

# ETSI TS 125 105 V5.0.0 (2002-03)

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*Technical Specification*

**Universal Mobile Telecommunications System (UMTS);  
UTRA (BS) TDD;  
Radio transmission and reception  
(3GPP TS 25.105 version 5.0.0 Release 5)**

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## Foreword

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# Foreword

This Technical Specification has been produced by the 3GPP.

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# 1 Scope

This document establishes the minimum RF characteristics of both options of the TDD mode of UTRA. The two options are the 3.84Mcps and 1.28Mcps options respectively. The requirements are listed in different subsections only if the parameters deviate.

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# 2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. 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)".

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# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

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

**Average Power:** The thermal power as measured through a root raised cosine filter with roll-off  $\alpha=0.22$  and a bandwidth equal to the chip rate of the radio access mode. The period of measurement shall be a transmit timeslot excluding the guard period unless otherwise stated.

**Maximum Output Power:** The maximum Output Power of the base station per carrier measured at the antenna connector (i.e. the actual broadband power as would be measured assuming no measurement error) for a specified reference condition. The period of measurement shall be a transmit timeslot excluding the guard period.

**Rated Output Power, PRAT:** The Output Power that the manufacturer has declared to be available.

## 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 <sub>o</sub>	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 <sub>o</sub> 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 <sub>oc</sub>	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
P <sub>out</sub>	Output power.
PRAT	Rated Output power
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

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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 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 the chip rates of 3.84 Mcps and 1.28 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

#### 5.3.1 3,84 Mcps TDD Option

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.

#### 5.3.2 1,28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

## 5.4 Channel arrangement

### 5.4.1 Channel spacing

#### 5.4.1.1 3,84 Mcps TDD Option

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

#### 5.4.1.2 1,28 Mcps TDD Option

The channel spacing is 1.6MHz, 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:

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

---

## 6 Transmitter characteristics

### 6.1 General

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

### 6.2 Base station output power

The rated output power of the base station is defined in section 3.1.

#### 6.2.1 Base station maximum output power

The maximum output power of the base station is defined in section 3.1.

##### 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

##### 6.3.1.1 3,84 Mcps TDD Option

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

##### 6.3.1.2 1,28 Mcps TDD Option

The modulated carrier frequency of the BS shall be accurate to within  $\pm 0.05$  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 output power of one code channel for a specified reference condition

### 6.4.3.1 Minimum Requirement

Down link (DL) power control dynamic range shall be greater or equal to 30 dB

## 6.4.4 Minimum output power

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

### 6.4.4.1 Minimum Requirement

Down link (DL) minimum output power shall be lower than or equal to:

$$\text{Maximum output power} - 30\text{dB}$$

## 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,  $P_{out}$ , 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
$PRAT-3 < P_{out} \leq PRAT+2$	+/- 2.5 dB
$PRAT-6 < P_{out} \leq PRAT-3$	+/- 3.5 dB
$PRAT-13 < P_{out} \leq PRAT-6$	+/- 5 dB

## 6.4.6 Differential accuracy of Primary CCPCH power

The differential accuracy of the Primary CCPCH power is the relative transmitted power accuracy of PCCPCH in consecutive frames when the nominal PCCPCH power is not changed.

### 6.4.6.1 Minimum Requirement for Differential accuracy of PCCPCH power

Differential accuracy of PCCPCH power: +/- 0.5 dB

## 6.5 Transmit ON/OFF power

### 6.5.1 Transmit OFF power

Transmit OFF power is defined as the average power measured over one chip when the transmitter is off. The transmit OFF power state is when the BS does not transmit.

#### 6.5.1.1 Minimum Requirement

##### 6.5.1.1.1 3,84 Mcps TDD Option

The requirement of transmit OFF power shall be less 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.

##### 6.5.1.1.2 1,28 Mcps TDD Option

The requirement of transmit OFF power shall be less than  $-82$  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

##### 6.5.2.1.1 3,84 Mcps TDD Option

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

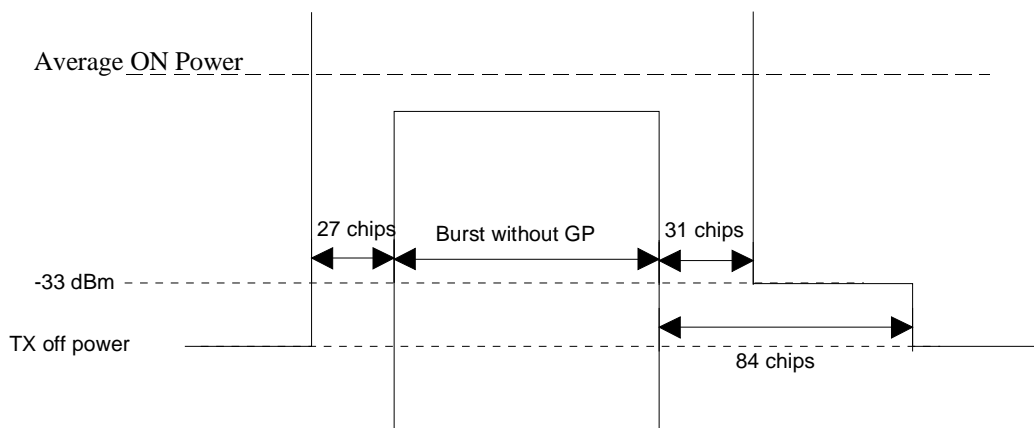


Figure 6.1: Transmit ON/OFF template



6.5.2.1.2 1,28 Mcps TDD Option

The transmit power level versus time should meet the mask specified in figure6.1A.

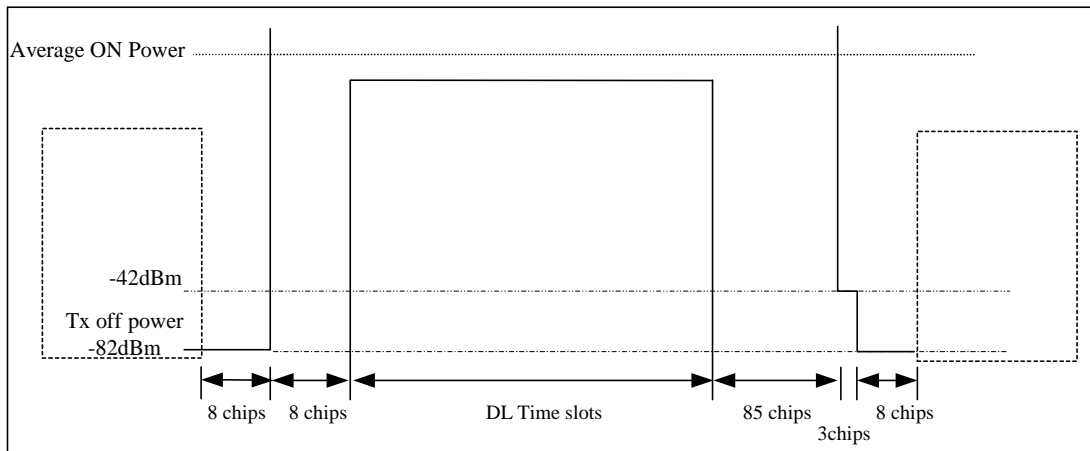


Figure 6.1A: Transmit ON/OFF template

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

6.6.1.1 3,84 Mcps TDD Option

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.

6.6.1.2 1,28 Mcps TDD Option

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 about 1.6 MHz based on a chip rate of 1.28 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

6.6.2.1.1 3,84 Mcps TDD Option

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  $\Delta f_{max}$  from the carrier frequency, where:

- $\Delta f$  is the separation between the carrier frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.
- $f_{\text{offset}}$  is the separation between the carrier frequency and the center frequency of the measuring filter.-  
 $f_{\text{offset}_{\text{max}}}$  is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in section 5.2, whichever is the greater.
- $\Delta f_{\text{max}}$  is equal to  $f_{\text{offset}_{\text{max}}}$  minus half of the bandwidth of the measurement filter.

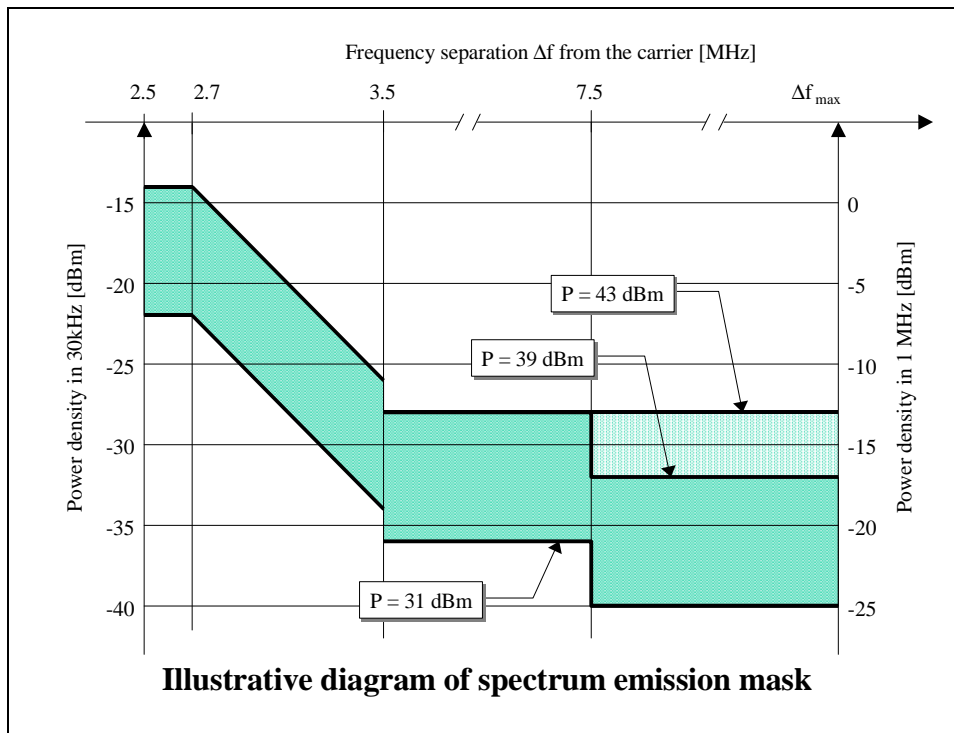


Figure 6.2

Table 6.3: Spectrum emission mask values, BS maximum output power  $P \geq 43$  dBm

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515\text{MHz} \leq f_{\text{offset}} < 2.715\text{MHz}$	-14 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715\text{MHz} \leq f_{\text{offset}} < 3.515\text{MHz}$	$-14\text{dBm} - 15 \cdot \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right) \text{dB}$	30 kHz
(see note)	$3.515\text{MHz} \leq f_{\text{offset}} < 4.0\text{MHz}$	-26 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{ma}}$	$4.0\text{MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	1 MHz

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

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	-14 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-14 \text{ dBm} - 15 \cdot \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right) \text{ dB}$	30 kHz
(see note)	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	-26 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	-13 dBm	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 56 \text{ dB}$	1 MHz

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

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	$P - 53 \text{ dB}$	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$P - 53 \text{ dB} - 15 \cdot \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right) \text{ dB}$	30 kHz
(see note)	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	$P - 65 \text{ dB}$	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	$P - 52 \text{ dB}$	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 56 \text{ dB}$	1 MHz

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

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	-22 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-22 \text{ dBm} - 15 \cdot \left( \frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right)$	30 kHz
(see note)	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	-34 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	-21 dBm	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-25 dBm	1 MHz

NOTE: This frequency range ensures that the range of values of  $f_{\text{offset}}$  is continuous.

#### 6.6.2.1.2 1,28 Mcps TDD Option

The mask defined in Table 6.3A to 6.6A 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 table 6.3A to 6.6A for the appropriate BS maximum output power, in the frequency range from  $\Delta f = 0.8$  MHz to  $\Delta f_{max}$  from the carrier frequency, where:

- $\Delta f$  is the separation between the carrier frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.
- $f_{offset}$  is the separation between the carrier frequency and the center frequency of the measuring filter.-  
 $f_{offset_{max}}$  is either 4 MHz or the offset to the UMTS Tx band edge as defined in section 5.2, whichever is the greater.
- $\Delta f_{max}$  is equal to  $f_{offset_{max}}$  minus half of the bandwidth of the measurement filter.

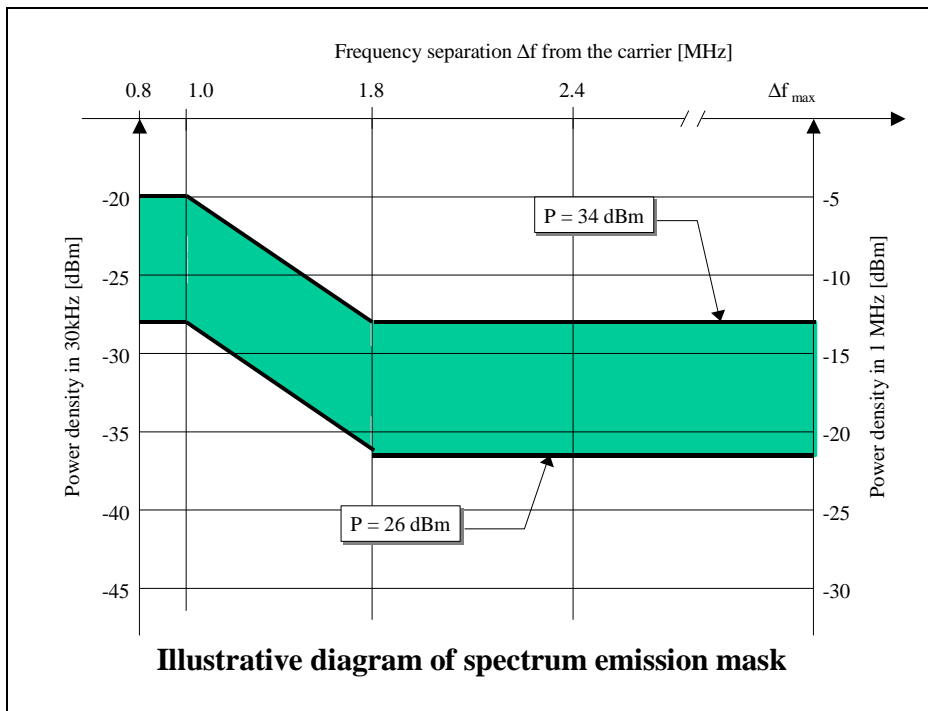


Figure 6.2A

Table 6.3A: Spectrum emission mask values, BS maximum output power  $P \geq 34$  dBm

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{offset}$	Maximum level	Measurement bandwidth
$0.8 \text{ MHz} \leq \Delta f < 1.0 \text{ MHz}$	$0.815\text{MHz} \leq f_{offset} < 1.015\text{MHz}$	-20 dBm	30 kHz
$1.0 \text{ MHz} \leq \Delta f < 1.8 \text{ MHz}$	$1.015\text{MHz} \leq f_{offset} < 1.815\text{MHz}$	$-20\text{dBm} - 10 \cdot \left( \frac{f_{offset}}{\text{MHz}} - 1,015 \right) \text{dB}$	30 kHz
See note	$1.815\text{MHz} \leq f_{offset} < 2.3\text{MHz}$	-28 dBm	30 kHz
$1.8 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$	$2.3\text{MHz} \leq f_{offset} < f_{offset_{max}}$	-13 dBm	1 MHz

**Table 6.4A: Spectrum emission mask values, BS maximum output power  $26 \leq P < 34$  dBm**

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$0.8 \text{ MHz} \leq \Delta f < 1.0 \text{ MHz}$	$0.815 \text{ MHz} \leq f_{\text{offset}} < 1.015 \text{ MHz}$	P-54 dB	30 kHz
$1.0 \text{ MHz} \leq \Delta f < 1.8 \text{ MHz}$	$1.015 \text{ MHz} \leq f_{\text{offset}} < 1.815 \text{ MHz}$	$P - 54 \text{ dB} - 10 \cdot \left( \frac{f_{\text{offset}}}{\text{MHz}} - 1,015 \right) \text{ dB}$	30 kHz
See note	$1.815 \text{ MHz} \leq f_{\text{offset}} < 2.3 \text{ MHz}$	P-62 dB	30 kHz
$1.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	P - 47 dB	1 MHz

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

Frequency offset of measurement filter -3dB point, $\Delta f$	Frequency offset of measurement filter centre frequency, $f_{\text{offset}}$	Maximum level	Measurement bandwidth
$0.8 \text{ MHz} \leq \Delta f < 1.0 \text{ MHz}$	$0.815 \text{ MHz} \leq f_{\text{offset}} < 1.015 \text{ MHz}$	-28 dBm	30 kHz
$1.0 \text{ MHz} \leq \Delta f < 1.8 \text{ MHz}$	$1.015 \text{ MHz} \leq f_{\text{offset}} < 1.815 \text{ MHz}$	$-28 \text{ dBm} - 10 \cdot \left( \frac{f_{\text{offset}}}{\text{MHz}} - 1,015 \right) \text{ dB}$	30 kHz
See note	$1.815 \text{ MHz} \leq f_{\text{offset}} < 2.3 \text{ MHz}$	-36 dBm	30 kHz
$1.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-21 dBm	1 MHz

NOTE: This frequency range ensures that the range of values of  $f_{\text{offset}}$  is continuous.

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

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the average power centered on the assigned channel frequency to the average power centered on an adjacent channel frequency. In both cases the power is measured with filter that has a Root Raised Cosine (RRC) filter response with roll-off  $\alpha=0.22$  and a 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.

The requirement depends on the deployment scenario. Three different deployment scenarios have been defined as given below.

#### 6.6.2.2.1 Minimum Requirement

##### 6.6.2.2.1.1 3,84 Mcps TDD Option

The ACLR of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall be higher than the value specified in Table 6.7.

**Table 6.7: BS ACLR**

BS adjacent channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	55 dB

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied individually to the single carriers or group of single carriers.

## 6.6.2.2.1.2 1,28 Mcps TDD Option

For the 1.28Mcps chip rate option, the ACLR of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall be better than the value specified in Table 6.7A

**Table 6.7A: BS ACLR (1.28Mcps chip rate)**

BS adjacent channel offset below the first or above the last carrier frequency used	ACLR limit
1.6 MHz	40 dB
3.2 MHz	45 dB

NOTE: This requirement is valid for co-existence with frame and switching point synchronised systems, or for non-synchronised systems if the path loss between the BSs is greater than 107dB.

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied individually to the single carriers or group of single carriers.

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

## 6.6.2.2.2.1 3,84 Mcps TDD Option

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 of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies 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 below the first or above the last carrier frequency used	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.

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied to those adjacent channels of the single carriers or group of single channels which are used by the TDD BS or FDD BS in proximity.

## 6.6.2.2.2.2 1,28 Mcps TDD Option

In case the equipment is operated in proximity to another TDD BS or FDD BS and both BSs operating on an adjacent frequency band, the requirement is specified in terms of power level of the transmitting BS. This requirement is valid for co-existence with non-frame and non-switching point synchronised systems operating on the closest used carrier. The interference power level shall not exceed the limit in Table 6.8A.

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

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas the interference powers shall be summed at all antenna connectors)	Measurement Bandwidth
Closest used carrier of the victim receiver: Either FDD carrier Or 3.84 Mcps TDD carrier Or 1.28 Mcps TDD carrier	-36 dBm	chip rate of the victim receiver: In case of FDD: 3.84 MHz In case of 3.84 Mcps TDD: 3.84 MHz In case of 1.28 Mcps TDD: 1.28 MHz

The closest used carrier with respect to the regarded carrier of one system is defined by:

a minimum difference in centre frequency between the regarded carrier and the carriers used in the other system and the chip rate of the other system.

If the actual allowed interference level  $P_{\text{int, allowed, actual}}$  at the victim receiver is higher than  $-106\text{dBm}$ , this requirement may be relaxed by the amount  $P_{\text{int, allowed, actual}} - (-106\text{dBm})$ .

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

#### 6.6.2.2.3.1 3,84 Mcps TDD Option

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 of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall not exceed the limit in Table 6.9.

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

BS adjacent channel offset below the first or above the last carrier frequency used	Maximum Level	Measurement Bandwidth
5 MHz	-80 dBm	3.84 MHz
10 MHz	-80 dBm	3.84 MHz

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied to those adjacent channels of the single carriers or group of single channels which are used by the co-sited TDD BS or FDD BS.

#### 6.6.2.2.3.2 1,28 Mcps TDD Option

In case the equipment is co-sited to another TDD BS or FDD BS and both BSs operating on an adjacent frequency band, the requirement is specified in terms of power level of the transmitting BS. This requirement is valid for co-existence with a non-frame and non-switching point synchronised systems operating on closest used carrier. The interference power level shall not exceed the limit in Table 6.9A.

**Table 6.9A: BS ACLR in case of co-sitting**

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas the interference powers shall be summed at all antenna connectors)	Measurement Bandwidth
Closest used carrier of the victim receiver: Either FDD carrier Or 3.84 Mcps TDD carrier Or 1.28 Mcps TDD carrier	-76 dBm	chip rate of the victim receiver: In case of FDD: 3.84 MHz In case of 3.84 Mcps TDD: 3.84 MHz In case of 1.28 Mcps TDD: 1.28 MHz

The closest used carrier with respect to the regarded carrier of one system is defined by:

a minimum difference in centre frequency between the regarded carrier and the carriers used in the other system and the chip rate of the other system.

If the actual  $MCL_{\text{actual}}$  is higher than 30dB, this requirement may be relaxed by the amount  $MCL_{\text{actual}} - 30\text{dB}$ .

If the actual allowed interference level  $P_{\text{int, allowed, actual}}$  at the victim receiver is higher than  $-106\text{dBm}$ , this requirement may be relaxed by the amount  $P_{\text{int, allowed, actual}} - (-106\text{dBm})$ .

### 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.

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

For 3.84 Mcps TDD option, either requirement applies at frequencies within the specified frequency ranges which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

For 1.28 Mcps TDD option, either requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

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.

##### 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

###### 6.6.3.1.1.1.1 3,84 Mcps TDD Option

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

###### 6.6.3.1.1.1.2 1,28 Mcps TDD Option

The power of any spurious emission shall not exceed:



**Table 6.10A: 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

NOTE: only the measurement bands are different according to the occupied bandwidth.

### 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

##### 6.6.3.1.2.1.1 3,84 Mcps TDD Option

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 ↔ Fc1-60 MHz or FI -10 MHz <i>whichever is the higher</i>	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-8, s4.1
Fc1 - 60 MHz or FI -10 MHz <i>whichever is the higher</i> ↔ Fc1 - 50 MHz or FI -10 MHz <i>whichever is the higher</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc1 - 50 MHz or FI -10 MHz <i>whichever is the higher</i> ↔ Fc2 + 50 MHz or Fu +10 MHz <i>whichever is the lower</i>	-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 <i>whichever is the lower</i> ↔ Fc2 + 60 MHz or Fu + 10 MHz <i>whichever is the lower</i>	-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 <i>whichever is the lower</i> ↔ 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

#### 6.6.3.1.2.1.2 1,28 Mcps TDD Option

The power of any spurious emission shall not exceed:

**Table 6.11A: 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 ↔ Fc1-19.2 MHz or Fl -3.2 MHz <i>whichever is the higher</i>	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-8, s4.1
Fc1 – 19.2 MHz or Fl -3.2MHz <i>whichever is the higher</i> ↔ Fc1 - 16 MHz or Fl -3.2 MHz <i>whichever is the higher</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.1
Fc1 - 16 MHz or Fl -3.2 MHz <i>whichever is the higher</i> ↔ Fc2 + 16 MHz or Fu +3.2 MHz <i>whichever is the lower</i>	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.1
Fc2 + 16 MHz or Fu + 3.2MHz <i>whichever is the lower</i> ↔ Fc2 +19.2 MHz or Fu + 3.2MHz <i>whichever is the lower</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.1
Fc2 + 19.2 MHz or Fu +3.2 MHz <i>whichever is the lower</i> ↔ 12,5 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, s4.1. 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 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.

## 6.6.3.3.2.1 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.

### 6.7.1 Minimum Requirement

#### 6.7.1.1 3,84 Mcps TDD Option

The frequency of the interference signal shall be  $\pm 5$  MHz,  $\pm 10$  MHz and  $\pm 15$  MHz offset from the subject signal. 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.

#### 6.7.1.2 1,28 Mcps TDD Option:

The frequency of the interference signal shall be  $\pm 1.6$  MHz,  $\pm 3.2$  MHz and  $\pm 4.8$  MHz offset from the subject signal. 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  $T_c$  is the chip duration.

### 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 corresponding to the considered chip rate 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

### 7.2.1.1 3,84 Mcps TDD Option

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

### 7.2.1.2 1,28 Mcps TDD Option

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

**Table 7.1A: BS reference sensitivity levels**

Data rate	BS reference sensitivity level (dBm)	FER/BER
12.2 kbps	-110 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

#### 7.3.1.1 3,84 Mcps TDD Option

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

#### 7.3.1.2 1,28 Mcps TDD Option

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

**Table 7.2A: Dynamic Range**

Parameter	Level	Unit
Data rate	12.2	kbps
Wanted signal	<REFSENS> + 30 dB	dBm
Interfering AWGN signal	-76dBm	dBm/1.28 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

#### 7.4.1.1 3,84 Mcps TDD Option

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

#### 7.4.1.2 1,28 Mcps TDD Option

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

**Table 7.3A: Adjacent channel selectivity**

Parameter	Level	Unit
Data rate	12.2	kbps
Wanted signal	Reference sensitivity level + 6dB	dBm
Interfering signal	-55	dBm
Fuw (Modulated)	1.6	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.

### 7.5.0 Minimum requirement

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.

## 7.5.0.1 3,84 Mcps TDD Option

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, 2010 – 2025 MHz	-40 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 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, 1980 – 1990 MHz, 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

## 7.5.0.2 1,28 Mcps TDD Option

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

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1900 – 1920 MHz, 2010 – 2025 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 2025 – 2045 MHz	-40dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1920 – 1980 MHz	-40dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1 – 1880 MHz, 1980 – 1990 MHz, 2045 – 12750 MHz	-15dBm	<REFSENS> + 6 dB	—	CW carrier



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

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1850 – 1990 MHz	-40dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1830 – 1850 MHz, 1990 – 2010 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1 – 1830 MHz, 2010 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

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

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1910 – 1930 MHz	-40dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1890 – 1910 MHz, 1930 – 1950 MHz	-40dBm	<REFSENS> + 6 dB	3.2 MHz	Narrow band CDMA 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.

### 7.5.1.1 3,84 Mcps TDD Option

**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

### 7.5.1.2 1,28 Mcps TDD Option

**Table 7.4A (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 7.4A (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 receive 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.

### 7.6.1 Minimum requirement

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.

#### 7.6.1.1 3,84 Mcps TDD Option

**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

#### 7.6.1.2 1,28 Mcps TDD Option

**Table7.5A: Intermodulation requirement**

Interfering Signal Level	Offset	Type of Interfering Signal
- 48 dBm	3.2 MHz	CW signal
- 48 dBm	6.4 MHz	1,28 Mcps TDD Option 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

### 7.7.1.1 3,84 Mcps TDD Option

The power of any spurious emission shall not exceed:

**Table 7.6: Receiver spurious emission requirements**

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 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.

In addition to the requirements in table 7.6, the co-existence requirements for co-located base stations specified in subclause 6.6.3.2.2, 6.6.3.3.2 and 6.6.3.4.2 may also be applied.

### 7.7.1.2 1,28 Mcps TDD Option

The power of any spurious emission shall not exceed:

**Table 7.6A: Receiver spurious emission requirements**

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 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 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.
1.9 GHz – 1.98 GHz and 2.01 GHz – 2.025 GHz	-83 dBm	1.28 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz 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 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.

In addition to the requirements in table 7.6A, the co-existence requirements for co-located base stations specified in subclause 6.6.3.2.2, 6.6.3.3.2 and 6.6.3.4.2 may also be applied.

## 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 <sup>-2</sup>	BLER < 10 <sup>-2</sup>	BLER < 10 <sup>-2</sup>	BLER < 10 <sup>-2</sup>
	64 kbps	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup> , 10 <sup>-3</sup>
	144 kbps	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup> , 10 <sup>-3</sup>
	384 kbps	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup>	BLER < 10 <sup>-1</sup> , 10 <sup>-2</sup> , 10 <sup>-3</sup>

### 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

###### 8.2.1.1.1 3,84 Mcps TDD Option

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 <sub>o</sub>		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 <sub>o</sub> 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
1	-2.0	$10^{-2}$
2	-0.4	$10^{-1}$
	-0.1	$10^{-2}$
3	-0.2	$10^{-1}$
	0.1	$10^{-2}$
4	-0.8	$10^{-1}$
	-0.6	$10^{-2}$

### 8.2.1.1.2 1,28 Mcps TDD Option

For the parameters specified in Table8.2A the BLER should not exceed the piece-wise linear BLER curve specified in Table8.3A. These requirements are applicable for TFCS size 16.

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

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of DPCH <sub>o</sub>		4	1	1	0
Spread factor of DPCH <sub>o</sub>		8	8	8	-
Scrambling code and basic midamble code number*		0	0	0	0
DPCH Channelization Codes*	C(k,Q)	C(1,8)	C(1,2)	C(1,2)	C(1,2) C(5,8)
DPCH <sub>o</sub> Channelization Codes*	C(k,Q)	C(i,8) 2 ≤ i ≤ 5	C(5,8)	C(5,8)	-
$\frac{DPCH_o - E_c}{I_{or}}$	dB	-7	-7	-7	0
$I_{oc}$	dBm/ 1.28MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

\*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

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

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	0.5	$10^{-2}$
2	-1.1	$10^{-1}$
	-0.7	$10^{-2}$
3	-0.5	$10^{-1}$
	-0.3	$10^{-2}$
4	0.1	$10^{-1}$
	0.4	$10^{-2}$

## 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

## 8.3.1.1.1 3,84 Mcps TDD Option

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 <sub>o</sub>		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 <sub>o</sub> 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 8.5: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.5	10 <sup>-2</sup>
2	5.5	10 <sup>-1</sup>
	9.8	10 <sup>-2</sup>
3	5.5	10 <sup>-1</sup>
	9.8	10 <sup>-2</sup>
4	5.1	10 <sup>-1</sup>
	9.5	10 <sup>-2</sup>

## 8.3.1.1.2 1,28 Mcps TDD Option

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

Table 8.4A: Parameters in multipath Case 1 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of DPCH <sub>o</sub>		4	1	1	0
Spread factor of DPCH <sub>o</sub>		8	8	8	-
Scrambling code and basic midamble code number*		0	0	0	0
DPCH Channelization Codes*	C(k,Q)	C(1,8)	C(1,2)	C(1,2)	C(1,2) C(5,8)
DPCH <sub>o</sub> Channelization Codes*	C(k,Q)	C(i,8) 2 ≤ i ≤ 5	C(5,8)	C(5,8)	-
$\frac{DPCH_o - E_c}{I_{or}}$	dB	-7	-7	-7	0
$I_{oc}$	dBm/1.28 MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

\*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

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

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.7	$10^{-2}$
2	5.3	$10^{-1}$
	9.6	$10^{-2}$
3	5.7	$10^{-1}$
	10.3	$10^{-2}$
4	6.0	$10^{-1}$
	10.3	$10^{-2}$

### 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

##### 8.3.2.1.1 3,84 Mcps TDD Option

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 <sub>o</sub>		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) C(5,16)	C(1,2) C(9,16)	C(1,2)
DPCH <sub>o</sub> 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	-0.4	$10^{-2}$
2	0.2	$10^{-1}$
	2.5	$10^{-2}$
3	3.6	$10^{-1}$
	6.0	$10^{-2}$
4	2.8	$10^{-1}$
	5.2	$10^{-2}$

##### 8.3.2.1.2 1,28 Mcps TDD Option

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

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

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of DPCH <sub>o</sub>		4	1	1	0
Spread factor of DPCH <sub>o</sub>		8	8	8	-
Scrambling code and basic midamble code number*		0	0	0	0
DPCH Channelization Codes*	C(k,Q)	C(1,8)	C(1,2)	C(1,2)	C(1,2) C(5,8)
DPCH <sub>o</sub> Channelization Codes*	C(k,Q)	C(i,8) 2 ≤ i ≤ 5	C(5,8)	C(5,8)	-
$\frac{DPCH_{o} - E_c}{I_{or}}$	dB	-7	-7	-7	0
I <sub>oc</sub>	dBm/1.28 MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

\*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

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

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.7	10 <sup>-2</sup>
2	3.5	10 <sup>-1</sup>
	5.9	10 <sup>-2</sup>
3	4.0	10 <sup>-1</sup>
	6.4	10 <sup>-2</sup>
4	4.4	10 <sup>-1</sup>
	6.3	10 <sup>-2</sup>

### 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

##### 8.3.3.1.1 3,84 Mcps TDD Option

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 <sub>o</sub>		2	0	0	0
$\frac{DPCH_{o} - E_c}{I_{or}}$	dB	-6	0	0	0
I <sub>oc</sub>	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 <sub>o</sub> 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	$10^{-1}$
	6.3	$10^{-2}$
	8.0	$10^{-3}$
4	3.6	$10^{-1}$
	5.0	$10^{-2}$
	6.3	$10^{-3}$

## 8.3.3.1.2 1,28 Mcps TDD Option

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

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

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of DPCH <sub>o</sub>		4	1	1	0
Spread factor of DPCH <sub>o</sub>		8	8	8	-
Scrambling code and basic midamble code number*		0	0	0	0
DPCH Channelization Codes*	C(k,Q)	C(1,8)	C(1,2)	C(1,2)	C(1,2) C(5,8)
DPCH <sub>o</sub> Channelization Codes*	C(k,Q)	C(i,8) 2 ≤ i ≤ 5	C(5,8)	C(5,8)	-
$\frac{DPCH_o - E_c}{I_{or}}$	dB	-7	-7	-7	0
I <sub>oc</sub>	dBm/1.28 MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

\*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

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

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	5.9	$10^{-2}$
2	3.2	$10^{-1}$
	4.8	$10^{-2}$
	6.1	$10^{-3}$
3	3.7	$10^{-1}$
	5.0	$10^{-2}$
	6.1	$10^{-3}$
4	4.1	$10^{-1}$
	5.1	$10^{-2}$
	5.9	$10^{-3}$

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## Annex A (normative): Measurement Channels

### A.1 General

(void)

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### A.2 Reference measurement channel

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

##### A.2.1.1 3,84 Mcps TDD Option

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	10% / 0%

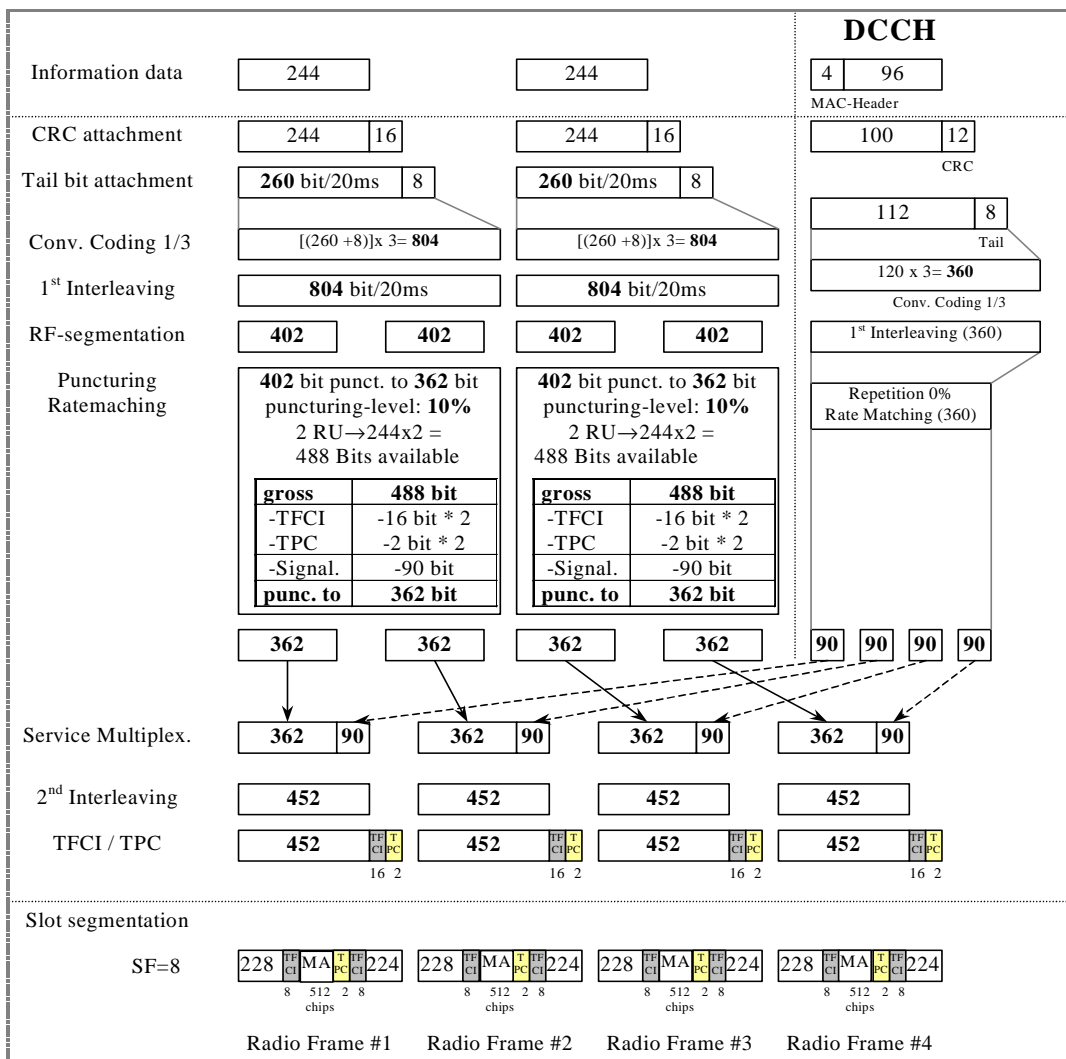


Figure A.1

A.2.1.2 1,28 Mcps TDD Option

Table A.1A

Parameter	Value
Information data rate	12.2 kbps
RU's allocated	1TS (1*SF8) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH / DCCH	33% / 33%

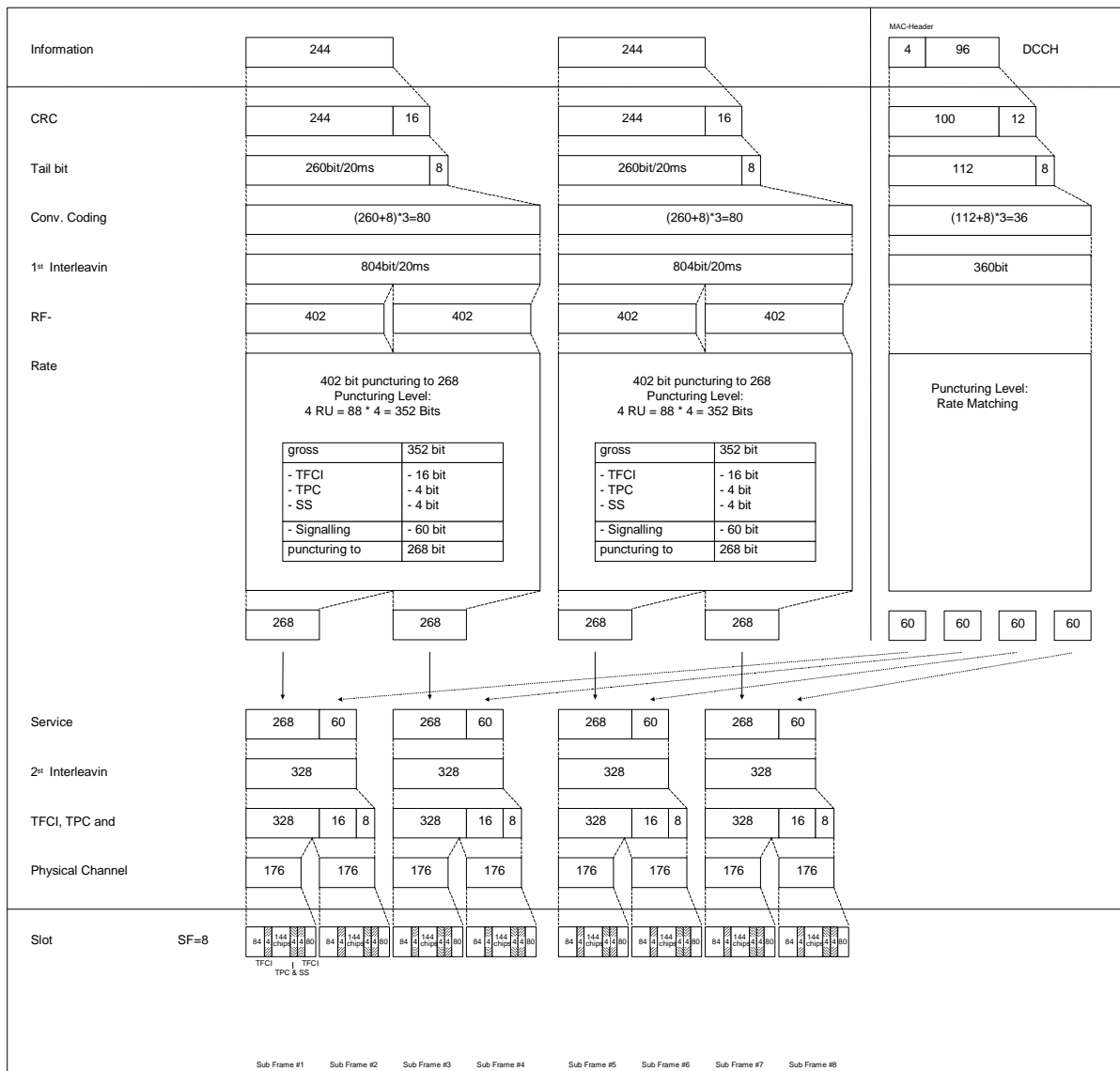


Figure A.1A

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

### A.2.2.1 3,84 Mcps TDD Option

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 / 1/2 DCCH	41.2% / 10%

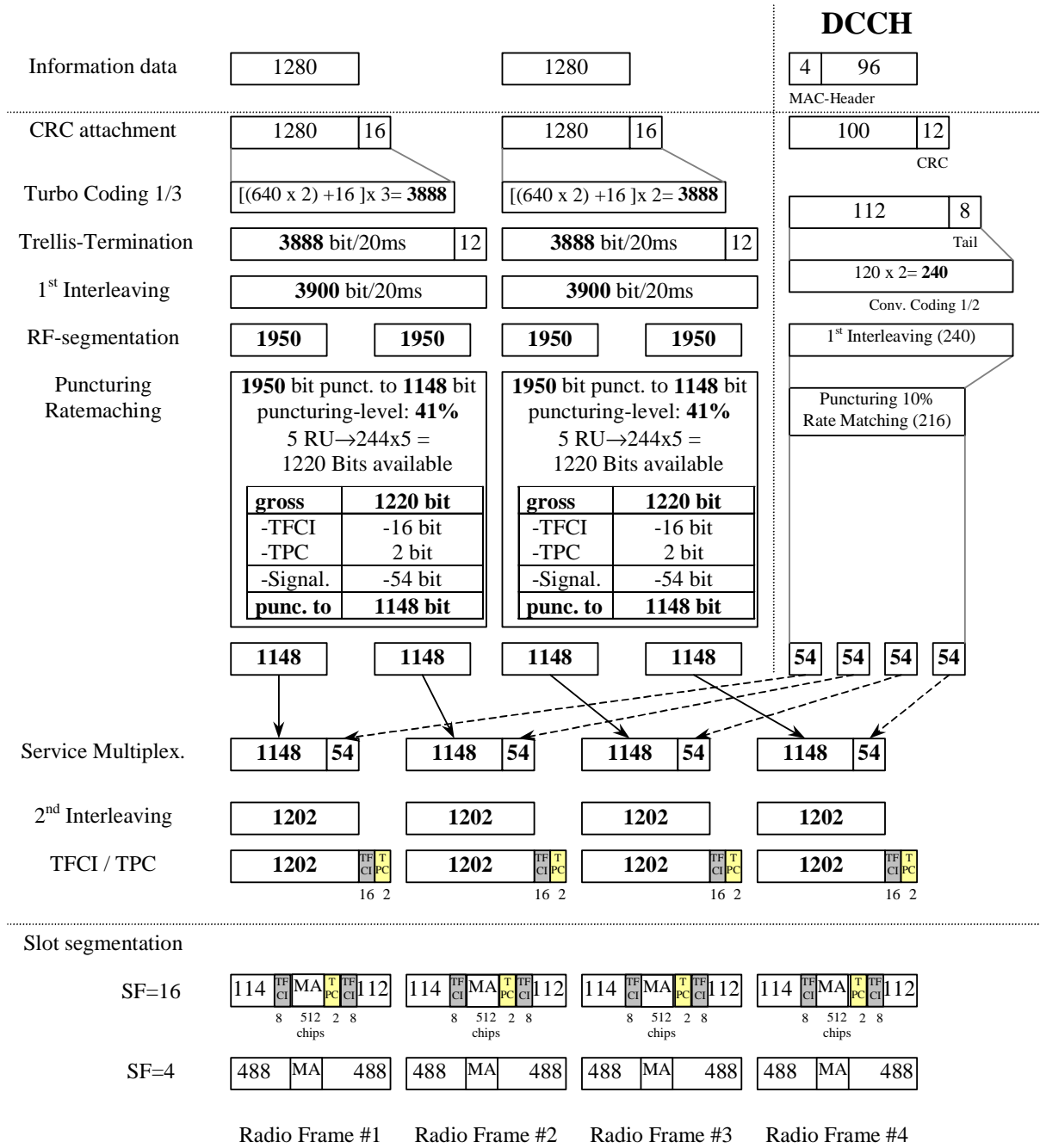


Figure A.2

### A.2.2.2 1,28 Mcps TDD Option

Table A.2A

Parameter	Value
Information data rate	64 kbps
RU's allocated	1TS (1*SF2) = 8RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / 1/2 DCCH	32% / 0

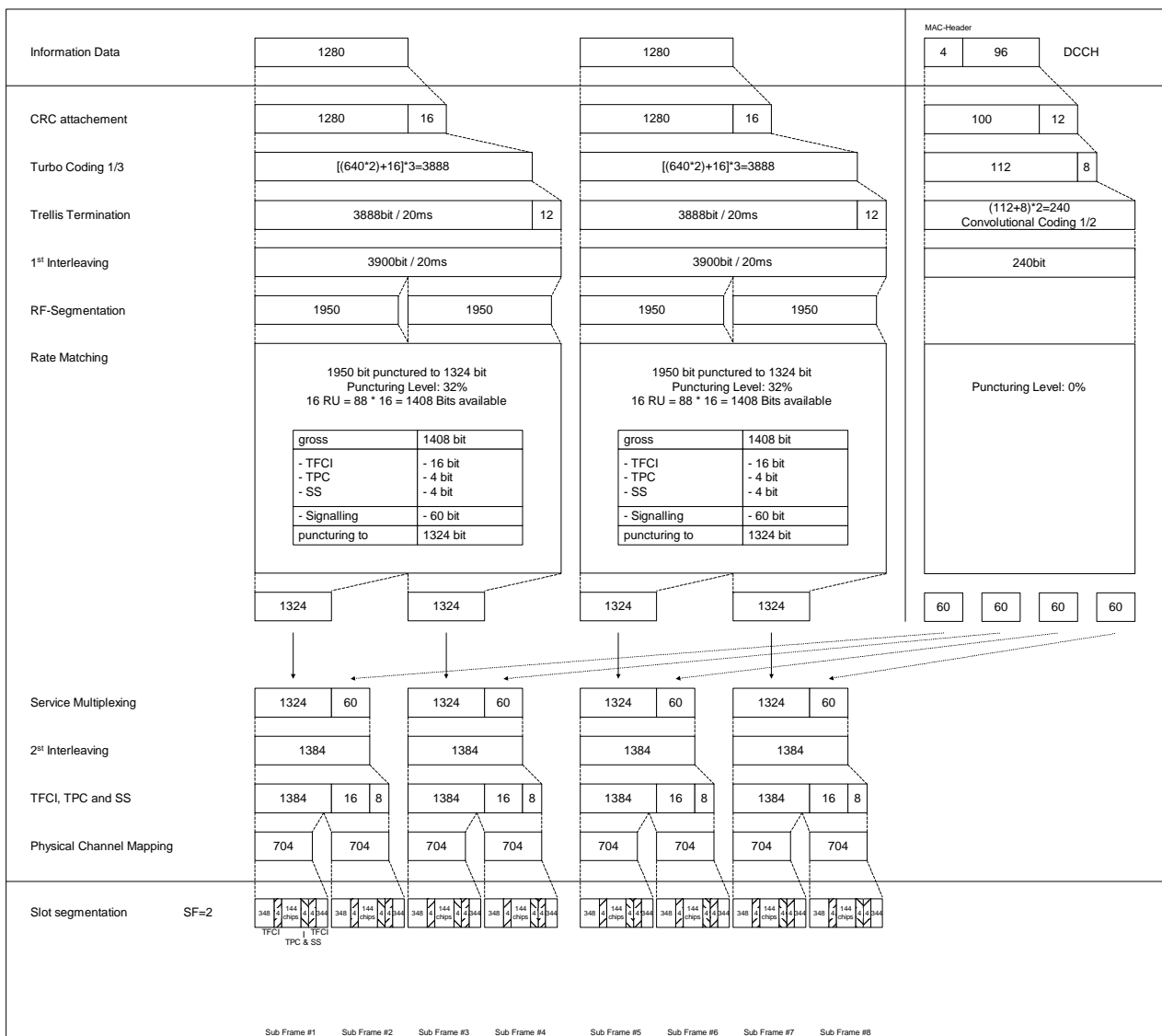


Figure A.2A

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

### A.2.3.1 3,84 Mcps TDD Option

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 / 1/2 DCCH	44.4% / 16.6%

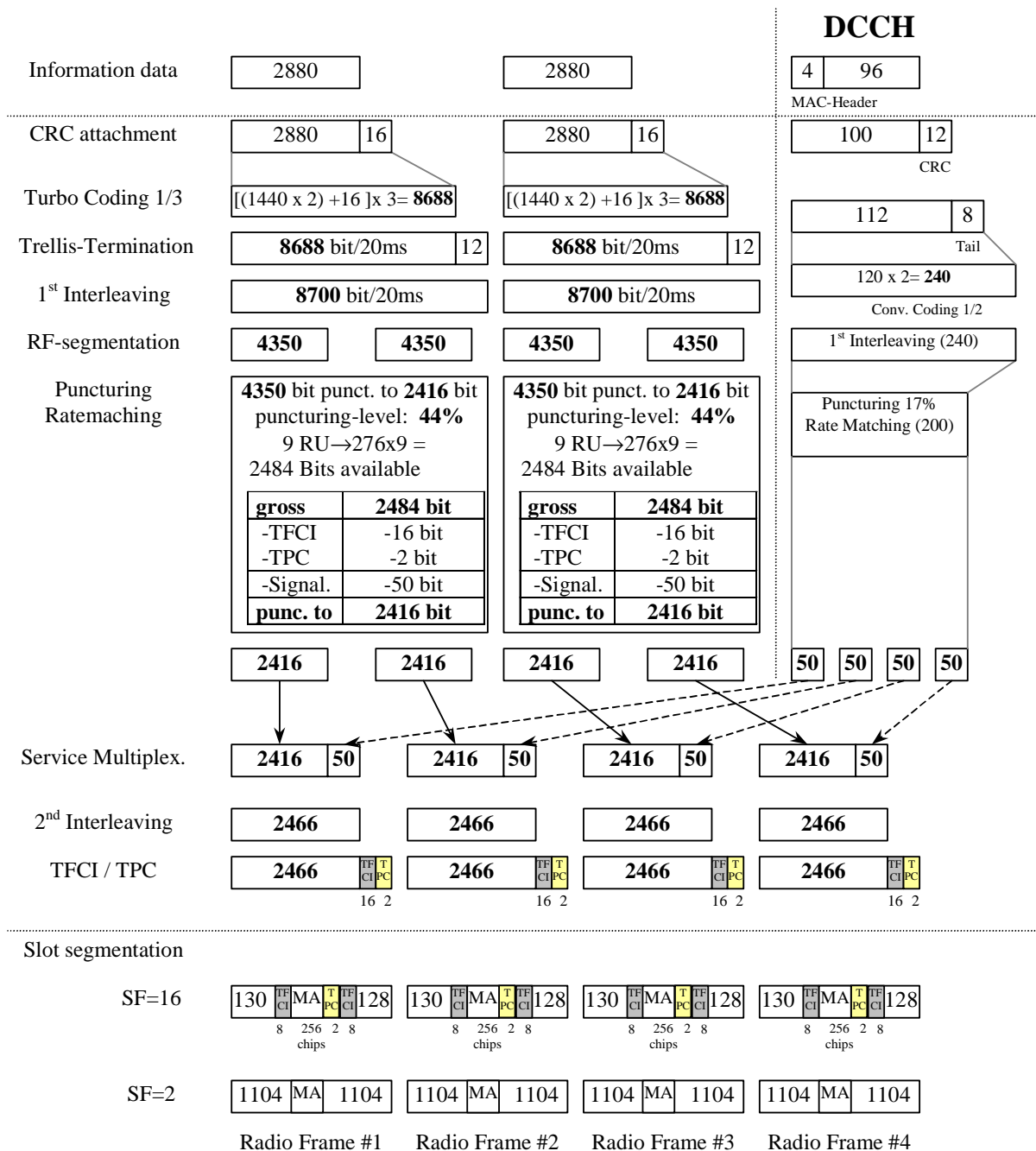


Figure A.3



### A.2.3.2 1,28 Mcps TDD Option

Table A.3A

Parameter	Value
Information data rate	144 kbps
RU's allocated	2TS (1*SF2) = 16RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	8 Bit/user/10ms
TFCI	32 Bit/user/10ms
Synchronisation Shift (SS)	8 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / 1/2 DCCH	38% / 7%

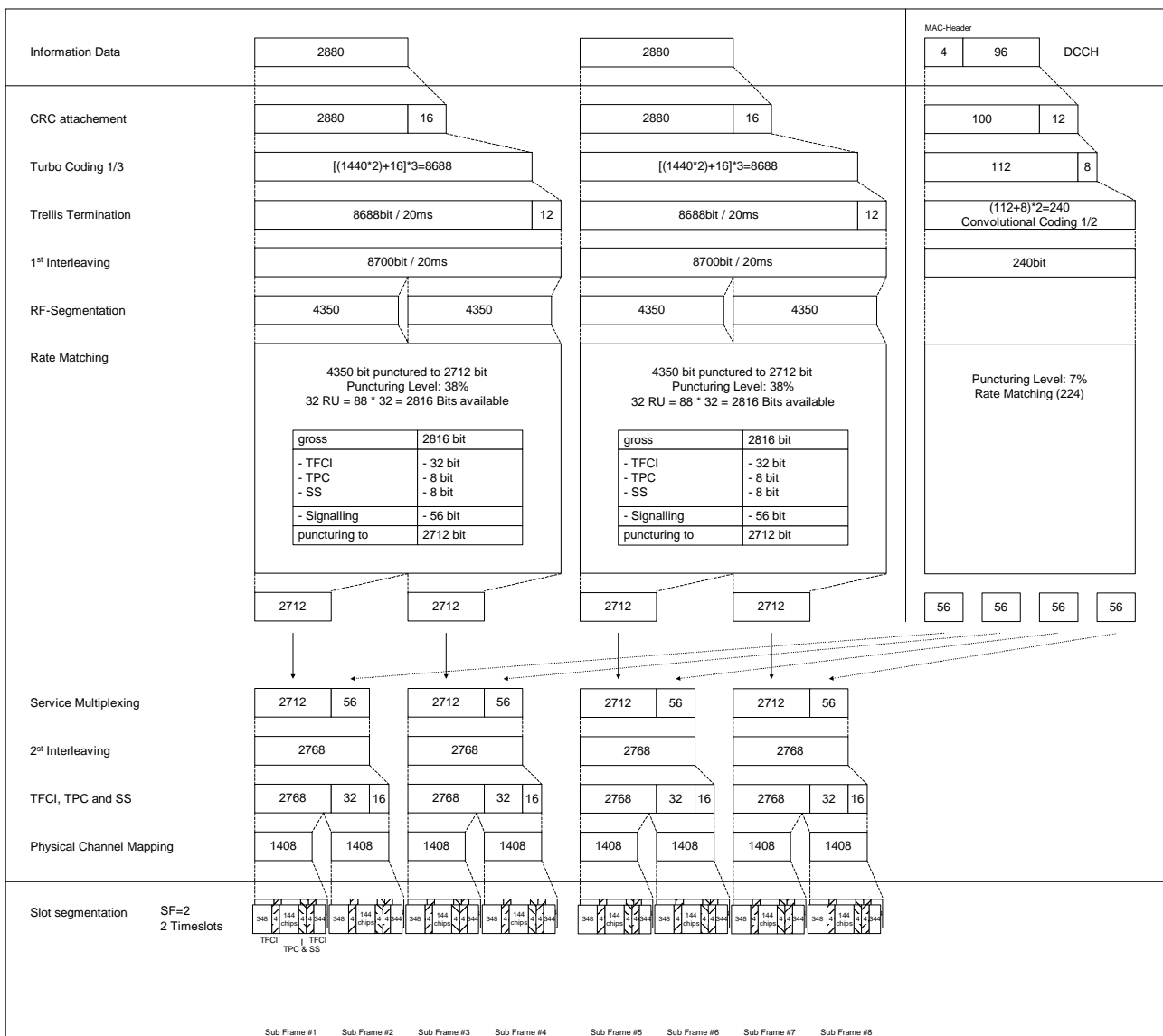


Figure A.3A

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

### A.2.4.1 3,84 Mcps TDD Option

**Table A.4**

<b>Parameter</b>	<b>Value</b>
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 / 1/2 DCCH	43.4% / 15.3%

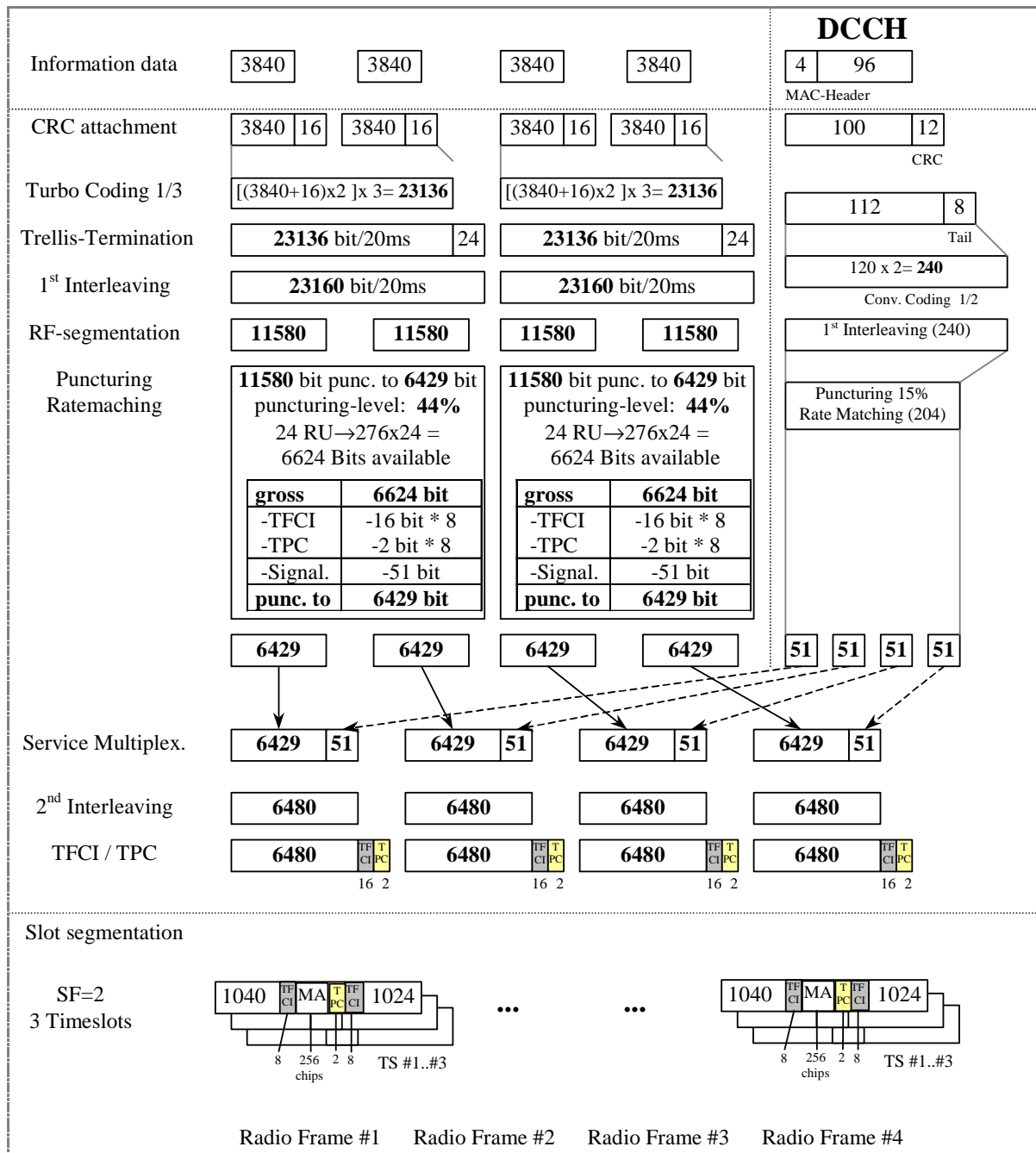


Figure A.4

### A.2.4.2 1,28 Mcps TDD Option

Table A.4A

Parameter	Value
Information data rate	384 kbps
RU's allocated	4TS (1*SF2 + 1*SF8) = 40RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	16 Bit/user/10ms
TFCI	64 Bit/user/10ms
Synchronisation Shift (SS)	16 Bit/user/10ms
Inband signalling DCCH	max 2.0 kbps
Puncturing level at Code rate: 1/3 DCH / 1/2 DCCH	41% / 12%

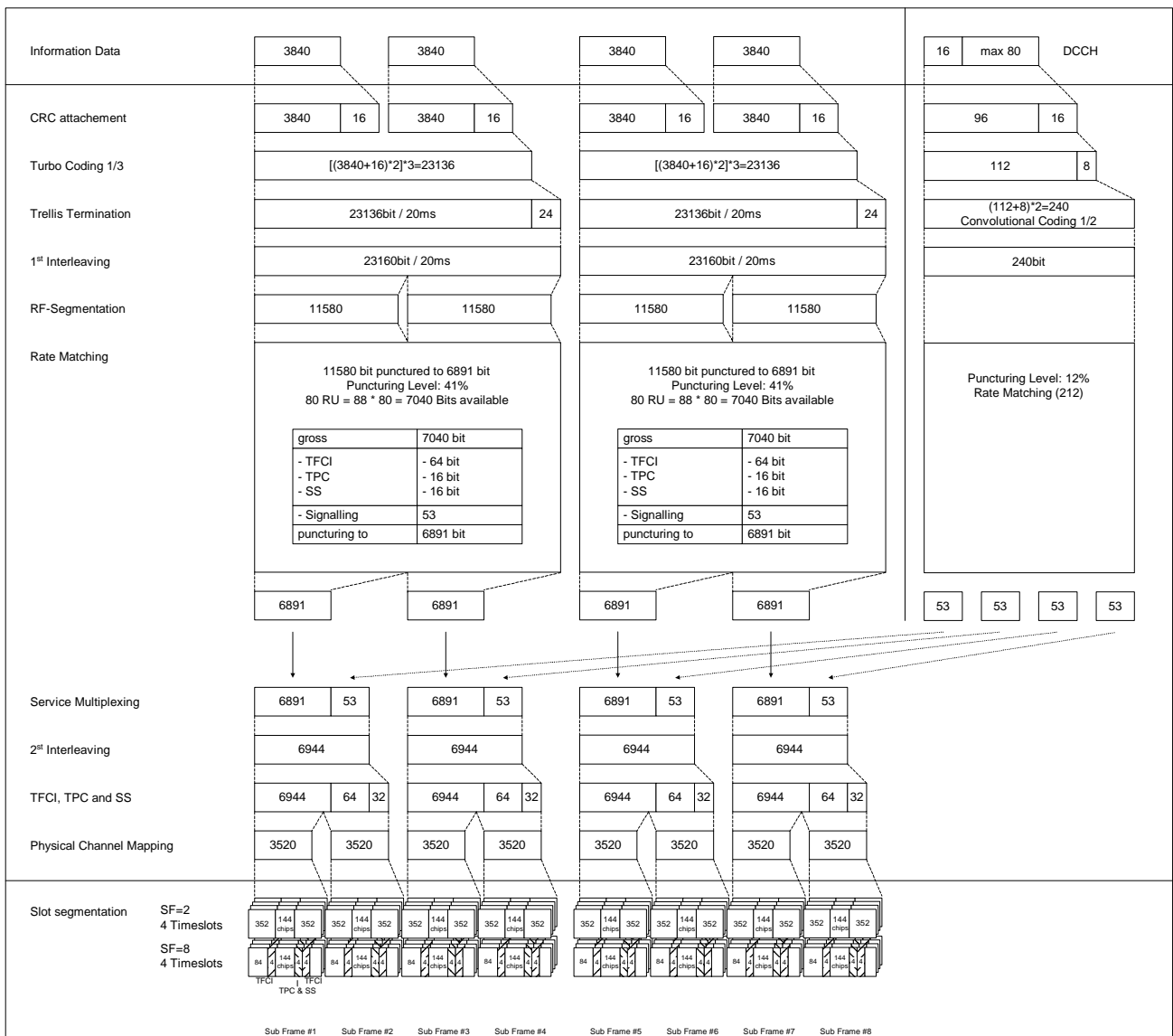


Figure A.4A

## A.2.5 RACH reference measurement channel

### A.2.5.0 General

#### A.2.5.0.1 3,84 Mcps TDD Option

Table A.5

Parameter	Value
Information data rate e.g. 2 TBs ( $B_{RACH}=2$ ): <b>SF16:</b> 0% puncturing rate at CR=1/2 10% puncturing rate at CR=1/2 $N_{RACH} = \frac{232 + N_{RM} - 8}{2} - 8$ <b>SF8:</b> 0% puncturing rate at CR=1/2 10% puncturing rate at CR=1/2 $N_{RACH} = \frac{464 + N_{RM} - 8}{2} - 16$	46 bits per frame and TB 53 bits per frame and TB  96 bits per frame and TB 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.2.5.0.2 1,28 Mcps TDD Option

Table A.5A

Parameter	Value
Information data rate: $N_{RACH} = \frac{88 * \frac{16}{SF} \left( \frac{N_{RM}}{100} + 1 \right) - 8}{2} - 16$ <b>SF16</b> (RU's allocated:1): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2 <b>SF8</b> (RU's allocated:2): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2 <b>SF4</b> (RU's allocated:4): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2	$B_{RACH}=1$ CRC length = 16 Tail Bits = 8  20 bits per frame and TB 24 bits per frame and TB  64 bits per frame and TB 73 bits per frame and TB  152 bits per frame and TB 170 bits per frame and TB
TTI	5msec
Midamble	144 chips
Power control	0 bit
TFCI	0 bit

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

$B_{RACH}$  = number of TBs

$N_{RM}$  = puncturing rate

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

#### A.2.5.1.1 3,84 Mcps TDD Option

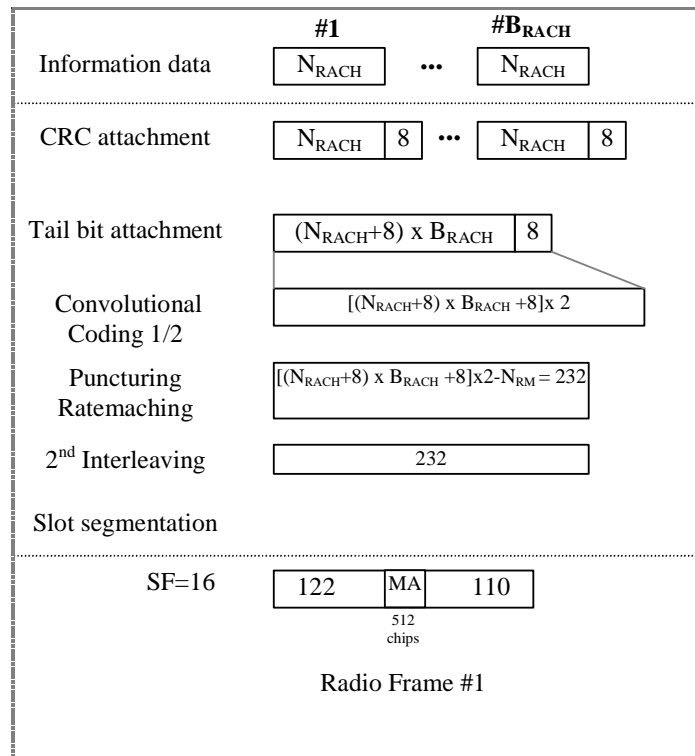


Figure A.5

A.2.5.1.2 1,28 Mcps TDD Option

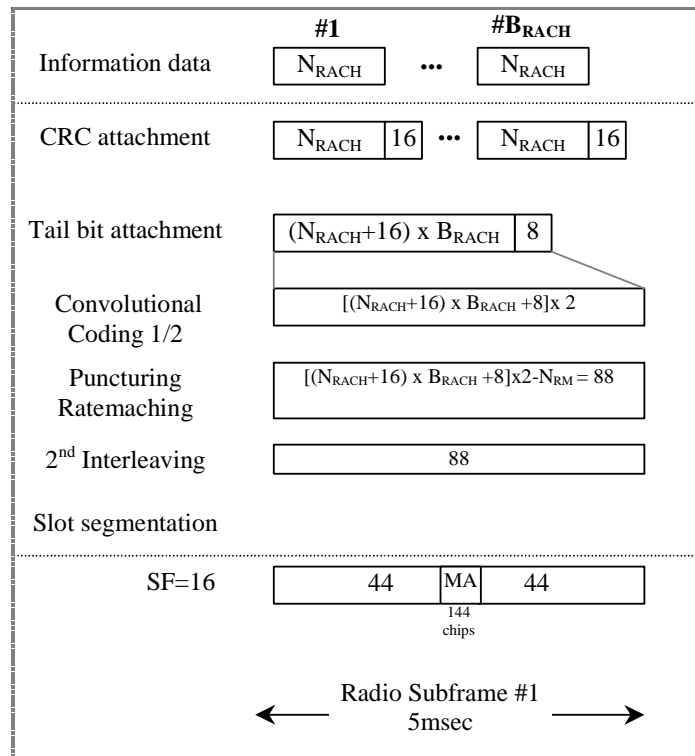


Figure A.5A

A.2.5.2 RACH mapped to 1 code SF8

A.2.5.2.1 3,84 Mcps TDD Option

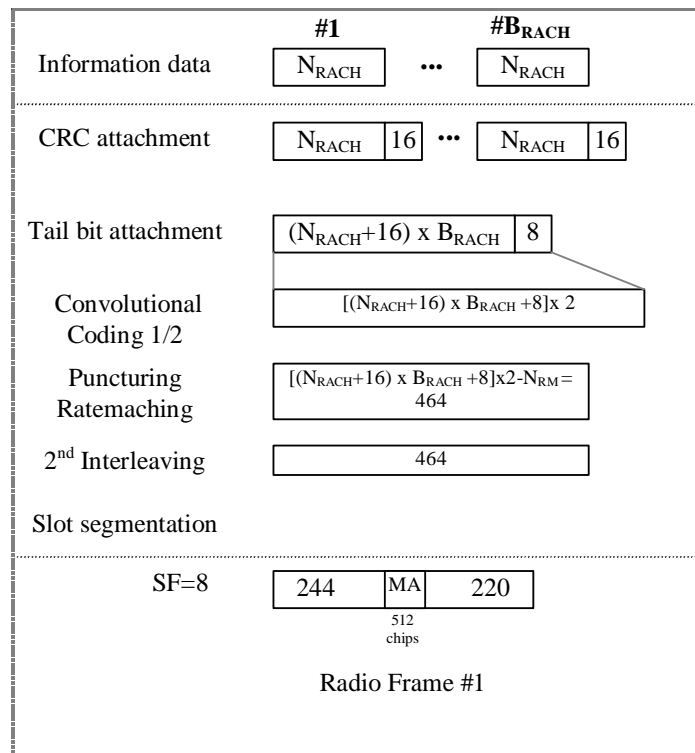


Figure A.6

A.2.5.2.2 1,28 Mcps TDD Option

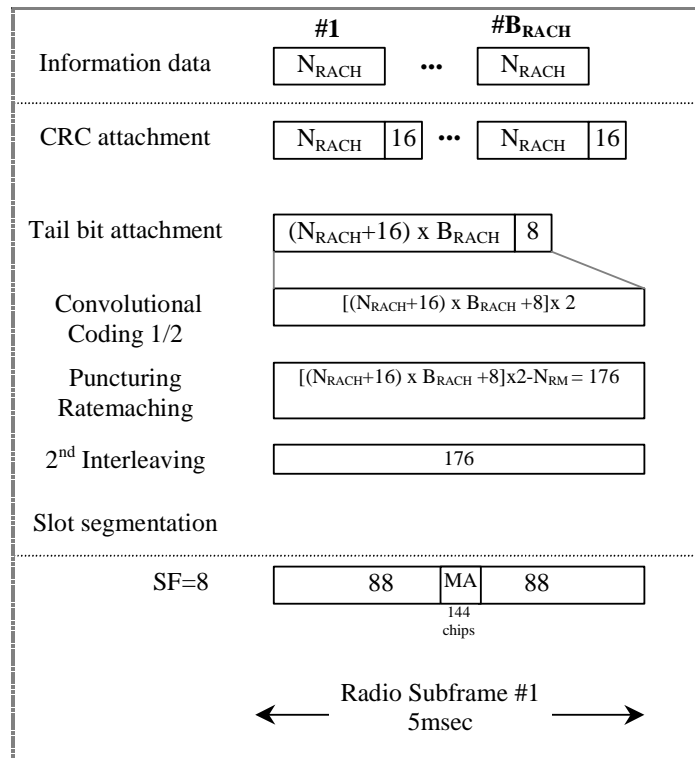


Figure A.6A

A.2.5.3 RACH mapped to 1 code SF4 (1,28 Mcps option only)

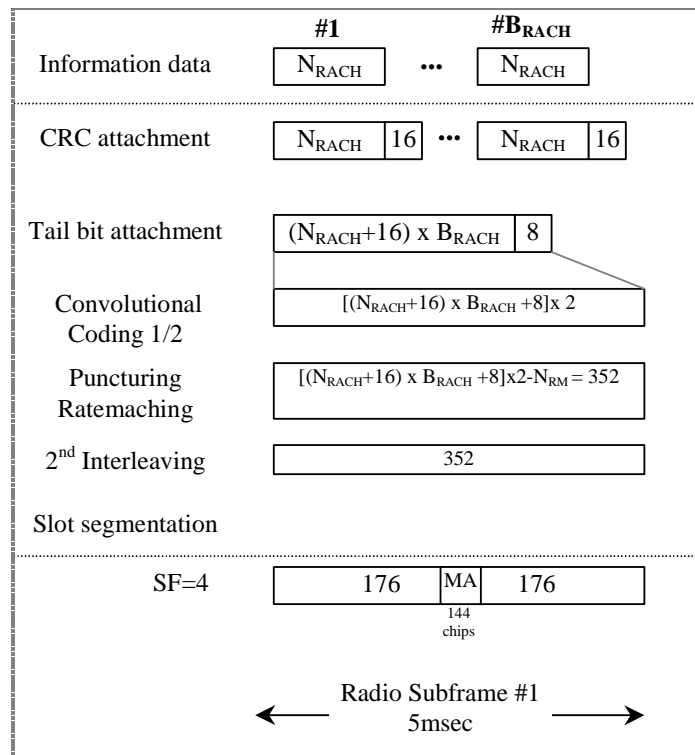


Figure A.7A



## 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

#### B.2.1 3,84 Mcps TDD Option

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

$$(CLASS) \quad S(f) \propto 1/(1 - (f / f_D)^2)^{0.5} \quad \text{for } f \in -f_D, f_D$$

**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

#### B.2.2 1,28 Mcps TDD Option

TableB2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum, defined as:

$$(CLASS) \quad S(f) \propto 1/(1 - (f / f_D)^2)^{0.5} \quad \text{for } f \in -f_D, f_D$$

**TableB2: Propagation Conditions for Multi-Path Fading Environments**

Case 1, speed 3km/h		Case 2, speed 3km/h		Case 3, speed 120km/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
2928	-10	2928	0	781	-3
		12000	0	1563	-6
				2344	-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 TFCl 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: Release 1999 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: Release 4 CRs approved at TSG#11**

RAN Doc	Spec	CR	R	Ph	Subject	Cat	Curr	New
RP-010097	25.105	52		R4	UTRA (BS) TDD; Radio transmission and Reception	B	3.6.0	4.0.0

Table C.8: Release 4 CRs approved at TSG#12

RAN Doc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-010361	25.105	53		Rel-4	Differential accuracy of P-CCPCH power	B	4.0.0	4.1.0
RP-010350	25.105	55		Rel-4	inclusion of environmental requirements	A	4.0.0	4.1.0
RP-010350	25.105	57		Rel-4	Application of blocking requirement	A	4.0.0	4.1.0
RP-010350	25.105	59		Rel-4	CR for BS Performance Requirements	A	4.0.0	4.1.0
RP-010361	25.105	60		Rel-4	Clarification of transmit intermodulation requirements	F	4.0.0	4.1.0
RP-010361	25.105	61		Rel-4	BS EVM definition correction	F	4.0.0	4.1.0
RP-010350	25.105	63		Rel-4	Correction to upper frequency of transmitter spurious emission limits	A	4.0.0	4.1.0
RP-010361	25.105	64		Rel-4	Application of blocking requirement for 1.28 Mcps TDD	F	4.0.0	4.1.0
RP-010361	25.105	65		Rel-4	Correction to upper frequency of transmitter spurious emission limits for 1.28 Mcps TDD	F	4.0.0	4.1.0

Table C.9: Release 4 CRs approved at TSG#13

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-010617	25.105	67		Rel-4	BS Performance Requirements (3.84Mcps TDD)	A	4.1.0	4.2.0
RP-010617	25.105	69		Rel-4	Receiver spurious emissions for co-located base stations	A	4.1.0	4.2.0
RP-010617	25.105	71		Rel-4	Power and ACLR definition corrections.	A	4.1.0	4.2.0
RP-010617	25.105	73		Rel-4	Clarification in Spectrum emission mask section	A	4.1.0	4.2.0
RP-010617	25.105	75		Rel-4	PC dynamic range and minimum TP requirements correction.	A	4.1.0	4.2.0
RP-010617	25.105	77		Rel-4	Correction of frequency range for receiver spurious emissions	A	4.1.0	4.2.0
RP-010617	25.105	79		Rel-4	Definition of "classical Doppler spectrum"	A	4.1.0	4.2.0
RP-010627	25.105	81		Rel-4	BS Performance Requirements (1.28Mcps TDD)	F	4.1.0	4.2.0
RP-010627	25.105	82		Rel-4	Power definition correction for 1.28 Mcps TDD option.	F	4.1.0	4.2.0
RP-010627	25.105	83		Rel-4	Receiver spurious emissions for co-located base stations for 1.28 Mcps TDD option	F	4.1.0	4.2.0
RP-010627	25.105	84		Rel-4	Correction of frequency range for receiver spurious emissions (1.28 Mcps TDD option)	F	4.1.0	4.2.0
RP-010627	25.105	85		Rel-4	Clarification in Spectrum emission mask section (1.28 Mcps section)	F	4.1.0	4.2.0

Table C.10: Release 4 CR approved at TSG#14

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-010780	25.105	87		Rel-4	Table label correction from BLER Required Eb/No to BLER	A	4.2.0	4.3.0

Table C.11: Release 4 CR approved at TSG#15

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-020017	25.105	89		Rel-4	UL reference measurement channel (12.2 kbps) puncturing rate correction	A	4.3.0	4.4.0
RP-020027	25.105	97	1	Rel-4	Amendment for BS ACLR2 of 1.28 Mcps TDD option	F	4.3.0	4.4.0
RP-020027	25.105	98	1	Rel-4	Amendment for BS Spectrum Emission Mask of 1.28Mcps TDD option	F	4.3.0	4.4.0
RP-020017	25.105	100	1	Rel-4	Consideration of multi-carrier operation in ACLR requirements	A	4.3.0	4.4.0
RP-020027	25.105	101	1	Rel-4	Consideration of multi-carrier operation in ACLR requirements for 1.28 Mcps TDD option	F	4.3.0	4.4.0
RP-020017	25.105	103		Rel-4	Single and multi carrier in spurious emissions requirements	A	4.3.0	4.4.0
RP-020027	25.105	104		Rel-4	Single and multi carrier in spurious emissions requirements for 1.28 Mcps TDD option	F	4.3.0	4.4.0
RP-020027	25.105	106		Rel-4	Addition of channelization code, scrambling code and midamble code parameter for BS performance requirements (1.28Mcps TDD)	F	4.3.0	4.4.0

**Table C.12: Release 5 CR approved at TSG#15**

<b>RAN Tdoc</b>	<b>Spec</b>	<b>CR</b>	<b>R</b>	<b>Ph</b>	<b>Title</b>	<b>Cat</b>	<b>Curr</b>	<b>New</b>
RP-020039	25.105	107		Rel-5	Correction to units in spectrum emission mask	F	4.3.0	5.0.0
RP-020032	25.105	108		Rel-5	Correction to units in Spectrum emission mask for 1.28 Mcps TDD option	F	4.3.0	5.0.0

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## History

<b>Document history</b>		
V5.0.0	March 2002	Publication