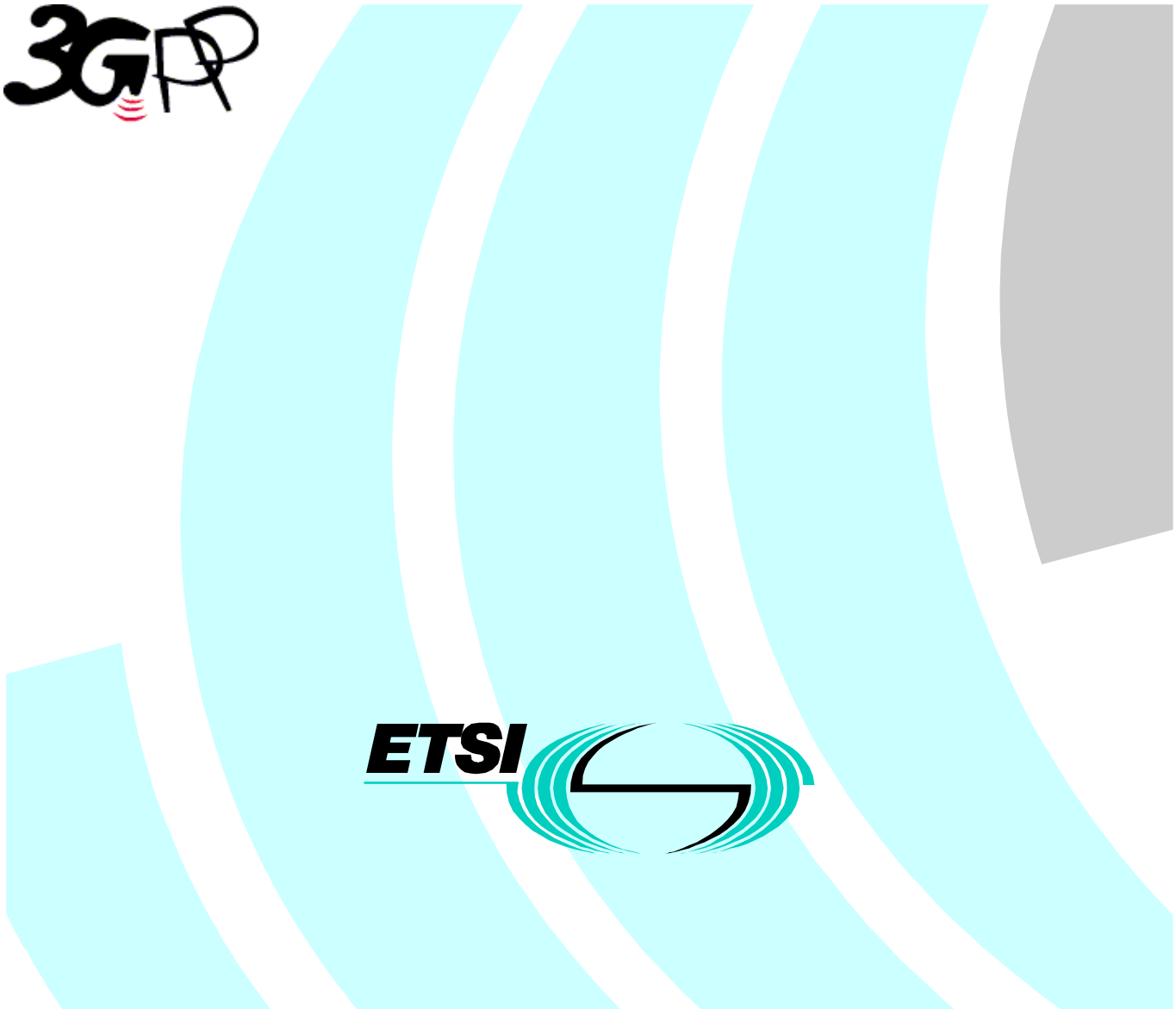
# ETSI TS 125 105 V3.7.0 (2001-06)

*Technical Specification*

**Universal Mobile Telecommunications System (UMTS);**
**UTRA (BS) TDD;**
**Radio transmission and Reception**
**(3GPP TS 25.105 version 3.7.0 Release 1999)**



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# Foreword

This Technical Specification (TS) has been produced by the ETSI 3rd Generation Partnership Project (3GPP).

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# Contents

# Foreword

This Technical Specification has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

- x the first digit:
  - 1 presented to TSG for information;
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  - 3 Indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the specification.

# 1 Scope

This document establishes the minimum RF characteristics of the TDD mode of UTRA.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] ITU-R Recommendation SM.329-8 "Spurious emissions".

[2] ETSI ETR 273-1-2: "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".

[3] IEC 60721-3-3 (1994): "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weather protected locations".

[4] IEC 60721-3-4 (1995): "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weather protected locations".

[5] 3GPP TS 25.142: "Base station conformance testing (TDD)".

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the definitions apply.

**Power Setting**: The value of the control signal, which determines the desired transmitter, output Power. Typically, the power setting would be altered in response to power control commands

**Maximum Power Setting**: The highest value of the Power control setting which can be used.

**Maximum output Power**: This refers to the measure of power when averaged over the transmit timeslot at the maximum power setting.

**Peak Power**: The instantaneous power of the RF envelope which is not expected to be exceeded for [99.9%] of the time.

**Maximum peak power:** The peak power observed when operating at a given maximum output power.

**Average Power**: The average transmitter output power obtained over any specified time interval, including periods with no transmission. *<Editors: This definition would be relevant when considering realistic deployment scenarios where the power control setting may vary. >*

**Maximum average power**: The average transmitter output power obtained over any specified time interval, including periods with no transmission, when the transmit time slots are at the maximum power setting. *<Editors: The average power at the maximum power setting would also be consistent with defining a long term average power>*

**Zero distance**: Connected to the antenna connector of the BS using an interconnection of negligible delay

## 3.2 Symbols

(void)

## 3.3 Abbreviations

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

| | |
|---|---|
| ACIR | Adjacent Channel Interference Ratio |
| ACLR | Adjacent Channel Leakage power Ratio |
| ACS | Adjacent Channel Selectivity |
| BER | Bit Error Rate |
| BS | Base Station |
| CW | Continuous wave (unmodulated signal) |
| DL | Down link (forward link) |
| $DPCH_o$ | A mechanism used to simulate an individual intracell interferer in the cell with one code and a spreading factor of 16 |
| $\frac{DPCH_o\_E_c}{I_{or}}$ | The ratio of the average transmit energy per PN chip for the $DPCH_o$ to the total transmit power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector |
| EIRP | Effective Isotropic Radiated Power |
| FDD | Frequency Division Duplexing |
| FER | Frame Error Rate |
| $I_{oc}$ | The power spectral density of a band limited white noise source (simulating interference form other cells) as measured at the BS antenna connector. |
| $\hat{I}_{or}$ | The received power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector |
| PPM | Parts Per Million |
| RSSI | Received Signal Strength Indicator |
| SIR | Signal to Interference ratio |
| TDD | Time Division Duplexing |
| TPC | Transmit Power Control |
| UE | User Equipment |
| UL | Up link (reverse link) |
| UTRA | UMTS Terrestrial Radio Access |

# 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 25.142 section 5.9.6 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 Base station classes

The requirements in this specification apply to base station intended for general-purpose applications in co-ordinated network operation.

In the future further classes of base stations may be defined; the requirements for these may be different than for general-purpose applications.

## 4.3 Regional requirements

Some requirements in TS 25.105 may only apply in certain regions. Table 4.1 lists all requirements that may be applied differently in different regions.

**Table 4.1: List of regional requirements.**

| Clause number | Requirement | Comments |
|---|---|---|
| 5.2 | Frequency bands | Some bands may be applied regionally. |
| 6.2.1 | Base station maximum output power | In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the range of conditions defined as normal. |
| 6.6.2.1 | Spectrum emission mask | The mask specified may be mandatory in certain regions. In other regions this mask may not be applied. |
| 6.6.3.1.1 | Spurious emissions (Category A) | These requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied. |
| 6.6.3.1.2 | Spurious emissions (Category B) | These requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied. |
| 6.6.3.2.1 | Co-existence with GSM900 – Operation in the same geographic area | This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed. |
| 6.6.3.2.2 | Co-existence with GSM900 – Co-located base stations | This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located. |
| 6.6.3.3.1 | Co-existence with DCS1800 – Operation in the same geographic area | This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed. |
| 6.6.3.3.2 | Co-existence with DCS1800 – Co-located base stations | This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located. |
| 6.6.3.4.1 | Co-existence with UTRA FDD – Operation in the same geographic area | This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed. |
| 6.6.3.4.2 | Co-existence with UTRA FDD – Co-located base stations | This requirement may be applied for the protection of UTRA-FDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located. |
| 7.5 | Blocking characteristic | The requirement is applied according to what frequency bands in Clause 5.2 that are supported by the BS. |
| 7.5.1 | Blocking characteristic Co-location with GSM900 and/or DCS 1800 | This requirement may be applied for the protection of UTRA TDD BS receivers when UTRA TDD BS and GSM 900/DCS1800 BS are co-located. |

## 4.4 Environmental requirements for the BS equipment

The BS equipment shall fulfil all the requirements in the full range of environmental conditions for the relevant environmental class from the relevant IEC specifications listed below:

IEC 60 721-3-3 “Stationary use at weather protected locations” [3]

IEC 60 721-3-4 “Stationary use at non weather protected locations” [4]

Normally it should be sufficient for all tests to be conducted using normal test conditions except where otherwise stated. For guidance on the use of test conditions to be used in order to show compliance refer to TS 25.142 [5].

# 5 Frequency bands and channel arrangement

## 5.1 General

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

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

## 5.2 Frequency bands

UTRA/TDD is designed to operate in the following bands;

a) 1900 – 1920 MHz: Uplink and downlink transmission
2010 – 2025 MHz Uplink and downlink transmission

b)* 1850 – 1910 MHz: Uplink and downlink transmission
1930 – 1990 MHz: Uplink and downlink transmission

c)* 1910 – 1930 MHz: Uplink and downlink transmission

* Used in ITU Region 2

Additional allocations in ITU region 2 are FFS.

Deployment in existing and other frequency bands is not precluded.

The co-existence of TDD and FDD in the same bands is still under study in WG4.

## 5.3 TX–RX frequency separation

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each TDMA frame consists of 15 timeslots where each timeslot can be allocated to either transmit or receive.

## 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, which means that the carrier frequency must be a multiple of 200 kHz.

### 5.4.3 Channel number

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined as follows:

$N_t = 5 * F$ $0.0 \leq F \leq 3276.6$ MHz where F is the carrier frequency in MHz

# 6 Transmitter characteristics

## 6.1 General

Unless detailed the transmitter characteristic are specified at the antenna connector.

## 6.2 Base station output power

Output power, Pout, of the base station is the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter during one slot.

Rated output power, PRAT, of the base station is the mean power level per carrier over an active timeslot that the manufacturer has delared to be available at the antenna connector.

### 6.2.1 Base station maximum output power

Maximum output power, Pmax, of the base station is the mean power level per carrier over an active timeslot measured at the antenna connector for a specified reference condition.

#### 6.2.1.1 Minimum Requirement

In normal conditions, the base station maximum output power shall remain within +2 dB and –2 dB of the manufacturer's rated output power.

In extreme conditions, the Base station maximum output power shall remain within +2.5 dB and –2.5 dB of the manufacturer's rated output power.

In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the range of conditions defined as normal.

## 6.3 Frequency stability

Frequency stability is ability of the BS to transmit at the assigned carrier frequency. The BS shall use the same frequency source for both RF frequency generation and the chip clock.

### 6.3.1 Minimum Requirement

The modulated carrier frequency of the BS shall be accurate to within ± 0.05 PPM observed over a period of one timeslot for RF frequency generation.

## 6.4 Output power dynamics

Power control is used to limit the interference level. The transmitter uses a quality-based power control on the downlink.

### 6.4.1 Inner loop power control

Inner loop power control is the ability of the BS transmitter to adjust its output power in response to the UL received signal.

For inner loop correction on the Downlink Channel, the base station adjusts the mean output power level of a CCTrCH in response to each valid power control bit received from the UE on the Uplink Traffic Channel based on the mapping of the TPC bits in uplink CCTrCH to downlink CCTrCH. Inner loop control is based on SIR measurements at the UE receiver and the corresponding TPC commands are generated by the UE.

### 6.4.2 Power control steps

The power control step is the step change in the DL transmitter output power in response to a TPC message from the UE.

#### 6.4.2.1 Minimum Requirement

Down link (DL) 1, 2, 3 dB

The tolerance of the transmitter output power and the greatest average rate of change in mean power due to the power control step shall be within the range shown in Table 6.1.

**Table 6.1: power control step size tolerance**

| Step size | Tolerance | Range of average rate of change in mean power per 10 steps | |
|---|---|---|---|
| | | minimum | maximum |
| 1dB | +/-0.5dB | +/-8dB | +/-12dB |

| | | | |
|---|---|---|---|
| 2dB | +/-0.75dB | +/-16dB | +/-24dB |
| 3dB | +/-1dB | +/-24dB | +/-36dB |

### 6.4.3 Power control dynamic range

The power control dynamic range is the difference between the maximum and the minimum transmit output power for a specified reference condition

#### 6.4.3.1 Minimum Requirement

Down link (DL) power control dynamic range 30 dB

### 6.4.4 Minimum transmit power

The minimum controlled output power of the BS is when the power control setting is set to a minimum value. This is when the power control indicates a minimum transmit output power is required.

#### 6.4.4.1 Minimum Requirement

Down link (DL) minimum transmit power is set to: Maximum output power – 30dB

### 6.4.5 Primary CCPCH power

Primary CCPCH power is the transmission power of the primary common control physical channel averaged over the transmit timeslot. Primary CCPCH power is signalled over the BCH.

The error between the BCH-broadcast value of the Primary CCPCH power and the Primary CCPCH power averaged over the timeslot shall not exceed the values in table 6.2. The error is a function of the total power averaged over the timeslot, Pout, and the manufacturer's rated output power, PRAT.

**Table 6.2: Errors between Primary CCPCH power and the broadcast value**

| Total power in slot, dB | PCCPCH power tolerance |
|---|---|
| PRAT-3 < Pout ≤ PRAT+2 | +/- 2.5 dB |
| PRAT-6 < Pout ≤ PRAT-3 | +/- 3.5 dB |
| PRAT-13 < Pout ≤ PRAT-6 | +/- 5 dB |

## 6.5 Transmit ON/OFF power

## 6.5.1 Transmit OFF power

The transmit OFF power state is when the BS does not transmit. This parameter is defined as maximum output transmit power within the channel bandwidth when the transmitter is OFF.

#### 6.5.1.1 Minimum Requirement

The requirement of transmitOFF power shall be better than –79 dBm measured with a filter that has a Root Raised Cosine (RRC) filter response with a roll off $\alpha$=0.22 and a bandwidth equal to the chip rate.

### 6.5.2 Transmit ON/OFF Time mask

The time mask transmit ON/OFF defines the ramping time allowed for the BS between transmit OFF power and transmit ON power.

#### 6.5.2.1 Minimum Requirement

The transmit power level versus time should meet the mask specified in figure 6.1.

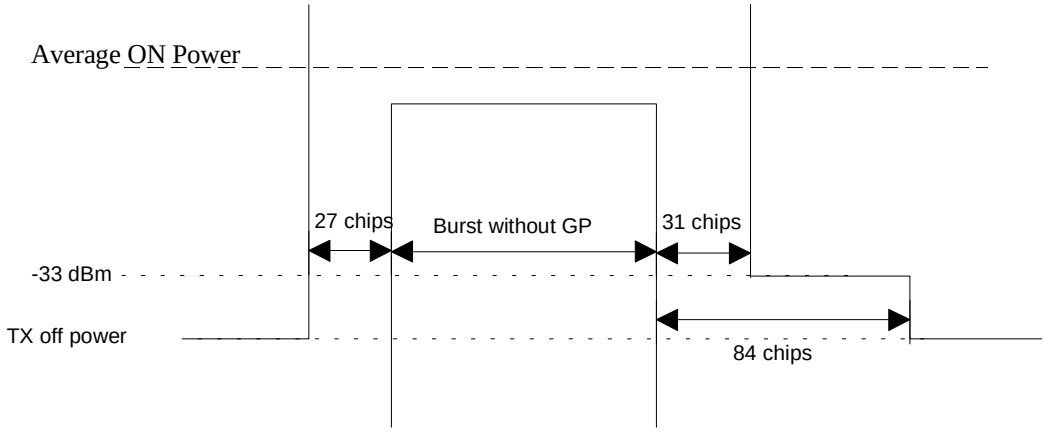


**Figure 6.1: Transmit ON/OFF template**

## 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 for transmitted spectrum and is centered on the assigned channel frequency. The occupied channel bandwidth is 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 channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission requirement is specified both in terms of a spectrum emission mask and adjacent channel power ratio for the transmitter.

#### 6.6.2.1 Spectrum emission mask

The mask defined in Table 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.3 to 6.6 for the appropriate BS maximum output power, in the frequency range from $\Delta f$ = 2.5 MHz to $f\_offset_{max}$ from the carrier frequency, where:

- $f\_offset_{max}$ is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in section 5.2, whichever is the greater.

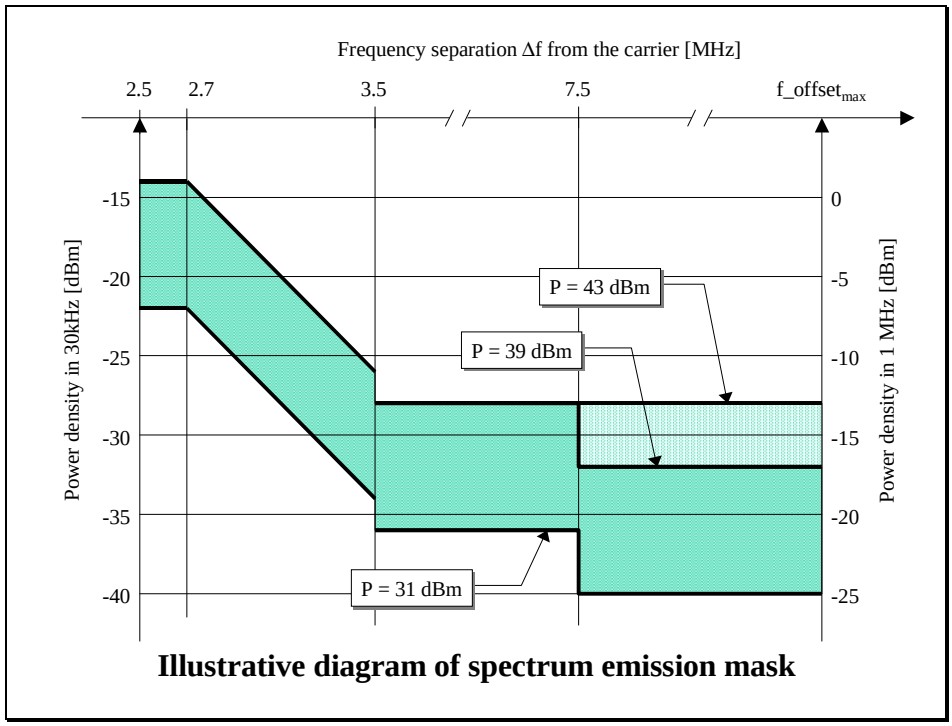


**Figure 6.2**

**Table 6.3: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm**

| Frequency offset of measurement filter – 3dB point, Δf | Frequency offset of measurement filter centre frequency, f_offset | Maximum level | Measurement bandwidth |
|---|---|---|---|
| 2.5 ≤ Δf < 2.7 MHz | 2.515MHz ≤ f_offset < 2.715MHz | -14 dBm | 30 kHz |
| 2.7 ≤ Δf < 3.5 MHz | 2.715MHz ≤ f_offset < 3.515MHz | - 14 - 15·(f_offset - 2.715) dBm | 30 kHz |
| (see note) | 3.515MHz ≤ f_offset < 4.0MHz | -26 dBm | 30 kHz |
| 3.5 ≤ Δf MHz | 4.0MHz ≤ f_offset < f_offset$_{max}$ | -13 dBm | 1 MHz |

**Table 6.4: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm**

| Frequency offset of measurement filter – 3dB point, Δf | Frequency offset of measurement filter centre frequency, f_offset | Maximum level | Measurement bandwidth |
|---|---|---|---|
| 2.5 ≤ Δf < 2.7 MHz | 2.515MHz ≤ f_offset < 2.715MHz | -14 dBm | 30 kHz |
| 2.7 ≤ Δf < 3.5 MHz | 2.715MHz ≤ f_offset < 3.515MHz | -14 - 15·(f_offset - 2.715) dBm | 30 kHz |
| (see note) | 3.515MHz ≤ f_offset < 4.0MHz | -26 dBm | 30 kHz |
| 3.5 ≤ Δf < 7.5 MHz | 4.0MHz ≤ f_offset < 8.0MHz | -13 dBm | 1 MHz |
| 7.5 ≤ Δf MHz | 8.0MHz ≤ f_offset < f_offset$_{max}$ | P - 56 dBm | 1 MHz |

**Table 6.5: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm**

| Frequency offset of measurement filter – 3dB point,Δf | Frequency offset of measurement filter centre frequency, f_offset | Maximum level | Measurement bandwidth |
|---|---|---|---|
| 2.5 ≤ Δf < 2.7 MHz | 2.515MHz ≤ f_offset < 2.715MHz | P - 53 dBm | 30 kHz |
| 2.7 ≤ Δf < 3.5 MHz | 2.715MHz ≤ f_offset < 3.515MHz | P - 53 - 15·(f_offset - 2.715) dBm | 30 kHz |
| (see note) | 3.515MHz ≤ f_offset < 4.0MHz | P - 65 dBm | 30 kHz |
| 3.5 ≤ Δf < 7.5 MHz | 4.0MHz ≤ f_offset < 8.0MHz | P - 52 dBm | 1 MHz |
| 7.5 ≤ Δf MHz | 8.0MHz ≤ f_offset < $f\_offset_{max}$ | P - 56 dBm | 1 MHz |

**Table 6.6: Spectrum emission mask values, BS maximum output power P < 31 dBm**

| Frequency offset of measurement filter – 3dB point, Δf | Frequency offset of measurement filter centre frequency, f_offset | Maximum level | Measurement bandwidth |
|---|---|---|---|
| 2.5 ≤ Δf < 2.7 MHz | 2.515MHz ≤ f_offset < 2.715MHz | -22 dBm | 30 kHz |
| 2.7 ≤ Δf < 3.5 MHz | 2.715MHz ≤ f_offset < 3.515MHz | -22 - 15·(f_offset - 2.715) dBm | 30 kHz |
| (see note) | 3.515MHz ≤ f_offset < 4.0MHz | -34 dBm | 30 kHz |
| 3.5 ≤ Δf < 7.5 MHz | 4.0MHz ≤ f_offset < 8.0MHz | -21 dBm | 1 MHz |
| 7.5 ≤ Δf MHz | 8.0MHz ≤ f_offset < $f\_offset_{max}$ | -25 dBm | 1 MHz |

NOTE: This frequency range ensures that the range of values of f_offset is continuous.

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

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured in an adjacent channel. Both the transmitted and the adjacent channel power are measured through a matched filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate. The requirements shall apply for all configurations of BS (single carrier or multi-carrier), and for all operating modes foreseen by the manufacturer's specification.

#### 6.6.2.2.1 Minimum Requirement

The ACLR shall be higher than the value specified in Table 6.7.

**Table 6.7: BS ACLR**

| BS adjacent channel offset | ACLR limit |
|---|---|
| ± 5 MHz | 45 dB |
| ± 10 MHz | 55 dB |

#### 6.6.2.2.2 Requirement in case of operation in proximity to TDD BS or FDD BS operating on an adjacent frequency

In case the equipment is operated in proximity to another TDD BS or FDD BS operating on the first or second adjacent frequency, the ACLR shall be higher than the value specified in Table 6.8.

**Table 6.8: BS ACLR in case of operation in proximity**

| BS adjacent channel offset | ACLR limit |
|---|---|
| ± 5 MHz | 70 dB |
| ± 10 MHz | 70 dB |

NOTE: The requirement is based on the assumption that the coupling loss between the base stations is at least 84dB.

#### 6.6.2.2.3 Requirement in case of co-siting with TDD BS or FDD BS operating on an adjacent frequency

In case the equipment is co-sited to another TDD BS or FDD BS operating on the first or second adjacent frequency, the requirement is specified in terms of the adjacent channel power level of the BS measured in the adjacent channel. The adjacent channel power shall not exceed the limit in Table 6.9.

**Table 6.9: BS ACLR in case of co-siting**

| BS adjacent channel offset | Maximum Level | Measurement Bandwidth |
|---|---|---|
| ± 5 MHz | -80 dBm | 3.84 MHz |
| ± 10 MHz | -80 dBm | 3.84 MHz |

## 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. This is measured at the base station RF output port.

Unless otherwise stated, all requirements are measured as mean power.

### 6.6.3.1 Mandatory Requirements

The requirements of either subclause 6.6.3.1.1 or subclause 6.6.3.1.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's.

Either requirement applies at frequencies within the specified frequency ranges which are more than 12.5MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

#### 6.6.3.1.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.

##### 6.6.3.1.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.10: BS Mandatory spurious emissions limits, Category A**

| Band | Minimum requirement | Measurement Bandwidth | Note |
|---|---|---|---|
| 9kHz – 150kHz | -13 dBm | 1 kHz | Bandwidth as in ITU SM.329-8, s4.1 |
| 150kHz – 30MHz | | 10 kHz | Bandwidth as in ITU SM.329-8, s4.1 |
| 30MHz – 1GHz | | 100 kHz | Bandwidth as in ITU SM.329-8, s4.1 |
| 1GHz – 12.75 GHz | | 1 MHz | Upper frequency as in ITU SM.329-8, s2.5 table 1 |

#### 6.6.3.1.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.

##### 6.6.3.1.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.11: BS Mandatory spurious emissions limits, Category B**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 9kHz – 150kHz | -36 dBm | 1 kHz | Bandwidth as in ITU SM.329-8, s4.1 |
| 150kHz – 30MHz | - 36 dBm | 10 kHz | Bandwidth as in ITU SM.329-8, s4.1 |
| 30MHz – 1GHz | -36 dBm | 100 kHz | Bandwidth as in ITU SM.329-8, s4.1 |
| 1GHz<br>↔<br>Fc1-60 MHz or Fl -10 MHz<br>*whichever is the higher* | -30 dBm | 1 MHz | Bandwidth as in ITU SM.329-8, s4.1 |
| Fc1 - 60 MHz or Fl -10 MHz<br>*whichever is the higher*<br>↔<br>Fc1 - 50 MHz or Fl -10 MHz<br>*whichever is the higher* | -25 dBm | 1 MHz | Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7 |
| Fc1 - 50 MHz or Fl -10 MHz<br>*whichever is the higher*<br>↔<br>Fc2 + 50 MHz or Fu +10 MHz<br>*whichever is the lower* | -15 dBm | 1 MHz | Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7 |
| Fc2 + 50 MHz or Fu + 10 MHz<br>*whichever is the lower*<br>↔<br>Fc2 + 60 MHz or Fu + 10 MHz<br>*whichever is the lower* | -25 dBm | 1 MHz | Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7 |
| Fc2 + 60 MHz or Fu + 10 MHz<br>*whichever is the lower*<br>↔<br>12,75 GHz | -30 dBm | 1 MHz | Bandwidth as in ITU-R SM.329-8, s4.3 and Annex 7. Upper frequency as in ITU-R SM.329-8, s2.5 table 1 |

Fc1: Center frequency of emission of the first carrier transmitted by the BS

Fc2: Center frequency of emission of the last carrier transmitted by the BS

Fl : Lower frequency of the band in which TDD operates

Fu : Upper frequency of the band in which TDD operates

### 6.6.3.2 Co-existence with GSM 900

#### 6.6.3.2.1 Operation in the same geographic area

This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.

##### 6.6.3.2.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.12: BS Spurious emissions limits for BS in geographic coverage area of GSM 900 MS receiver**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 921 – 960MHz | -57 dBm | 100 kHz | |

#### 6.6.3.2.2 Co-located base stations

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.

##### 6.6.3.2.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.13: BS Spurious emissions limits for protection of the GSM 900 BTS receiver**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 876 – 915 MHz | –98 dBm | 100 kHz | |

### 6.6.3.3 Co-existence with DCS 1800

#### 6.6.3.3.1 Operation in the same geographic area

This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.

##### 6.6.3.3.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.14: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800 MS receiver**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 1805 – 1880MHz | -47 dBm | 100 kHz | |

#### 6.6.3.3.2 Co-located basestations

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.

##### 6.6.3.3.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.15: BS Spurious emissions limits for BS co-located with DCS 1800 BTS**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 1710 – 1785 MHz | -98 dBm | 100 kHz | |

### 6.6.3.4 Co-existence with UTRA-FDD

#### 6.6.3.4.1 Operation in the same geographic area

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

##### 6.6.3.4.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.16: BS Spurious emissions limits for BS in geographic coverage area of UTRA-FDD**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 1920 – 1980 MHz | -32 dBm | 1 MHz | |
| 2110 – 2170 MHz | -52 dBm | 1 MHz | |

#### 6.6.3.4.2 Co-located base stations

This requirement may be applied for the protection of UTRA-FDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.

##### 6.6.3.4.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 6.17: BS Spurious emissions limits for BS co-located with UTRA-FDD**

| Band | Maximum Level | Measurement Bandwidth | Note |
|---|---|---|---|
| 1920 – 1980 MHz | -86 dBm | 1 MHz | |
| 2110 – 2170 MHz | -52 dBm | 1 MHz | |

## 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.

The transmit intermodulation level is the power of the intermodulation products when a CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal. The frequency of the interference signal shall be ±5 MHz, ±10 MHz and ±15 MHz offset from the subject signal.

### 6.7.1 Minimum Requirement

The Transmit intermodulation level shall not exceed the out of band or the spurious emission requirements of section 6.6.2 and 6.6.3.

## 6.8 Transmit modulation

### 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:

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

### 6.8.2 Modulation Accuracy

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. The requirement is valid over the total power dynamic range as specified in subclause 6.4.3. See Annex C of TS 25.142 for further details.

#### 6.8.2.1 Minimum Requirement

The Modulation accuracy shall not be worse than 12.5 %.

### 6.8.3 Peak Code Domain Error

The code domain error is computed by projecting the error vector power onto the code domain at a specific spreading factor. The error power for each code is defined as the ratio to the mean power of the reference waveform expressed in dB. And the Peak Code Domain Error is defined as the maximum value for Code Domain Error. The measurement interval is one timeslot.

#### 6.8.3.1 Minimum Requirement

The peak code domain error shall not exceed -28 dB at spreading factor 16.

# 7 Receiver characteristics

## 7.1 General

The requirements in this clause 7 assume that the receiver is not equipped with diversity. For receivers with diversity, the requirements apply to each antenna connector separately, with the other one(s) terminated or disabled .The requirements are otherwise unchanged.

## 7.2 Reference sensitivity level

The reference sensitivity is the minimum receiver input power measured at the antenna connector at which the FER/BER does not exceed the specific value indicated in section 7.2.1.

### 7.2.1 Minimum Requirement

For the measurement channel specified in Annex A, the reference sensitivity level and performance of the BS shall be as specified in table 7.1 below.

**Table 7.1: BS reference sensitivity levels**

| Data rate | BS reference sensitivity level (dBm) | FER/BER |
|---|---|---|
| 12.2 kbps | -109 dBm | BER shall not exceed 0.001 |

## 7.3 Dynamic range

Receiver dynamic range is the receiver ability to handle a rise of interference in the reception frequency channel. The receiver shall fulfil a specified BER requirement for a specified sensitivity degradation of the wanted signal in the presence of an interfering AWGN signal in the same reception frequency channel.

### 7.3.1 Minimum requirement

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

**Table 7.2: Dynamic Range**

| Parameter | Level | Unit |
|---|---|---|
| Data rate | 12.2 | kbps |
| Wanted signal | <REFSENS> + 30 dB | dBm |
| Interfering AWGN signal | -73 | dBm/3.84 MHz |

## 7.4 Adjacent Channel Selectivity (ACS)

Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the center frequency of the assigned channel.ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

### 7.4.1 Minimum Requirement

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

**Table 7.3 : Adjacent channel selectivity**

| Parameter | Level | Unit |
|---|---|---|
| Data rate | 12.2 | kbps |
| Wanted signal | Reference sensitivity level + 6dB | dBm |
| Interfering signal | –52 | dBm |
| Fuw (Modulated) | 5 | MHz |

## 7.5 Blocking characteristics

The blocking characteristics is a measure of the receiver 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 adjacent channels. The blocking performance requirement applies to interfering signals with center frequency within the ranges specified in the tables below, using a 1MHz step size.

The static reference performance as specified in clause 7.2.1 shall be met with a wanted and an interfering signal coupled to BS antenna input using the following parameters.

**Table 7.4 (a): Blocking requirements for operating bands defined in 5.2(a)**

| Centre Frequency of Interfering Signal | Interfering Signal Level | Wanted Signal Level | Minimum Offset of Interfering Signal | Type of Interfering Signal |
|---|---|---|---|---|
| 1900 – 1920 MHz,<br>2010 – 2025 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1880 – 1900 MHz,<br>1990 – 2010 MHz,<br>2025 – 2045 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1920 – 1980 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1 – 1880 MHz,<br>1980 – 1990 MHz,<br>2045 – 12750 MHz | -15 dBm | <REFSENS> + 6 dB | — | CW carrier |

**Table 7.4(b) : Blocking requirements for operating bands defined in 5.2(b)**

| Centre Frequency of Interfering Signal | Interfering Signal Level | Wanted Signal Level | Minimum Offset of Interfering Signal | Type of Interfering Signal |
|---|---|---|---|---|
| 1850 – 1990 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1830 – 1850 MHz, 1990 – 2010 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1 – 1830 MHz, 2010 – 12750 MHz | -15 dBm | <REFSENS> + 6 dB | — | CW carrier |

**Table 7.4(c) : Blocking requirements for operating bands defined in 5.2(c)**

| Centre Frequency of Interfering Signal | Interfering Signal Level | Wanted Signal Level | Minimum Offset of Interfering Signal | Type of Interfering Signal |
|---|---|---|---|---|
| 1910 – 1930 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1890 – 1910 MHz, 1930 – 1950 MHz | -40 dBm | <REFSENS> + 6 dB | 10 MHz | WCDMA signal with one code |
| 1 – 1890 MHz, 1950 – 12750 MHz | -15 dBm | <REFSENS> + 6 dB | — | CW carrier |

### 7.5.1 Co-location with GSM900 and/or DCS 1800

This additional blocking requirement may be applied for the protection of TDD BS receivers when GSM900 and/or DCS1800 BTS are co-located with UTRA TDD BS.

The blocking performance requirement applies to interfering signals with center frequency within the ranges specified in the tables below, using a 1MHz step size.

In case this additional blocking requirement is applied, the static reference performance as specified in clause 7.2.1 shall be met with a wanted and an interfering signal coupled to BS antenna input using the following parameters.

**Table 7.4 (d): Additional blocking requirements for operating bands defined in 5.2(a) when co-located with GSM900**

| Centre Frequency of Interfering Signal | Interfering Signal Level | Wanted Signal Level | Minimum Offset of Interfering Signal | Type of Interfering Signal |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 921 – 960 MHz | +16 dBm | <REFSENS> + 6 dB | — | CW carrier |

**Table 7.4 (e): Additional blocking requirements for operating bands defined in 5.2(a) when co-located with DCS1800**

| Center Frequency of Interfering Signal | Interfering Signal Level | Wanted Signal Level | Minimum Offset of Interfering Signal | Type of Interfering Signal |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 1805 - 1880 | +16 dBm | <REFSENS> + 6 dB | — | CW carrier |

## 7.6 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.

The static reference performance as specified in clause 7.2.1 should be met when the following signals are coupled to BS antenna input.

- A wanted signal at the assigned channel frequency, 6 dB above the static reference level.
- Two interfering signals with the following parameters.

**Table 7.5 : Intermodulation requirement**

| Interfering Signal Level | Offset | Type of Interfering Signal |
|---|---|---|
| - 48 dBm | 10 MHz | CW signal |
| - 48 dBm | 20 MHz | WCDMA signal with one code |

## 7.7 Spurious emissions

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the BS antenna connector. The requirements apply to all BS with separate RX and TX antenna port. The test shall be performed when both TX and RX are on with the TX port terminated.

For all BS with common RX and TX antenna port the transmitter spurious emission as specified in section 6.6.3 is valid.

### 7.7.1 Minimum Requirement

The power of any spurious emission shall not exceed:

**Table 7.6 : Receiver spurious emission requirements**

| Band | Maximum level | Measurement Bandwidth | Note |
|---|---|---|---|
| 9 kHz – 1 GHz | -57 dBm | 100 kHz | |
| 1 GHz – 1.9 GHz and 1.98 GHz – 2.01 GHz | -47 dBm | 1 MHz | With the exception of frequencies between 12.5MHz below the first carrier frequency and 12.5MHz above the last carrier frequency used by the BS. |
| 1.9 GHz – 1.98 GHz and 2.01 GHz – 2.025 GHz | -78 dBm | 3.84 MHz | With the exception of frequencies between 12.5MHz below the first carrier frequency and 12.5MHz above the last carrier frequency used by the BS. |
| 2.025 GHz – 12.75 GHz | -47 dBm | 1 MHz | With the exception of frequencies between 12.5MHz below the first carrier frequency and 12.5MHz above the last carrier frequency used by the BS. |

# 8 Performance requirement

## 8.1 General

Performance requirements for the BS are specified for the measurement channels defined in Annex A and the propagation conditions in Annex B. The requirements only apply to those measurement channels that are supported by the base station.

The requirements only apply to a base station with dual receiver antenna diversity. The required $\hat{I}_{or}/I_{oc}$ shall be applied separately at each antenna port.

**Table 8.1: Summary of Base Station performance targets**

| Physical channel | Measurement channel | Static | Multi-path Case 1 | Multi-path Case 2 | Multi-path Case 3 |
|---|---|---|---|---|---|
| | | Performance metric | | | |
| DCH | 12.2 kbps | BLER<$10^{-2}$ | BLER<$10^{-2}$ | BLER<$10^{-2}$ | BLER<$10^{-2}$ |
| | 64 kbps | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$, $10^{-3}$ |
| | 144 kbps | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$, $10^{-3}$ |
| | 384 kbps | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$ | BLER< $10^{-1}$, $10^{-2}$, $10^{-3}$ |

# 8.2 Demodulation in static propagation conditions

## 8.2.1 Demodulation of DCH

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Rate (BLER ) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

### 8.2.1.1 Minimum requirement

For the parameters specified in Table 8.2 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.3. These requirements are applicable for TFCS size 16.

**Table 8.2: Parameters in static propagation conditions**

| Parameters | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Number of $DPCH_o$ | | 6 | 4 | 0 | 0 |
| $\frac{DPCH_o \_ E_c}{I_{or}}$ | dB | -9 | -9.5 | 0 | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -89 | | | |
| Cell Parameter* | | 0,1 | | | |
| DPCH Channelization Codes* | C(k,Q) | C(1,8) | C(1,4) C(5,16) | C(1,2) C(9,16) | C(1,2) |
| $DPCH_o$ Channelization Codes* | C(k,Q) | C(i,16) 3≤ i ≤8 | C(i,16) 6≤ i ≤9 | - | - |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |
| *Note: Refer to TS 25.223 for definition of channelization codes and cell parameter. | | | | | |

**Table 8.3: Performance requirements in AWGN channel.**

| Test Number | $\frac{\hat{I}_{or}}{I_{oc}}$ [dB] | BLER Required $E_b/N_0$ |
|---|---|---|
| 1 | -1.8 | $10^{-2}$ |
| 2 | -0.35 | $10^{-1}$ |
| | -0.05 | $10^{-2}$ |
| 3 | -0.2 | $10^{-1}$ |
| | 0.1 | $10^{-2}$ |
| 4 | -0.7 | $10^{-1}$ |
| | -0.5 | $10^{-2}$ |

# 8.3 Demodulation of DCH in multipath fading conditions

## 8.3.1 Multipath fading Case 1

The performance requirement of DCH in multipath fading Case 1 is determined by the maximum Block Error Rate (BLER ) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

### 8.3.1.1 Minimum requirement

For the parameters specified in Table 8.4 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.5. These requirements are applicable for TFCS size 16.

**Table 8.4: Parameters in multipath Case 1 channel**

| Parameters | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Number of $DPCH_o$ | | 6 | 4 | 0 | 0 |
| $\frac{DPCH_o\_E_c}{I_{or}}$ | dB | -9 | -9.5 | 0 | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -89 | | | |
| Cell Parameter* | | 0,1 | | | |
| DPCH Channelization Codes* | C(k,Q) | C(1,8) | C(1,4)<br>C(5,16) | C(1,2)<br>C(9,16) | C(1,2) |
| $DPCH_o$ Channelization Codes* | C(k,Q) | C(i,16) 3≤ i ≤8 | C(i,16) 6≤ i ≤9 | - | - |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |

**Table 8.5: Performance requirements in multipath Case 1 channel.**

| Test Number | $\frac{\hat{I}_{or}}{I_{oc}}$ [dB] | BLER |
|---|---|---|
| 1 | 6.7 | $10^{-2}$ |
| 2 | 5.3 | $10^{-1}$ |
| | 9.7 | $10^{-2}$ |
| 3 | 5.5 | $10^{-1}$ |
| | 9.8 | $10^{-2}$ |
| 4 | 4.8 | $10^{-1}$ |
| | 9.2 | $10^{-2}$ |

## 8.3.2 Multipath fading Case 2

The performance requirement of DCH in multipath fading Case 2 is determined by the maximum Block Error Rate (BLER ) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

### 8.3.2.1 Minimum requirement

For the parameters specified in Table 8.6 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.7. These requirements are applicable for TFCS size 16.

**Table 8.6: Parameters in multipath Case 2 channel**

| Parameters | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Number of $DPCH_o$ | | 2 | 0 | 0 | 0 |
| $\frac{DPCH_o\_E_c}{I_{or}}$ | dB | -6 | 0 | 0 | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -89 | | | |
| Cell Parameter* | | 0,1 | | | |
| DPCH Channelization Codes* | C(k,Q) | C(1,8) | C(1,4)<br>C(5,16) | C(1,2)<br>C(9,16) | C(1,2) |
| $DPCH_o$ Channelization Codes* | C(k,Q) | C(i,16) 3≤ i ≤4 | - | - | - |
| Information Data Rate | kbps | 12.2 | 64 | 144 | 384 |
| *Note: Refer to TS 25.223 for definition of channelization codes and cell parameter. | | | | | |

**Table 8.7: Performance requirements in multipath Case 2 channel.**

| Test Number | $\frac{\hat{I}_{or}}{I_{oc}}$ [dB] | BLER |
|---|---|---|
| 1 | 0.2 | $10^{-2}$ |
| 2 | 0.1 | $10^{-1}$ |
| | 2.5 | $10^{-2}$ |
| 3 | 3.5 | $10^{-1}$ |
| | 5.8 | $10^{-2}$ |
| 4 | 2.8 | $10^{-1}$ |
| | 5.1 | $10^{-2}$ |

## 8.3.3 Multipath fading Case 3

The performance requirement of DCH in multipath fading Case 3 is determined by the maximum Block Error Rate (BLER ) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

### 8.3.3.1 Minimum requirement

For the parameters specified in Table 8.8 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.9. These requirements are applicable for TFCS size 16.

**Table 8.8: Parameters in multipath Case 3 channel**

| Parameters | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
|---|---|---|---|---|---|
| Number of $DPCH_o$ | | 2 | 0 | 0 | 0 |
| $\frac{DPCH_o\_E_c}{I_{or}}$ | dB | -6 | 0 | 0 | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -89 | | | |
| Cell Parameter* | | 0,1 | | | |
| DPCH Channelization Codes* | C(k,Q) | C(1,8) | C(1,4)<br>C(5,16) | C(1,2)<br>C(9,16) | C(1,2) |
| $DPCH_o$ Channelization Codes* | C(k,Q) | C(i,16) 3≤ i ≤4 | - | - | - |
| Information Data Rate | Kbps | 12.2 | 64 | 144 | 384 |
| *Note: Refer to TS 25.223 for definition of channelization codes and cell parameter. | | | | | |

**Table 8.9: Performance requirements in multipath Case 3 channel.**

| Test Number | $\frac{\hat{I}_{or}}{I_{oc}}$ [dB] | BLER |
|---|---|---|
| 1 | -0.1 | $10^{-2}$ |
| 2 | 0.8 | $10^{-1}$ |
| | 2.7 | $10^{-2}$ |
| | 4.2 | $10^{-3}$ |
| 3 | 4.5 | $10^{-1}$ |
| | 6.4 | $10^{-2}$ |
| | 8.0 | $10^{-3}$ |
| 4 | 3.6 | $10^{-1}$ |
| | 5.1 | $10^{-2}$ |
| | 6.5 | $10^{-3}$ |

# Annex A (normative): Measurement Channels

## A.1 General

## A.2 Reference measurement channel

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

**Table A.1**

| Parameter | Value |
|---|---|
| Information data rate | 12.2 kbps |
| RU´s allocated | 2 RU |
| Midamble | 512 chips |
| Interleaving | 20 ms |
| Power control | 2 Bit/user |
| TFCI | 16 Bit/user |
| Inband signalling DCCH | 2 kbps |
| Puncturing level at Code rate 1/3 : DCH / DCCH | 5% / 0% |

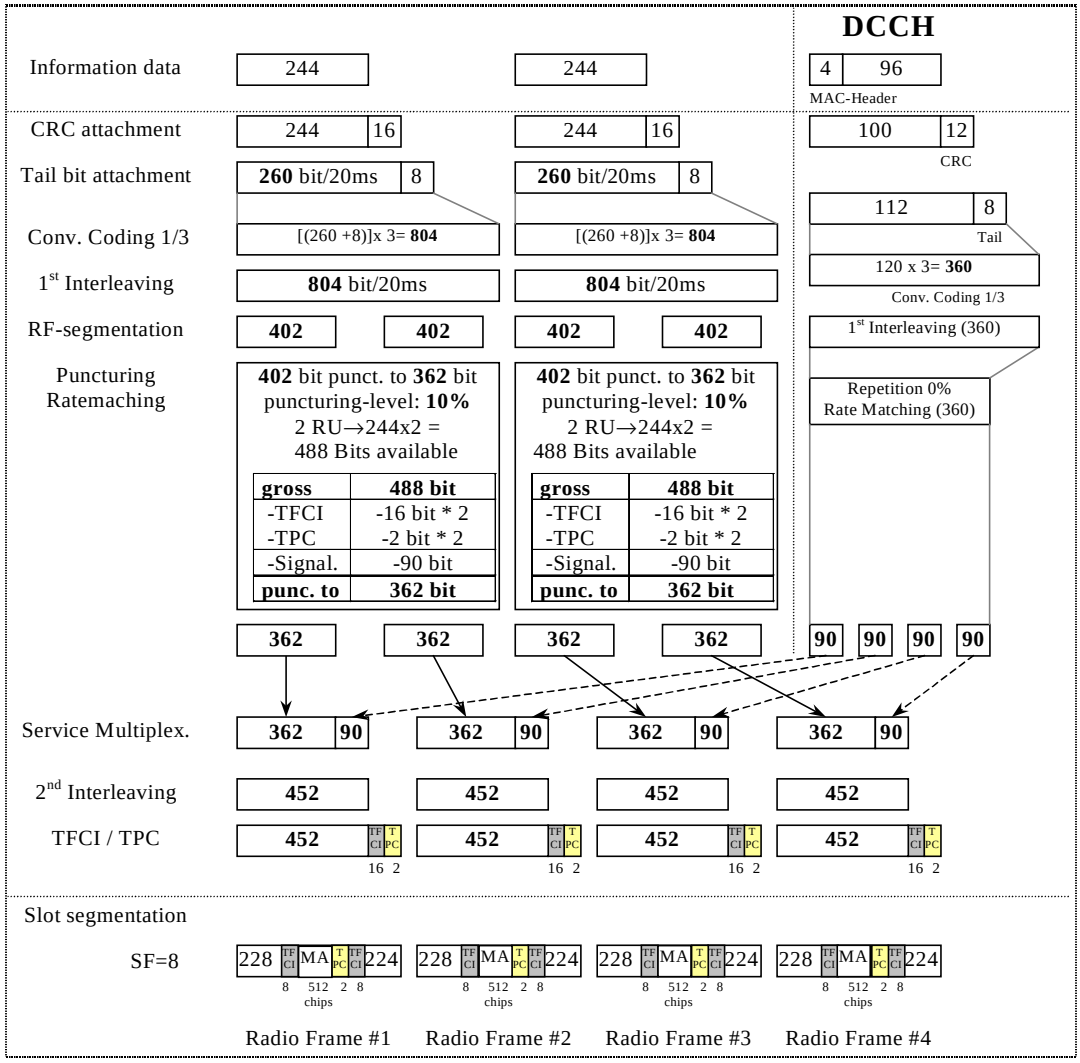


**Figure A.1**

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

**Table A.2**

| Parameter | Value |
|---|---|
| Information data rate | 64 kbps |
| RU´s allocated | 1 SF4 + 1 SF16 = 5RU |
| Midamble | 512 chips |
| Interleaving | 20 ms |
| Power control | 2 Bit/user |
| TFCI | 16 Bit/user |
| Inband signalling DCCH | 2 kbps |
| Puncturing level at Code rate : 1/3 DCH / ½ DCCH | 41.2% / 10% |

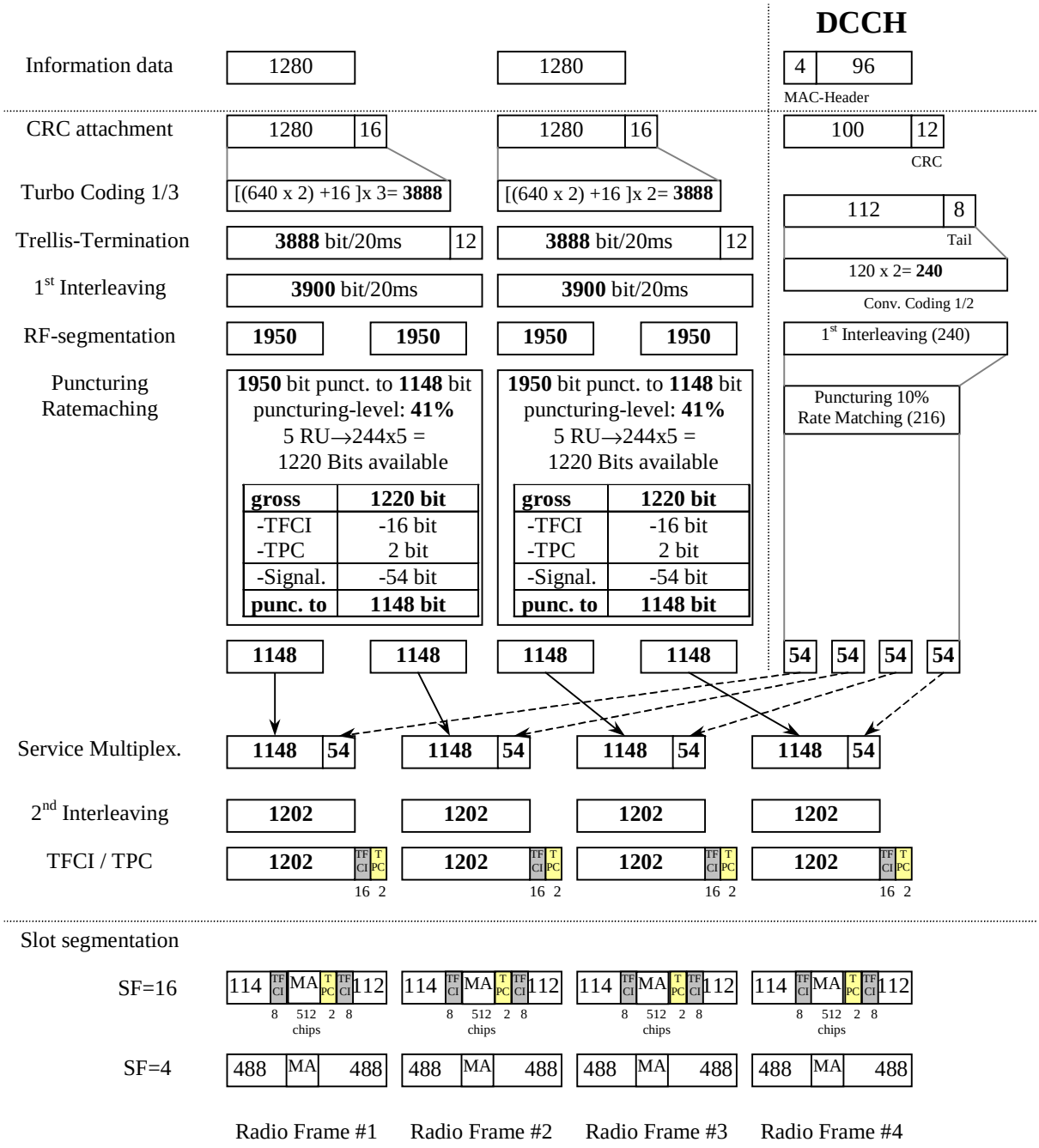


**Figure A.2**

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

**Table A.3**

| Parameter | Value |
|---|---|
| Information data rate | 144 kbps |
| RU´s allocated | 1 SF2 + 1 SF16 = 9RU |
| Midamble | 256 chips |
| Interleaving | 20 ms |
| Power control | 2 Bit/user |
| TFCI | 16 Bit/user |
| Inband signalling DCCH | 2 kbps |
| Puncturing level at Code rate : 1/3 DCH / ½ DCCH | 44.4% / 16.6% |

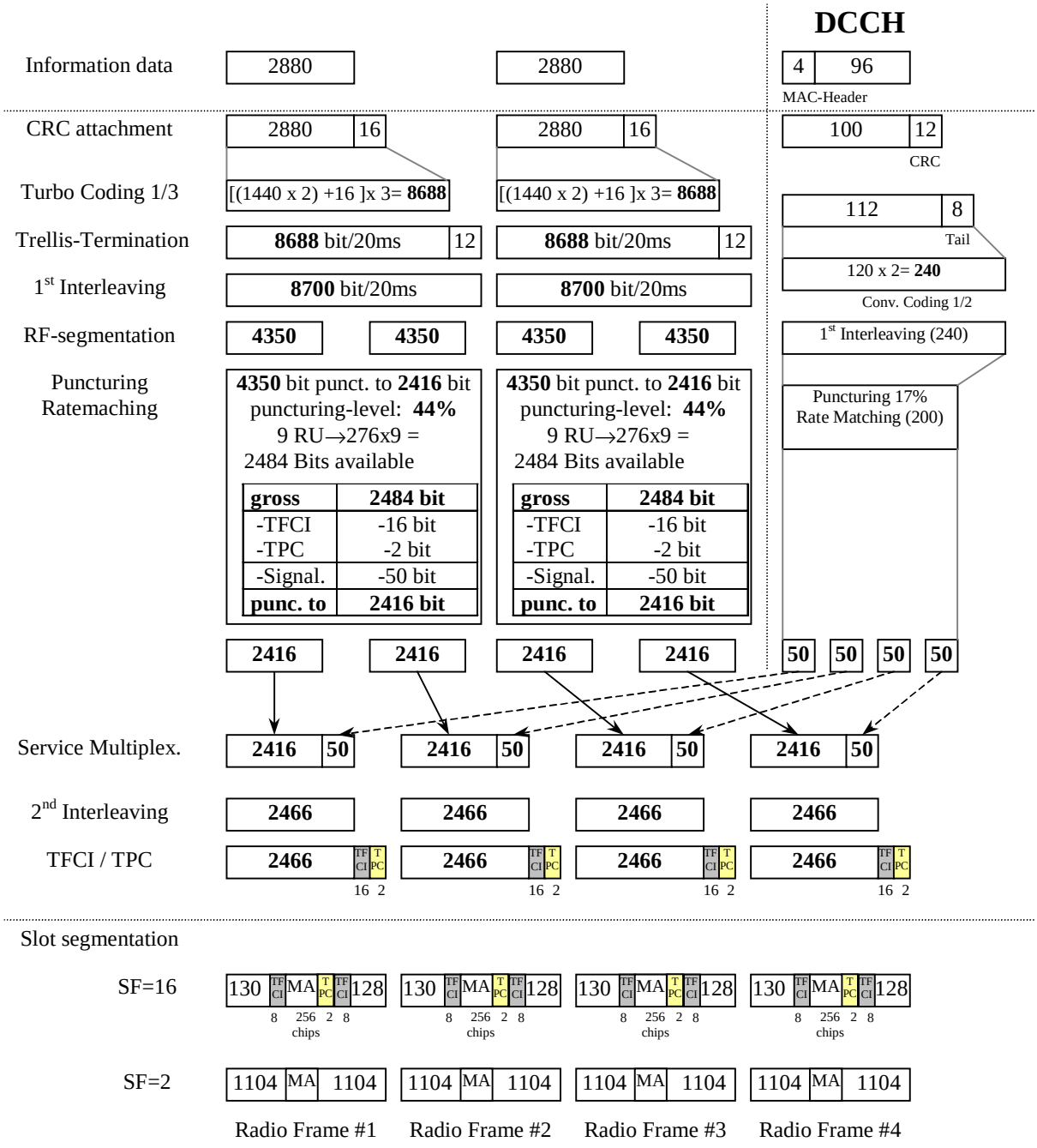


**Figure A.3**

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

**Table A.4**

| Parameter | Value |
|---|---|
| Information data rate | 384 kbps |
| RU´s allocated | 8*3TS = 24RU |
| Midamble | 256 chips |
| Interleaving | 20 ms |
| Power control | 2 Bit/user |
| TFCI | 16 Bit/user |
| Inband signalling DCCH | 2 kbps |
| Puncturing level at Code rate : 1/3 DCH / ½ DCCH | 43.4% / 15.3% |

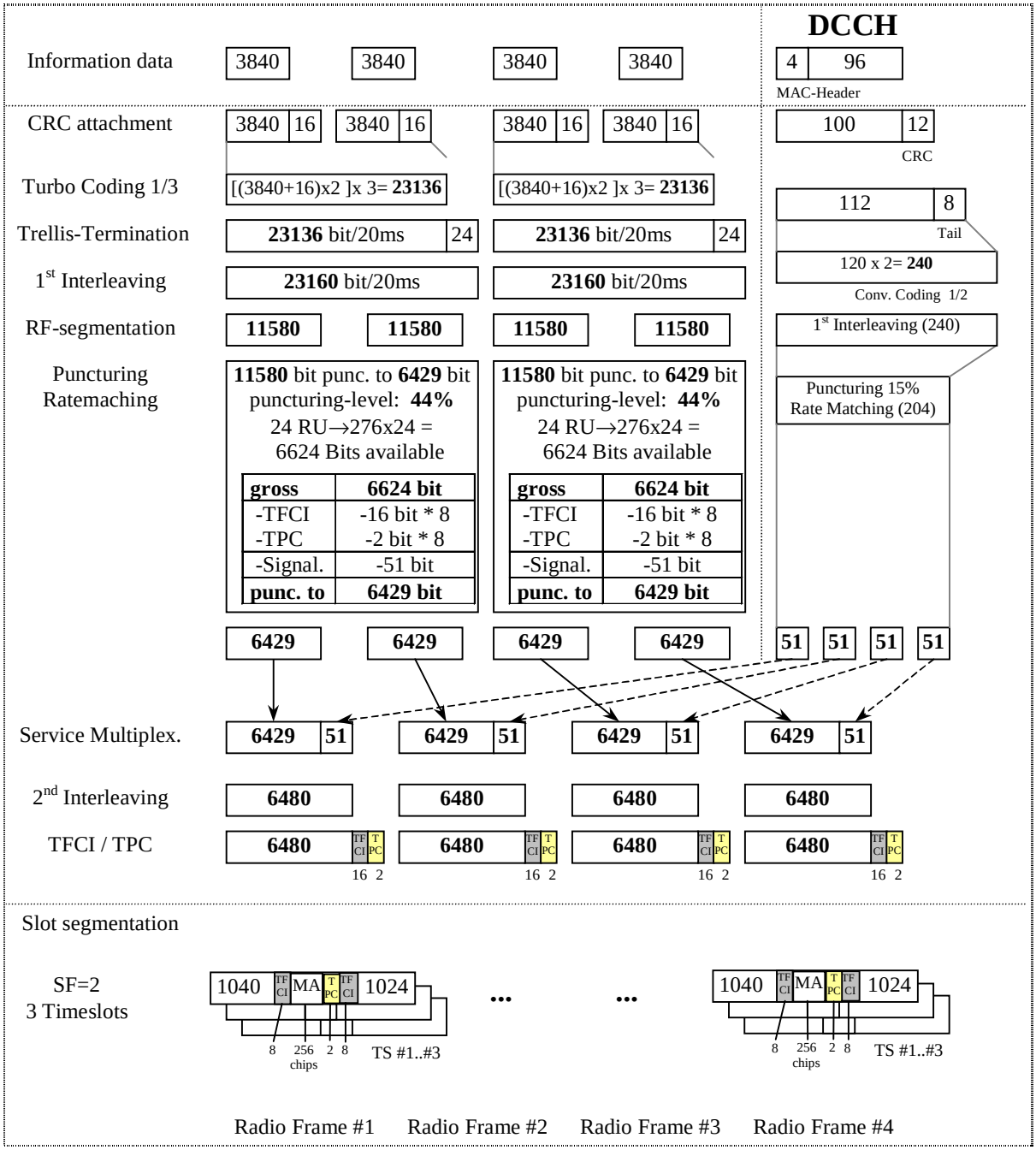
DCCH
Information data
3840
3840
3840
3840
4
96
MAC-Header
CRC attachment
3840 16
3840 16
3840 16
3840 16
100
12
CRC
Turbo Coding 1/3
[(3840+16)x2 ]x 3= 23136
[(3840+16)x2 ]x 3= 23136
112
8
Tail
Trellis-Termination
23136 bit/20ms
24
23136 bit/20ms
24
120 x 2= 240
1st Interleaving
23160 bit/20ms
23160 bit/20ms
Conv. Coding 1/2
RF-segmentation
11580
11580
11580
11580
1st Interleaving (240)
Puncturing
Ratemaching
11580 bit punc. to 6429 bit
puncturing-level: 44%
24 RU→276x24 =
6624 Bits available
gross 6624 bit
-TFCI -16 bit * 8
-TPC -2 bit * 8
-Signal. -51 bit
punc. to 6429 bit
11580 bit punc. to 6429 bit
puncturing-level: 44%
24 RU→276x24 =
6624 Bits available
gross 6624 bit
-TFCI -16 bit * 8
-TPC -2 bit * 8
-Signal. -51 bit
punc. to 6429 bit
Puncturing 15%
Rate Matching (204)
6429
6429
6429
6429
51
51
51
51
Service Multiplex.
6429 51
6429 51
6429 51
6429 51
2nd Interleaving
6480
6480
6480
6480
TFCI / TPC
6480 TFCI TPC
6480 TFCI TPC
6480 TFCI TPC
6480 TFCI TPC
16 2
16 2
16 2
16 2
Slot segmentation
SF=2
3 Timeslots
1040 TFCI MA TPC TFCI 1024
8 256 chips 2 8 TS #1..#3
1040 TFCI MA TPC TFCI 1024
8 256 chips 2 8 TS #1..#3
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

**Figure A.4**

## A.2.5 RACH reference measurement channel

**Table A.5**

| Parameter | |
|---|---|
| Information data rate e.g. 2 TBs ($B_{RACH}$=2):<br>**SF16:**<br>0% puncturing rate at CR=1/2<br>10% puncturing rate at CR=1/2<br>$N_{RACH} = \frac{\frac{232 + N_{RM}}{2} - 8}{B_{RACH}} - 8$<br><br>**SF8:**<br>0% puncturing rate at CR=1/2<br>10% puncturing rate at CR=1/2<br>$N_{RACH} = \frac{\frac{464 + N_{RM}}{2} - 8}{B_{RACH}} - 16$ | <br><br>46 bits per frame and TB<br>53 bits per frame and TB<br><br><br><br>96 bits per frame and TB<br>109 bits per frame and TB |
| RU´s allocated | 1 RU |
| Midamble | **512** chips |
| Power control | 0 bit |
| TFCI | 0 bit |

$N_{RACH}$ = number of bits per TB

$B_{RACH}$ = number of TBs

### A.2.5.1 RACH mapped to 1 code SF16

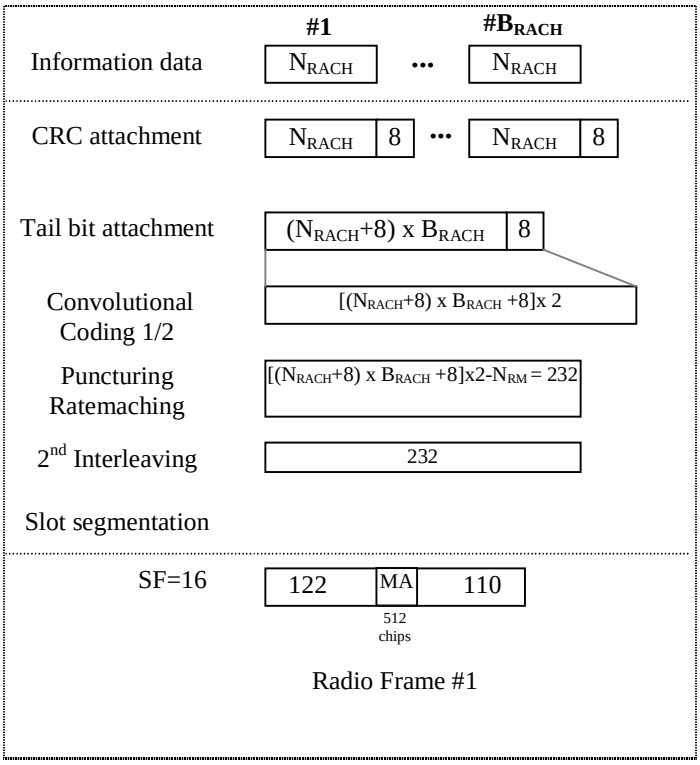


**Figure A.5**

## A.2.5.2 RACH mapped to 1 code SF8

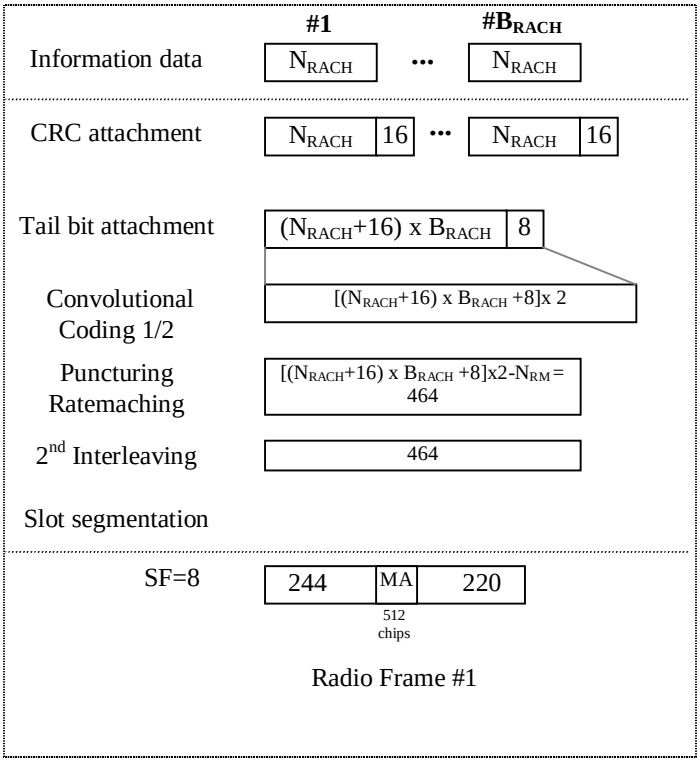


**Figure A.6**

# Annex B (normative): Propagation conditions

## B.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 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**

| Case 1, speed 3km/h | | Case 2, speed 3 km/h | | Case 3, 120 km/h | |
|---|---|---|---|---|---|
| **Relative Delay [ns]** | **Average Power [dB]** | **Relative Delay [ns]** | **Average Power [dB]** | **Relative Delay [ns]** | **Average Power [dB]** |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 976 | -10 | 976 | 0 | 260 | -3 |
| | | 12000 | 0 | 521 | -6 |
| | | | | 781 | -9 |

# Annex C (informative): Change request history

**Table C.1: CRs approved at TSG#6**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-99780 | 25.105 | 002 | | R99 | Primary CCPCH Power for TDD-mode | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 003 | | R99 | BS Maximum input level (TDD) | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 001 | | R99 | Corrections to 25.105 version 3.0.0 | F | 3.0.0 | 3.1.0 |
| RP-99779 | 25.105 | 006 | | R99 | Open item list in Annex D of 25.105 v3.0.0 | D | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 004 | | R99 | Receiver spurious emissions for BS TDD | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 005 | | R99 | Power control in UTRA TDD | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 002 | 3 | R99 | TDD Base station power accuracy of PCCPCH | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 007 | - | R99 | Change of propagation conditions recommendations | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 008 | | R99 | Timing Advance Requirements | F | 3.0.0 | 3.1.0 |
| RP-99781 | 25.105 | 009 | | R99 | Transmit Template | B | 3.0.0 | 3.1.0 |
| RP-99781 | 25.105 | 010 | | R99 | Performance Requirements | B | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 011 | | R99 | Corrections for BS TDD Blocking Characteristics | F | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 012 | | R99 | Corrections to 25.105 v.3.0.0 (change ME to BTS) | F | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 013 | | R99 | Synchronization Requirement | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 014 | | R99 | Update of ITU Region 2 Specific Specifications and | C | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 015 | | R99 | Clarification of Antenna Diversity receiver | F | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 016 | | R99 | Spurious Emission in 25.105 | F | 3.0.0 | 3.1.0 |
| RP-99780 | 25.105 | 017 | | R99 | ACLR | C | 3.0.0 | 3.1.0 |
| RP-99781 | 25.105 | 018 | | R99 | BS TDD Spurious Emission Requirements for Co- | B | 3.0.0 | 3.1.0 |

**Table C.2: CRs approved at TSG#7.**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| R4-000283 | 25.105 | 019 | 1 | R99 | Corrections for BS TDD Blocking Requirements | F | 3.1.0 | 3.2.0 |
| R4-000088 | 25.105 | 020 | | R99 | Revised Spurious Emission Requirements | F | 3.1.0 | 3.2.0 |
| R4-000100 | 25.105 | 021 | | R99 | Corrections of spurious emissions aligning to GSM for | F | 3.1.0 | 3.2.0 |
| R4-000109 | 25.105 | 022 | | R99 | Editorial corrections | D | 3.1.0 | 3.2.0 |
| R4-000111 | 25.105 | 023 | | R99 | Spurious emission correction | F | 3.1.0 | 3.2.0 |
| R4-000112 | 25.105 | 024 | | R99 | Protection outside a licensee's frequency block | F | 3.1.0 | 3.2.0 |
| R4-000199 | 25.105 | 025 | | R99 | Definition of Rated Output Power and Pmax | F | 3.1.0 | 3.2.0 |
| R4-000200 | 25.105 | 026 | | R99 | Primary CCPCH Power | F | 3.1.0 | 3.2.0 |
| R4-000216 | 25.105 | 027 | | R99 | BS Transmit OFF power | F | 3.1.0 | 3.2.0 |
| R4-000223 | 25.105 | 028 | | R99 | Corrected reference sensitivity value for the TDD BS | F | 3.1.0 | 3.2.0 |
| R4-000259 | 25.105 | 029 | | R99 | ACLR | F | 3.1.0 | 3.2.0 |
| R4-000255 | 25.105 | 030 | | R99 | Spectrum emission mask | F | 3.1.0 | 3.2.0 |
| R4-000135 | 25.105 | 031 | | R99 | Clock Accuracy | C | 3.1.0 | 3.2.0 |

**Table C.3: CRs approved at TSG#8.**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-000207 | 25.105 | 032 | | R99 | Reference Measurement Channels | F | 3.2.0 | 3.3.0 |
| RP-000207 | 25.105 | 033 | | R99 | Regional requirements in TS 25.105 | F | 3.2.0 | 3.3.0 |
| RP-000207 | 25.105 | 034 | | R99 | Clarification of receiver dynamic range. | F | 3.2.0 | 3.3.0 |
| RP-000207 | 25.105 | 035 | | R99 | Input power level for performance requirements | F | 3.2.0 | 3.3.0 |
| RP-000207 | 25.105 | 036 | | R99 | Modification to the handling of UE TDD Measurement | F | 3.2.0 | 3.3.0 |
| RP-000207 | 25.105 | 037 | | R99 | Clarification of the specification on Peak Code | F | 3.2.0 | 3.3.0 |
| RP-000207 | 25.105 | 038 | | R99 | Correction for emission mask measurement (TDD) | F | 3.2.0 | 3.3.0 |

**Table C.4: CRs approved at TSG#9.**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-000397 | 25.105 | 39 | | R99 | Maximum frequency deviation for receiver | F | 3.3.0 | 3.4.0 |
| RP-000397 | 25.105 | 40 | | R99 | Corrections to spectrum mask | F | 3.3.0 | 3.4.0 |
| RP-000397 | 25.105 | 41 | | R99 | Handling of measurement uncertainties in base | F | 3.3.0 | 3.4.0 |
| RP-000397 | 25.105 | 42 | | R99 | Performance requirements with TFCI decoding | F | 3.3.0 | 3.4.0 |
| RP-000397 | 25.105 | 43 | | R99 | Inner Loop Power Control | F | 3.3.0 | 3.4.0 |
| RP-000397 | 25.105 | 44 | | R99 | BS Transmit ON/OFF time mask for TDD-mode | F | 3.3.0 | 3.4.0 |
| RP-000397 | 25.105 | 45 | | R99 | Definition of period for frequency error | F | 3.3.0 | 3.4.0 |

**Table C.5: CRs approved at TSG#10**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-000397 | 25.105 | 46 | | R99 | Correction for 25.105 concerning the channel number | F | 3.4.0 | 3.5.0 |
| RP-000397 | 25.105 | 47 | | R99 | Correction to reference measurement channels | F | 3.4.0 | 3.5.0 |

**Table C.6: CRs approved at TSG#11**

| RAN Doc | Spec | CR | R | Ph | Subject | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-010088 | 25.105 | 48 | | R99 | Receiver Blocking requirement for co-existence with GSM/DCS and co-located base stations. | F | 3.5.0 | 3.6.0 |
| RP-010088 | 25.105 | 49 | | R99 | Relationship between Minimum Requirements and Test Tolerances. | F | 3.5.0 | 3.6.0 |
| RP-010088 | 25.105 | 50 | | R99 | Correction of reference to SM.329-8 in TS25.105 | F | 3.5.0 | 3.6.0 |
| RP-010088 | 25.105 | 51 | | R99 | BS EVM definition | F | 3.5.0 | 3.6.0 |

**Table C.7: CRs approved at TSG#12**

| RAN Doc | Spec | CR | R | Ph | Title | Cat | Curr | New |
|---|---|---|---|---|---|---|---|---|
| RP-010350 | 25.105 | 54 | | R99 | inclusion of environmental requirements | F | 3.6.0 | 3.7.0 |
| RP-010350 | 25.105 | 56 | | R99 | Application of blocking requirement | F | 3.6.0 | 3.7.0 |
| RP-010350 | 25.105 | 58 | | R99 | CR for BS Performance Requirements | F | 3.6.0 | 3.7.0 |
| RP-010350 | 25.105 | 62 | | R99 | Correction to upper frequency of transmitter Spurious | F | 3.6.0 | 3.7.0 |

# History

| Document history | | |
|---|---|---|
| V3.1.0 | January 2000 | Publication |
| V3.2.0 | March 2000 | Publication |
| V3.3.0 | June 2000 | Publication |
| V3.4.0 | October 2000 | Publication |
| V3.5.0 | December 2000 | Publication |
| V3.6.0 | March 2001 | Publication |
| V3.7.0 | June 2001 | Publication |