99 | Editorial modification for BTFD measurement channels | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 75 | | R99 | Editorial modification to Annex A.5 of TS 25.101 | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 76 | | R99 | Tap magnitudes and phases for Birth-Death propagation conditions | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 73 | | R99 | Removal of confidence levels | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 74 | | R99 | Corrections to all tests with power control ON in TS 25.101 | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 70 | | R99 | Definition of period for frequency error | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 77 | | R99 | UE emission mask measurement filter definition correction for TS 25.101 | F | 3.3.1 | 3.4.0 |
| RP-000394 | 25.101 | 78 | | R99 | Handling of measurement uncertainties in UE radio conformance testing (FDD) | F | 3.3.1 | 3.4.0 |
| | | | | | Re-inclusion of reference [4] which had been accidentally deleted. | | 3.4.0 | 3.4.1 |



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**Table E.5: CRs approved at RAN#10**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| R4-000885 | 25.101 | 79 | | R99 | Proposed CR to TS 25.101 on subclause 7.8 RX Intermodulation | F | 3.4.1 | 3.5.0 |
| R4-000901 | 25.101 | 80 | | R99 | Corrections to DL compressed mode tests in TS 25.101 | F | 3.4.1 | 3.5.0 |
| R4-000902 | 25.101 | 81 | | R99 | Correction to DL 384 kbps and BTFD measurement channels | F | 3.4.1 | 3.5.0 |
| R4-000917 | 25.101 | 82 | | R99 | Compressed mode, proposal for specification | F | 3.4.1 | 3.5.0 |
| R4-000973 | 25.101 | 82 | | R99 | RX spurious emissions | F | 3.4.1 | 3.5.0 |
| R4-000982 | 25.101 | 84 | | R99 | Correction for 25.101 concerning the channel number calculation | F | 3.4.1 | 3.5.0 |
| R4-000990 | 25.101 | 85 | | R99 | Definition of multi-code OCNS signal for receiver and performance tests | F | 3.4.1 | 3.5.0 |

**Table E.6: CRs approved at RAN#11**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-010085 | 25.101 | 86 | | R99 | CR to 25.101 for Test Tolerances | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 87 | | R99 | Proposed CR to TS 25.101 on subclause 3.2 Abbreviations | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 88 | | R99 | Correction of version number of the ITU-R Recommendation SM.329 | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 89 | | R99 | REL 99 Corrections | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 90 | | R99 | Tx power during measurement on Rx characteristics | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 91 | | R99 | Removal of square brackets and TBDs from TS 25.101 | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 92 | | R99 | Correction of Definition of multi-code OCNS signal | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 93 | | R99 | Performance requirement for 250km/h | F | 3.5.0 | 3.6.0 |
| RP-010085 | 25.101 | 94 | | R99 | TS25.101 Rel 99 Clarification of UARFCN (channel number) | F | 3.5.0 | 3.6.0 |

**Table E.7: Release 4 CRs approved at RAN#11**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-010100 | 25.101 | 96 | | R4 | Performance requirements BCH | B | 3.6.0 | 4.0.0 |
| RP-010100 | 25.101 | 97 | | R4 | Performance requirements for paging channel | B | 3.6.0 | 4.0.0 |
| RP-010100 | 25.101 | 98 | | R4 | Performance requirements for AI channel | B | 3.6.0 | 4.0.0 |

**Table E.8: Release 4 CRs approved at RAN#12**

| RAN Doc | Spec | CR | R | Ph | Title | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-010347 | 25.101 | 100 | | Rel-4 | Correction for SSDT test parameters | A | 4.0.0 | 4.1.0 |
| RP-010347 | 25.101 | 104 | | Rel-4 | UL DPCCH slot format for performance tests | A | 4.0.0 | 4.1.0 |
| RP-010347 | 25.101 | 108 | | Rel-4 | Terminology for power definition | A | 4.0.0 | 4.1.0 |
| RP-010347 | 25.101 | 110 | | Rel-4 | out of synchronization handling | A | 4.0.0 | 4.1.0 |
| RP-010347 | 25.101 | 112 | | Rel-4 | Clarification of limits for inner loop power control | A | 4.0.0 | 4.1.0 |
| RP-010347 | 25.101 | 114 | | Rel-4 | UE EVM definition | A | 4.0.0 | 4.1.0 |
| RP-010347 | 25.101 | 116 | | Rel-4 | CR on the Modification to OCNS code channels to allow for 384 kbps allocation | A | 4.0.0 | 4.1.0 |
| RP-010358 | 25.101 | 117 | | Rel-4 | Correction of AICH performance | F | 4.0.0 | 4.1.0 |

**Table E.9: Release 4 CRs approved at RAN#13**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-010614 | 25.101 | 119 | | Rel-4 | Compressed mode, correction of reference pattern 1, Set1 | A | 4.1.0 | 4.2.0 |
| RP-010614 | 25.101 | 121 | | Rel-4 | DL Power Control Step Size in performance requirements | A | 4.1.0 | 4.2.0 |
| RP-010614 | 25.101 | 123 | | Rel-4 | Correction for test numbers in fading propagation tests | A | 4.1.0 | 4.2.0 |
| RP-010614 | 25.101 | 125 | | Rel-4 | Correction of frequency range for receiver spurious emission requirements | A | 4.1.0 | 4.2.0 |
| RP-010614 | 25.101 | 127 | | Rel-4 | UE Maximum Output Power | A | 4.1.0 | 4.2.0 |
| RP-010614 | 25.101 | 129 | | Rel-4 | Clarification of definition of Df | A | 4.1.0 | 4.2.0 |
| RP-010614 | 25.101 | 131 | | Rel-4 | CR to TS25.101 for clarification of modulated interferer | A | 4.1.0 | 4.2.0 |



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**Table E.10: Release 5 CR approved at RAN#13**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-010636 | 25.101 | 132 | | Rel-5 | Addition of UE performance requirement for CPCH | B | 4.1.0 | 5.0.0 | TEI5 |

**Table E.11: Release 5 CRs approved at RAN#14**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-010777 | 25.101 | 135 | | Rel-5 | Clarification on 25.101 sec 8.8.2 averaging method. | A | 5.0.0 | 5.1.0 | TEI |
| RP-010777 | 25.101 | 138 | | Rel-5 | Correction of power control in downlink, initial convergence | A | 5.0.0 | 5.1.0 | TEI |
| RP-010789 | 25.101 | 141 | | Rel-5 | UMTS1800/1900 changes | B | 5.0.0 | 5.1.0 | RInImp-UMTS19, RInImp-UMTS18 |
| RP-010790 | 25.101 | 142 | | Rel-5 | Performance requirement for dedicated pilot | B | 5.0.0 | 5.1.0 | RANimp-BeamF |

**Table E.12: Release 5 CRs approved at RAN#15**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-020039 | 25.101 | 145 | 1 | Rel-5 | Correction of Change of TFC | F | 5.1.0 | 5.2.0 | TEI5 |
| RP-020034 | 25.101 | 148 | | Rel-5 | Corrections to UMTS1800/1900 requirements | F | 5.1.0 | 5.2.0 | RInImp-UMTS18, RInImp-UMTS19 |
| RP-020034 | 25.101 | 149 | | Rel-5 | Additional spurious emission requirements for band III | B | 5.1.0 | 5.2.0 | RInImp-UMTS18 |
| RP-020014 | 25.101 | 156 | 1 | Rel-5 | Power setting for uplink compressed mode | A | 5.1.0 | 5.2.0 | TEI |
| RP-020014 | 25.101 | 160 | | Rel-5 | Correction of power terms and definitions | A | 5.1.0 | 5.2.0 | TEI |
| RP-020014 | 25.101 | 162 | | Rel-5 | Correction of power spectral density | A | 5.1.0 | 5.2.0 | TEI |

**Table E.13: Release 5 CRs approved at RAN#16**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-020303 | 25.101 | 164 | | Rel-5 | Correction of ITU-R SM.329 references | F | 5.2.0 | 5.3.0 | TEI5 |
| RP-020279 | 25.101 | 169 | 1 | Rel-5 | Control and monitoring function of UE requirement | A | 5.2.0 | 5.3.0 | TEI |
| RP-020279 | 25.101 | 171 | | Rel-5 | Addition of a set of Compressed mode reference pattern 2 parameters for FDD-TDD test cases in 25.133 | A | 5.2.0 | 5.3.0 | TEI |
| RP-020302 | 25.101 | 177 | | Rel-5 | UE HSDPA performance requirements (fixed reference channel) | B | 5.2.0 | 5.3.0 | HSDPA-RF |
| RP-020279 | 25.101 | 180 | | Rel-5 | Compressed mode performance requirements | A | 5.2.0 | 5.3.0 | TEI |

**Table E.14: Release 5 CRs approved at RAN#17**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-020484 | 25.101 | 184 | 2 | Rel-5 | Requirements in case of dedicated pilot | F | 5.3.0 | 5.4.0 | RANimp-BFR-UE |
| RP-020495 | 25.101 | 188 | 2 | Rel-5 | Performance requirements for the HSDPA Fixed Reference Channel (FRC) | F | 5.3.0 | 5.4.0 | HSDPA-RF |
| RP-020484 | 25.101 | 189 | 1 | Rel-5 | Corrections to Spectrum Emission Mask | F | 5.3.0 | 5.4.0 | TEI5 |
| RP-020484 | 25.101 | 191 | | Rel-5 | PRACH modulation quality | F | 5.3.0 | 5.4.0 | TEI5 |

**Table E.15: Release 5 CRs approved at RAN#18**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-020778 | 25.101 | 195 | | Rel-5 | Correction for TPC combining test case 1 | A | 5.4.0 | 5.5.0 | TEI |
| RP-020803 | 25.101 | 198 | | Rel-5 | Correction to Specified TBS for HSDPA Reference Channels | F | 5.4.0 | 5.5.0 | HSDPA-RF |
| RP-020803 | 25.101 | 200 | 1 | Rel-5 | Introduction of requirements for HSDPA UE categories 11 and 12 | B | 5.4.0 | 5.5.0 | HSDPA-RF |



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**Table E.16: Release 5 CRs approved at RAN#19**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-030037 | 25.101 | 205 | 1 | Rel-5 | Phase shift due to power steps | F | 5.5.0 | 5.6.0 | TEI5 |
| RP-030046 | 25.101 | 212 | 1 | Rel-5 | Specification of HSDPA FRC Performance for H-Sets 4 & 5 | F | 5.5.0 | 5.6.0 | HSDPA-RF |
| RP-030046 | 25.101 | 213 | 1 | Rel-5 | Specification of HSDPA FRC Performance with Open Loop Transmit Diversity | F | 5.5.0 | 5.6.0 | HSDPA-RF |
| RP-030046 | 25.101 | 215 | 1 | Rel-5 | Clarification of HSDPA FRC Test Procedure on HS-SCCH Signalling Error | F | 5.5.0 | 5.6.0 | HSDPA-RF |
| RP-030025 | 25.101 | 219 | | Rel-5 | The Closed Loop Timing Adjustment Mode parameter for the transmit diversity performance requirements | A | 5.5.0 | 5.6.0 | TEI |
| RP-030037 | 25.101 | 223 | | Rel-5 | Correction to PRACH modulation quality | F | 5.5.0 | 5.6.0 | TEI5 |
| RP-030025 | 25.101 | 226 | | Rel-5 | Downlink power control during compressed mode tests | A | 5.5.0 | 5.6.0 | TEI |
| RP-030032 | 25.101 | 228 | | Rel-5 | Correction to PCH demodulation test | A | 5.5.0 | 5.6.0 | TEI4 |

**Table E.17: Release 6 CRs approved at RAN#19**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-020300 | 25.101 | 166 | 1 | Rel-6 | FDD UE Performance Requirements | C | 5.5.0 | 6.0.0 | RInImp-UERecPerf |
| RP-030048 | 25.101 | 201 | 1 | Rel-6 | Addition of requirement of CSICH demodulation when CA is active. | F | 5.5.0 | 6.0.0 | TEI6 |

Note: CR166r1 was approved at TSG RAN #16, but put on hold until another CR to Rel-6 of this specification was produced. It was then implemented after TSG RAN #19 together with CR201r1

**Table E.18: Release 6 CRs approved at RAN#20**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-030217 | 25.101 | 232 | | Rel-6 | Maximum input power for the UE | A | 6.0.0 | 6.1.0 | HSDPA-RF |
| RP-030220 | 25.101 | 234 | 1 | Rel-6 | Requirements on common channels with TX diversity | F | 6.0.0 | 6.1.0 | TEI6 |
| RP-030207 | 25.101 | 238 | 1 | Rel-6 | Problems with "Out of sync" in Initial convergence test | A | 6.0.0 | 6.1.0 | TEI |
| RP-030207 | 25.101 | 243 | 1 | Rel-6 | Correction of SSDT performance requirements | A | 6.0.0 | 6.1.0 | TEI |
| RP-030213 | 25.101 | 245 | | Rel-6 | Correction of TPC dynamic range in tests using DPCCH as a phase reference | A | 6.0.0 | 6.1.0 | TEI5 |
| RP-030217 | 25.101 | 252 | | Rel-6 | Removal of some of the FRC test cases with PA3 channel | A | 6.0.0 | 6.1.0 | HSDPA-RF |
| RP-030217 | 25.101 | 253 | | Rel-6 | Specification of HSDPA CQI test | A | 6.0.0 | 6.1.0 | HSDPA-RF |
| RP-030217 | 25.101 | 256 | | Rel-6 | Specification of HSDPA FRC Performance with Closed Loop Transmit Diversity | A | 6.0.0 | 6.1.0 | HSDPA-RF |
| RP-030217 | 25.101 | 258 | | Rel-6 | Specification of HS-SCCH Performance | A | 6.0.0 | 6.1.0 | HSDPA-RF |
| RP-030217 | 25.101 | 260 | | Rel-6 | Specification of HSDPA CQI test in fading | A | 6.0.0 | 6.1.0 | HSDPA-RF |

**Table E.19: Release 6 CRs approved at RAN#21**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-030417 | 25.101 | 251 | 3 | Rel-6 | Addition of transmitter characteristics for HS-DPCCH | A | 6.1.0 | 6.2.0 | HSDPA-RF |
| RP-030415 | 25.101 | 264 | 1 | Rel-6 | Problems with "Out of sync" in Initial Convergence test | A | 6.1.0 | 6.2.0 | TEI |
| RP-030423 | 25.101 | 265 | 1 | Rel-6 | UE blocking requirements | F | 6.1.0 | 6.2.0 | TEI6 |
| RP-030423 | 25.101 | 267 | 1 | Rel-6 | Spurious Emission in GSM bands | F | 6.1.0 | 6.2.0 | TEI6 |
| RP-030418 | 25.101 | 270 | | Rel-6 | Correction of CR 160 implementation for Correction of power terms and definitions | A | 6.1.0 | 6.2.0 | TEI5 |
| RP-030515 | 25.101 | 271 | 1 | Rel-6 | Frequency bands for UMTS1.7/2.1, UMTS800 and UMTS850 | B | 6.1.0 | 6.2.0 | RInImp-UMTS850, RInImp-UMTS800, RInImp-UMTS1721 |



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**Table E.20: Release 6 CRs approved at RAN#22**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Workitem |
|---|---|---|---|---|---|---|---|---|---|
| RP-030720 | 25.101 | 274 | 2 | Rel-6 | SML definition | F | 6.2.0 | 6.3.0 | TEI6 |
| RP-030596 | 25.101 | 278 | | Rel-6 | Correction of references to ITU recommendations | A | 6.2.0 | 6.3.0 | TEI5 |
| RP-030605 | 25.101 | 280 | 1 | Rel-6 | DS-CDMA Introduction in the 800 MHz Band | B | 6.2.0 | 6.3.0 | RInImp-UMTS800 |
| RP-030608 | 25.101 | 281 | | Rel-6 | Specification of HSDPA FRC Performance for H-Set 6 | F | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030608 | 25.101 | 282 | 1 | Rel-6 | Specification of HS-SCCH Performance with Open Loop Transmit Diversity | F | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030608 | 25.101 | 284 | 1 | Rel-6 | Specification of CQI Testing for UE Capability Categories 11, 12 and 1-6 in Open and Closed Loop Transmit Diversities | F | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030608 | 25.101 | 285 | 1 | Rel-6 | Specification of CQI Testing for UE Capability Categories 7 and 8 | F | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030604 | 25.101 | 286 | 2 | Rel-6 | Introduction of UMTS 850 requirements | B | 6.2.0 | 6.3.0 | RInImp-UMTS850 |
| RP-030607 | 25.101 | 294 | | Rel-6 | New Compressed Mode Reference Pattern | F | 6.2.0 | 6.3.0 | TEI6 |
| RP-030595 | 25.101 | 297 | 3 | Rel-6 | Clarification to HSDPA OCNS definition | A | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030595 | 25.101 | 302 | | Rel-6 | Power allocation for HS-SCCH in FRC test | A | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030595 | 25.101 | 303 | | Rel-6 | Corrections of CQI reporting section | A | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030595 | 25.101 | 304 | | Rel-6 | Correction for FRC test in Closed loop mode 1 | A | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030595 | 25.101 | 305 | | Rel-6 | DTX handling for CQI test in fading channel | A | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030590 | 25.101 | 307 | | Rel-6 | Correction of W-CDMA modulated interferer definition | A | 6.2.0 | 6.3.0 | TEI |
| RP-030603 | 25.101 | 308 | | Rel-6 | Introduction of new channel arrangement for bands IV, V and VI | B | 6.2.0 | 6.3.0 | RInImp-UMTS850, UMTS800,UMTS1721 |
| RP-030595 | 25.101 | 309 | 1 | Rel-6 | Additional Specification of CQI Testing for UE Capability Categories 11 and 12 | A | 6.2.0 | 6.3.0 | HSDPA-RF |
| RP-030605 | 25.101 | 314 | | Rel-6 | DS CDMA introduction in the 800 MHz band (performance requirement in Band VI) | B | 6.2.0 | 6.3.0 | RInImp-UMTS800 |
| RP-030605 | 25.101 | 315 | | Rel-6 | DS CDMA introduction in the 800 MHz band (Addition of spurious emissions requirement) | B | 6.2.0 | 6.3.0 | RInImp-UMTS800 |
| RP-030607 | 25.101 | 316 | | Rel-6 | Additional spurious emission requirements for Band II to protect UMTS850 | F | 6.2.0 | 6.3.0 | TEI6 |
| RP-030607 | 25.101 | 317 | | Rel-6 | Clarification of UE blocking definition | F | 6.2.0 | 6.3.0 | TEI6 |

**Table E.21: Release 6 CRs approved at RAN#23**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-040039 | 25.101 | 324 | | Rel-6 | Introduction of UMTS 1.7/2.1 GHz requirements | B | 6.3.0 | 6.4.0 | RInImp-UMTS1721 |
| RP-040042 | 25.101 | 325 | | Rel-6 | Additional spurious emission requirements for Bands II and V to protect 1.7/2.1 GHz | F | 6.3.0 | 6.4.0 | TEI6 |
| RP-040042 | 25.101 | 326 | | Rel-6 | Additional spurious emission requirements for Band I to protect UMTS800 | F | 6.3.0 | 6.4.0 | TEI6 |
| RP-040036 | 25.101 | 328 | | Rel-6 | Clarification of frequency error observation period for PRACH preambles | A | 6.3.0 | 6.4.0 | TEI5 |
| RP-040042 | 25.101 | 329 | 1 | Rel-6 | Clarification to Power on/off time mask diagram | F | 6.3.0 | 6.4.0 | TEI6 |
| RP-040043 | 25.101 | 331 | | Rel-6 | Reduction of channel number for UMTS800(band VI) | F | 6.3.0 | 6.4.0 | RInImp-UMTS800 |
| RP-040036 | 25.101 | 334 | | Rel-6 | Minimum requirements for UE ACS | A | 6.3.0 | 6.4.0 | TEI5 |
| RP-040044 | 25.101 | 338 | 1 | Rel-6 | Minimum requirements for TPC combining in soft Handover | A | 6.3.0 | 6.4.0 | TEI |



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**Table E.22: Release 6 CRs approved at RAN#25**

| RAN Tdoc | Spec | CR | R | Ph | Title | Cat | Curr | New | Work Item |
|---|---|---|---|---|---|---|---|---|---|
| RP-040291 | 25.101 | 342 | 2 | Rel-6 | UE maximum output power with HS-DPCCH | A | 6.4.0 | 6.5.0 | HSDPA-RF |
| RP-040291 | 25.101 | 344 | 3 | Rel-6 | Correction of maximum allowed power and range in TFC selection with HS-DPCCH and other clarifications | F | 6.4.0 | 6.5.0 | HSDPA-RF |
| RP-040292 | 25.101 | 346 | 1 | Rel-6 | Correction in the Band V (850MHz) additional frequency channel - UARFCN | F | 6.4.0 | 6.5.0 | RInImp-UMTS850 |
| RP-040288 | 25.101 | 352 | | Rel-6 | Clarification of test parameter of reliable TPC command combining | F | 6.4.0 | 6.5.0 | TEI6 |
| RP-040292 | 25.101 | 353 | | Rel-6 | Frequency range correction of out-of-band blocking for Band IV | F | 6.4.0 | 6.5.0 | RInImp-UMTS1721 |
| RP-040288 | 25.101 | 354 | 1 | Rel-6 | UE maximum input level for HS-PDSCH | F | 6.4.0 | 6.5.0 | TEI6, HSDPA-RF |
| RP-040288 | 25.101 | 358 | | Rel-6 | Clarification to change of TFC and compressed mode time mask diagrams | F | 6.4.0 | 6.5.0 | TEI6 |
| RP-040284 | 25.101 | 361 | | Rel-6 | Clarification of HS-DSCH level | A | 6.4.0 | 6.5.0 | HSDPA-RF |
| RP-040284 | 25.101 | 363 | 1 | Rel-6 | Correction to OCNS code allocation for HSDPA testing | A | 6.4.0 | 6.5.0 | HSDPA-RF |
| RP-040287 | 25.101 | 364 | 1 | Rel-6 | Specification of enhanced performance requirements for HSDPA based on receiver diversity | B | 6.4.0 | 6.5.0 | RInImp-HSPerf-RxDiv |
| RP-040384 | 25.101 | 365 | | Rel-6 | UE maximum output power for HSDPA-only terminal | B | 6.4.0 | 6.5.0 | EDCH-RF |



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# History

| Document history | | |
|---|---|---|
| V6.3.0 | December 2003 | Publication |
| V6.4.0 | March 2004 | Publication |
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