TSG-RAN Meeting #11 *RP-010097*
Palm Springs, CA, U.S.A., 13-16 March 2001

Title: **CRs (Rel-4) for WI "Low Chip Rate TDD RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing"**

Source: **TSG-RAN WG4**

Agenda item: **6.7.5**

WI Acronym: LCRTDD-RF

Doc-2nd-Level	Spec	CR	Subject	Cat	Version-Current	Version-New
R4-010423	25.102	45	UTRA (UE) TDD; Radio transmission and Reception	B	3.5.0	4.0.0
R4-010291	25.105	52	UTRA (BS) TDD; Radio transmission and Reception	B	3.5.0	4.0.0
R4-010292	25.113	10	Base station electromagnetic compatibility (EMC) for 1.28Mcps TDD	B	3.4.0	4.0.0
R4-010443	25.123	44	Requirements for Support of Radio Resources Management (TDD) for 1.28Mcps TDD	B	3.4.0	4.0.0
R4-010294	25.142	56	BS Conformance test for 1.28Mcps TDD	B	3.4.0	4.0.0
R4-010432	34.124	6	UE electromagnetic compatibility (EMC) for 1.28Mcps TDD Option	B	3.2.0	4.0.0

3GPP TSG RAN WG4 Meeting #16 R4-010423

Vienna, Austria 19th - 23rd February 2001

CR-Form-v3

CHANGE REQUEST

⌘	25.102	CR	45	⌘	rev	-	⌘	Current version:	3.5.0	⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	UTRA (UE) TDD; Radio transmission and Reception		
Source:	⌘	RAN WG4		
Work item code:	⌘	LCRTDD-RF	***Date:*** ⌘	19 February 2001
Category:	⌘	**B**	***Release:*** ⌘	REL-4
		Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(Addition of feature),* ***C*** *(Functional modification of feature)* ***D*** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	This CR collects the principally agreed wording of the changes necessary for introducing the feature '1.28Mcps TDD option' in the TS25.102. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.
Summary of change:	⌘	Based on the approved contents of TR25.945, the '1.28Mcps TDD option' related descriptions are add in the corresponding sections in existing TS25.102
Consequences if not approved:	⌘	

Clauses affected:	⌘			
Other specs affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	
Other comments:	⌘			

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3GPP TS 25.102 V3.5.0 (2000-12)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Radio Access Networks;
UTRA (UE) TDD; Radio Transmission and Reception
(Release 1999)

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Keywords
UMTS, radio

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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:

Version 3.y.z

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 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.This document establishes the minimum RF characteristics of the TDD mode of UTRA for the User Equipment (UE).

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply. 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 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 measuremement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes"

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following 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 transmit 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>
Received Signal Code	Given only signal power is received, the average power of the received signal after

Power (RSCP)	despreading and combining.
Interference Signal Code Power (ISCP)	Given only interference power is received, the average power of the received signal after despreading to the code and combining. Equivalent to the RSCP value but now only interference is received instead of signal

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
BS	Base Station
CW	Continuous wave (unmodulated signal)
DL	Down link (forward link)
DPCH	Dedicated physical channel
DPCH_Ec	Average energy per PN chip for DPCH
$\frac{DPCH\_Ec}{I_{or}}$	The ratio of the average energy per PN chip of the DPCH to the total transmit power spectral density of the downlink at the BS antenna connector
$\frac{\Sigma\, DPCH\_Ec}{I_{or}}$	The ratio of the sum of DPCH_Ec for one service in case of multicode to the total transmit power spectral density of the downlink at the BS antenna connector
EIRP	Effective Isotropic Radiated Power
FDD	Frequency Division Duplexing
FER	Frame Error Ratio
Fuw	Frequency of unwanted signal. This is specified in bracket in terms of an absolute frequency(s) or frequency offset from the assigned channel frequency.
Ioc	The power spectral density of a band limited white noise source (simulating interference from other cells) as measured at the UE antenna connector.
Ior	The total transmit power spectral density of the downlink at the BS antenna connector
$\hat{I}_{or}$	The received power spectral density of the downlink as measured at the UE 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 Measurement Uncertainty

The requirements given in the present document make no allowance for measurement uncertainty. The test specification 34.122 Annex F defines test tolerances. These test tolerances are individually calculated for each test. The test tolerances are then added to the limits in this specification to create test limits. The measurement results are compared against the test limits as defined by the shared risk principle.

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

4.2 Power Classes

For UE power classes 1 and 4, a number of RF parameter are not specified. It is intended that these are part of a later release.

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 Option and 1.28 Mcps Option respectivelya chip rate of 3.84 Mcps.

Note

1. 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 or other frequency bands is not precluded.

5.3 TX–RX frequency separation

5.3.1 3.84Mcps 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 1.28Mcps 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 3.84Mcps 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 1.28Mcps TDD Option

The nominal channel spacing is 1.6 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:

$N_t = 5*F$ $0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$ 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 of the UE. For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed. Transmitter characteristics for UE(s) with multiple antennas/antenna connectors are FFS.

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

All the parameters in section 6 are defined using the UL reference measurement channel (12.2 kbps) specified in Annex A.2.1.

6.2 Transmit power

6.2.1 User Equipment maximum output power

The following Power Classes define the maximum output power;

Table 6.1: UE power classes

Power Class	Maximum output power	Tolerance
1	+30 dBm	+1 dB / -3 dB
2	+24 dBm	+1 dB / -3 dB
3	+21 dBm	+2 dB / -2 dB
4	+10 dBm	+4 dB / -4 dB

Note

1. The maximum output power refers to the measure of power when averaged over the useful part of the transmit timeslots at the maximum power control setting.
2. For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission.
3. The tolerance of the maximum power is below the prescribed value even at the multi-code transmission mode
4. For UE using directive antennas for transmission, a class dependent limit will be placed on the maximum EIRP (Equivalent Isotropic Radiated Power)..

6.3 UE frequency stability

The UE modulated carrier frequency shall be accurate to within ±0.1 PPM observed over a period of one timeslot compared to carrier frequency received from the BS. These signals will have an apparent error due to BS frequency error and Doppler shift. In the later case, signals from the BS must be averaged over sufficient time that errors due to noise or interference are allowed for within the above ±0.1PPM figure. The UE shall use the same frequency source for both RF frequency generation and the chip clock.

Table 6.2: Frequency stability

AFC	Frequency stability
ON	within ± 0.1 PPM

6.4 Output power dynamics

Power control is used to limit the interference level.

6.4.1. Power control

6.4.1.1 3.84Mcps TDD Option

Uplink power control is the ability of the UE transmitter to sets its output power in accordance with measured downlink path loss, values determined by higher layer signaling and path loss weighting parameter α as defined in TS 25.224. The output power is defined as the average power of the transmit timeslot, and is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off α = 0.22 and a bandwidth equal to the chip rate.

6.4.1.1.1 Initial Accuracy

The UE power control initial accuracy error shall be less than +/-9dB under normal conditions and +/- 12dB under extreme conditions.

6.4.1.1.2 Differential accuracy, controlled input

The power control differential accuracy, controlled input, is defined as the error in the UE transmitter power step as a result of a step in SIR_{TARGET} when the path loss weighting parameter α=0. The step in SIR_{TARGET} shall be rounded to the closest integer dB value. The error shall not exceed the values in table 6.3.

Table 6.3: Transmitter power step tolerance as a result of control power step

$\Delta SIR_{TARGET\ [dB]}$	Transmitter power step tolerance [dB]
$\Delta SIR_{TARGET} \leq 1$	± 0.5
$1 < \Delta SIR_{TARGET} \leq 2$	± 1
$2 < \Delta SIR_{TARGET} \leq 3$	± 1.5
$3 < \Delta SIR_{TARGET} \leq 10$	± 2
$10 < \Delta SIR_{TARGET} \leq 20$	± 4
$20 < \Delta SIR_{TARGET} \leq 30$	± 6
$30 < \Delta SIR_{TARGET}$	± 9 (1)

(1) Value is given for normal conditions. For extreme conditions value is ±12

6.4.1.1.3 Differential accuracy, measured input

The power control differential accuracy, measured input, is defined as the error in UE transmitter power step change as a result of a step change in path loss $L_{PCCPCH.}$

The error shall not exceed the sum of the following two errors:

- The power control error, resulting from a change in the path loss (ΔL_{PCCPCH}), the same tolerances as defined in table 6.3 shall apply,
- and the errors in the PCCPCH RSCP measurement as defined in TS 25.123.

Note: This requirement needs not to be tested, because the step accuracy error is tested according to the requirement in section 6.4.1.2 and the PCCPCH RSCP measurement error is tested according to the requirement in 25.123.

6.4.1.2 1.28Mcps TDD Option

6.4.1.2.1 Open loop power control

Open loop power control is the ability of the UE transmitter to sets its output power to a specific value. The open loop power control tolerance is given in Table 6.4

6.4.1.2.1.1 minimum requirement

The UE open loop power is defined as the average power in a timeslot or ON power duration, whichever is available, and they are 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.

Table 6.4: Open loop power control

Normal conditions	± 9 dB
Extreme conditions	± 12 dB

6.4.1.2.2 Closed loop power control

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

6.4.1.2.2.1 Power control steps

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

6.4.1.2.2.1.1 Minimum requirement

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

(a) The transmitter output power step due to closed loop power control shall be within the range shown in Table 6.5.

(b) The transmitter average output power step due to closed loop power control shall be within the range shown in Table 6.6. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration.

The closed loop power is defined as the relative power differences between averaged power of original (reference) timeslot and averaged power of the target timeslot without transient duration. They are 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.

Table 6.5: Transmitter power control range

TPC_cmd	Transmitter power control range					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
Up	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB
Down	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB

Table 6.6: Transmitter average power control range

TPC_ cmd group	Transmitter power control range after 10 equal TPC_ cmd groups					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
Up	+8 dB	+12 dB	+16 dB	+24 dB	+24 dB	+36 dB
Down	-8 dB	-12 dB	-16 dB	-24 dB	-24 dB	-36 dB

6.4.2 Minimum transmit output power

The minimum controlled output power of the UE is when the power control setting is set to a minimum value. This is when both the closed loop and open loop power control indicates a minimum transmit output power is required.

6.4.2.1 Minimum requirement

6.4.2.1.1 3.84Mcps TDD Option

The minimum transmit power shall be better than–44 dBm measured with a filter that has a root-raised cosine (RRC) filter response with a roll-off-factor $\alpha = 0.22$ and a bandwidth equal to the chip rate.

6.4.2.1.2 1.28Mcps TDD Option

The minimum transmit power shall be better than–49 dBm measured with a filter that has a root-raised cosine (RRC) filter response with a roll-off-factor $\alpha = 0.22$ and a bandwidth equal to the chip rate.

6.4.3 Out-of-synchronisation handling of output power

The UE shall monitor the DPCH quality in order to detect a loss of the signal on Layer 1, as specified in TS 25.224. The thresholds Q_{out} and Q_{in} specify at what DPCH quality levels the UE shall shut its power off and when it shall turn its power on, respectively. The thresholds are not defined explicitly, but are defined by the conditions under which the UE shall shut its transmitter off and turn it on, as stated in this clause.

6.4.3.1 Requirement

6.4.3.1.1 3.84Mcps TDD Option

The parameters in Table 6.74 are defined using the DL reference measurement channel (12.2) kbps specified in Annex A.2.21, where the CRC bits are replaced by data bits, and with static propagation conditions.

Table 6.74: DCH parameters for test of Out-of-synch handling

Parameter	Unit	Value
$\hat{I}_{or}/I_{oc}$	dB	-1
I_{oc}	dBm/3.84 MHz	-60
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	See figure 6.1
Information Data Rate	kbps	13
TFCI	-	On

The conditions for when the UE shall shut its transmitter on and when it shall turn it on are defined by the parameters in Table 6.74 together with the DPCH power level as defined in Figure 6.1.

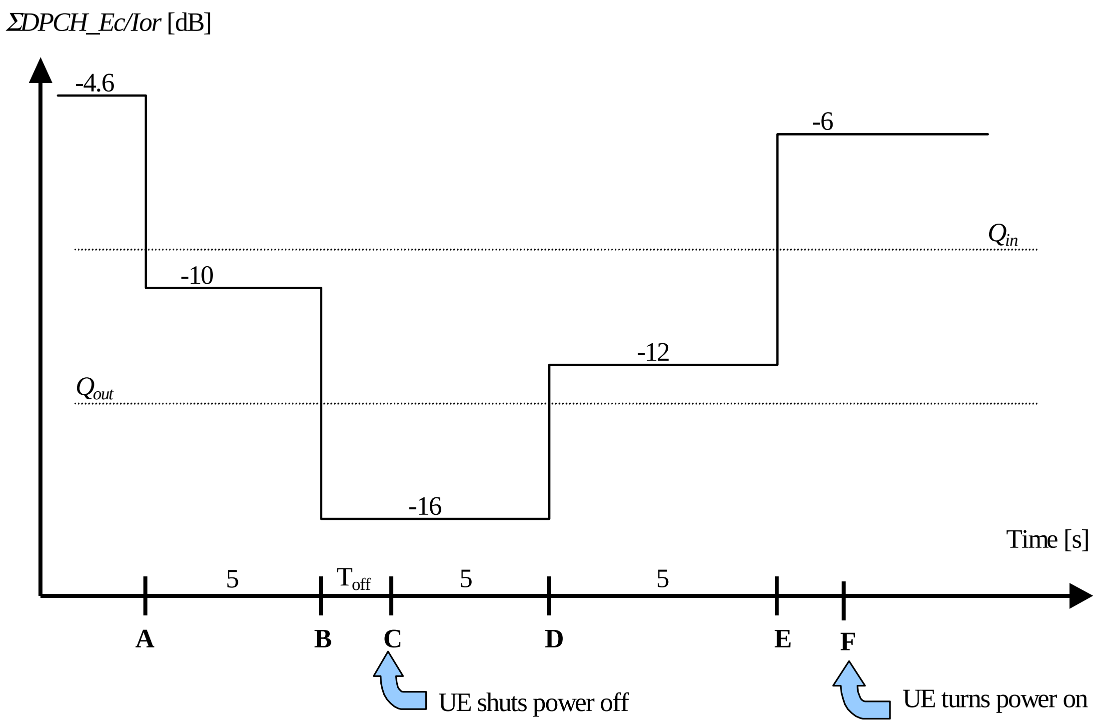


Figure 6.1. Conditions for out-of-synch handling in the UE. The indicated thresholds Q_{out} and Q_{in} are only informative.

The requirements for the UE are that

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

6.4.3.1.2 1.28Mcps TDD Option

The parameters in Table 6.8 are defined using the DL reference measurement channel (12.2) kbps specified in Annex A 2.2, where the CRC bits are replaced by data bits, and with static propagation conditions.

Table 6.8: DCH parameters for test of Out-of-synch handling

Parameter	**Unit**	**Value**
$\hat{I}_{or}/I_{oc}$	DB	-1
I_{oc}	dBm/1.28 MHz	-60
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	DB	See figure 1
Information Data Rate	kbps	12.2
TFCI	-	On

The conditions for when the UE shall shut its transmitter on and when it shall turn it on are defined by the parameters in Table 5.2.6 together with the DPCH power level as defined in Figure 1.

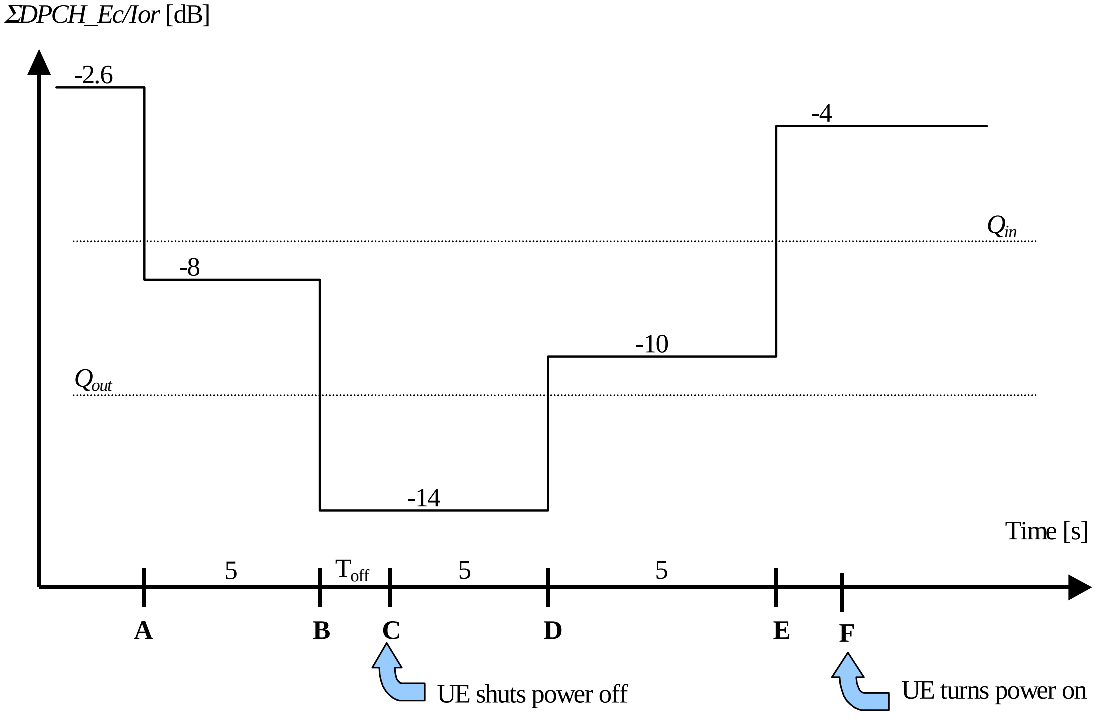


Figure 6.2. Conditions for out-of-synch handling in the UE. The indicated thresholds Q_{out} and Q_{in} are only informative.

The requirements for the UE are that

The UE shall not shut its transmitter off before point B.

The UE shall shut its transmitter off before point C, which is T_{off} = 200 ms after point B

The UE shall not turn its transmitter on between points C and E.

The UE shall turn its transmitter on before point F, which is T_{on} = 200 ms after Point E.

6.5 Transmit ON/OFF power

6.5.1 Transmit OFF power

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

6.5.1.1 Minimum Requirement

The requirement for transmit OFF power shall be better than –65 dBm measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off α=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 UE between transmit OFF power and transmit ON power.

6.5.2.1 Minimum Requirement

6.5.2.1.1 3.84Mcps TDD Option

The transmit power level versus time shall meet the mask specified in figure 6.32, where the transmission period refers to the burst without guardperiod for a single transmission slot, and to the period from the beginning of the burst in the first transmission slot to the end of the burst without guard period in the last transmission timeslot for consecutive transmission slots.

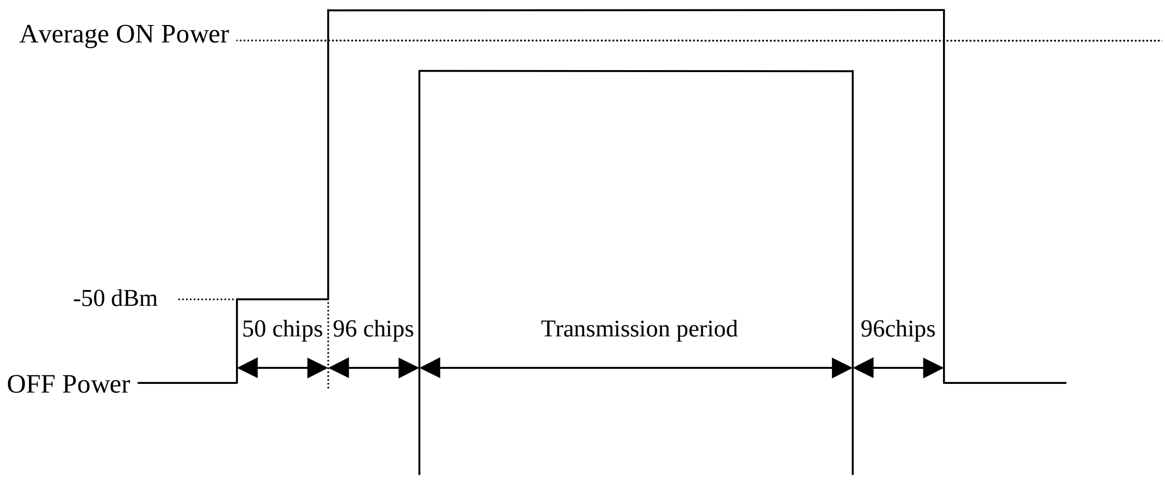


Figure 6.23: Transmit ON/OFF template for 3.84Mcps TDD Option

6.5.2.1.2 1.28Mcps TDD Option

The transmit power level versus time shall meet the mask specified in figure 6.43, where the transmission period refers to the burst without guardperiod for a single transmission slot, and to the period from the beginning of the burst in the first transmission slot to the end of the burst without guard period in the last transmission timeslot for consecutive transmission slots.

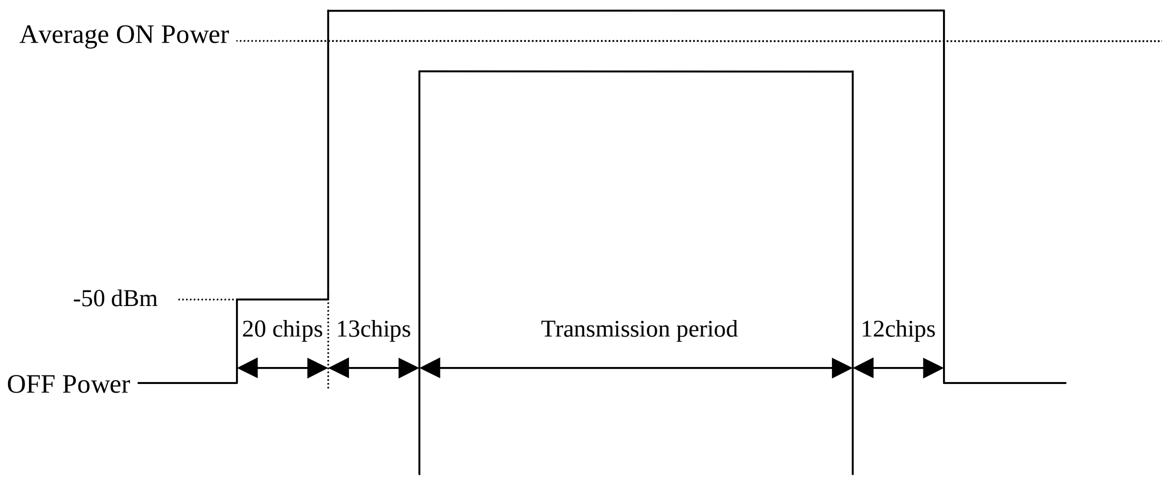


Figure 6.43: Transmit ON/OFF template for 1.28Mcps TDD Option

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

6.6.1.1 3.84Mcps TDD Option

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

6.6.1.2 1.28Mcps TDD Option

Occupied bandwidth is a measure of the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centred on the assigned channel frequency. The occupied channel bandwidth shall be less than 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 nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and adjacent channel power ratio.

6.6.2.1 Spectrum emission mask

6.6.2.1.1 3.84Mcps TDD Option ~~Spectrum emission mask~~

The spectrum emission mask of the UE applies to frequencies, which are between 2.5 and 12.5MHz from a carrier frequency. The out of channel emission is specified relative to the UE output power in measured in a 3.84 MHz bandwidth.

6.6.2.1.1.1 Minimum Requirement

The power of any UE emission shall not exceed the levels specified in table 6.~~5~~98.

Table 6.98~~5~~ : Spectrum Emission Mask Requirement (3.84Mcps TDD Option)

Frequency offset from carrier Δf	Minimum requirement	Measurement bandwidth
2.5 - 3.5 MHz	-35 -15*(Δf – 2.5) dBc	30 kHz *
3.5 - 7.5 MHz	-35- 1*(Δf-3.5) dBc	1 MHz *
7.5 - 8.5 MHz	-39 - 10*(Δf – 7.5) dBc	1 MHz *
8.5 - 12.5 MHz	-49 dBc	1 MHz *

Note

1. The first and last measurement position with a 30 kHz filter is 2.515 MHz and 3.485 MHz
2. The first and last measurement position with a 1 MHz filter is 4 MHz and 12 MHz
3. The lower limit shall be –50dBm/3.84 MHz or which ever is the higher

6.6.2.1.2 1.28Mcps TDD Option

The spectrum emission mask of the UE applies to frequencies, which are between 0.8 and 4.0MHz from a carrier frequency. The out of channel emission is specified relative to the UE output power in measured in a 1.28 MHz bandwidth.

6.6.2.1.2.1 Minimum Requirement

The power of any UE emission shall not exceed the levels specified in table 6.10~~9~~

Table 6.10~~9~~: Spectrum Emission Mask Requirement (1.28Mcps TDD Option)

Frequency offset from carrier Δf	Minimum requirement	Measurement bandwidth
0.8 MHz	-35 dBc	30 kHz
0.8-1.8 MHz	-35 – 14*(Δf-0.8) dBc	30 kHz
1.8-2.4 MHz	-49 – 25*(Δf-1.8)dBc	30 kHz
2.4 – 4.0MHz	-49 dBc	1MHz

Note:

1. The first and last measurement position with a 30 kHz filter is 0.815 MHz and 2.385 MHz
2. The first and last measurement position with a 1 MHz filter is 2.9MHz and 3.5MHz
3. The lower limit shall be –55dBm/1.28 MHz or which ever is the higher.

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 channels. Both the transmitted power and the adjacent channel power are measured with a filter response that has a Root-Raised Cosine (RRC) filter response with roll-off α = 0.22 and a bandwidth equal to the chip rate.

6.6.2.2.1 Minimum requirement

6.6.2.2.1.1 3.84Mcps TDD Option

If the adjacent channel power is greater than –50dBm then the ACLR shall be better than the value specified in Table 6.11~~06~~.

Table 6.~~6~~1~~0~~1: UE ACLR (3.84Mcps TDD Option)

Power Class	adjacent channel	ACLR limit
2, 3	UE channel ± 5 MHz	33 dB
2, 3	UE channel ± 10 MHz	43 dB

Note

1. The requirement shall still be met in the presence of switching transients.
2. The ACLR requirements reflect what can be achieved with present state of the art technology.
3. Requirement on the UE shall be reconsidered when the state of the art technology progresses.

6.6.2.2.1.2 1.28Mcps TDD Option

If the adjacent channel power is greater than –55dBm/1.28MHz then the ACLR shall be better than the value specified in Table 6.12~~1~~.

Table 6.121: UE ACLR (1.28Mcps TDD Option)

Power Class	adjacent channel	ACLR limit
2, 3	UE channel ± 1.6 MHz	33 dB
2, 3	UE channel ± 3.2 MHz	43 dB

Note

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

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

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

6.6.3 Spurious emissions

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

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

6.6.3.1 Minimum Requirement

6.6.3.1.1 3.84Mcps TDD Option

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

Table 6.1327a : General Spurious emissions requirements (3.84Mcps TDD Option)

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

Table 6.1327b : Additional Spurious emissions requirements (3.84Mcps TDD Option)

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
925 MHz ≤ f ≤ 935 MHz	100 KHz	-67 dBm*
935 MHz < f ≤ 960 MHz	100 KHz	-79 dBm*
1805 MHz ≤ f ≤ 1880 MHz	100 KHz	-71 dBm*

Note

* The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 6.1327a are permitted for each UARFCN used in the measurement.

6.6.3.1.2 1.28Mcps TDD Option

These requirements are only applicable for frequencies which are greater than 4 MHz away from the UE center carrier frequency.

Table 6.134a : General Spurious emissions requirements **(1.28Mcps TDD Option)**

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

Table 6.1~~4~~3b : Additional Spurious emissions requirements (1.28Mcps TDD Option)

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
925 MHz ≤ f ≤ 935 MHz	100 KHz	-67 dBm*
935 MHz < f ≤ 960 MHz	100 KHz	-79 dBm*
1805 MHz ≤ f ≤ 1880 MHz	100 KHz	-71 dBm*

Note

* The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 6.13a are permitted for each UARFCN used in the measurement.

6.7 Transmit intermodulation

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

6.7.1 Minimum requirement

User Equipment(s) transmitting in close vicinity of each other can produce intermodulation products, which can fall into the UE, or BS receive band as an unwanted interfering signal. The UE intermodulation attenuation is defined by the ratio of the output power of the wanted signal to the output power of the intermodulation product when an interfering CW signal is added at a level below the wanted signal. Both the wanted signal power and the intermodulation product power are measured with a filter response that is root-raised cosine (RRC) with roll-off α=0.22 and with a bandwidth equal to the chip rate.

6.7.1.1 3.84 Mcps TDD Option

The requirement of transmitting intermodulation for carrier spacing 5 MHz is prescribed in Table 6.15~~4~~~~8~~.

Table 6.15~~4~~~~8~~ : Transmit Intermodulation (3.84Mcps TDD Option)

Interference Signal Frequency Offset	5MHz	10MHz
Interference Signal Level	-40 dBc	
Minimum Requirement	-31dBc	-41dBc

6.7.1.2 1.28 Mcps TDD Option

The requirement of transmitting intermodulation for carrier spacing 1.6 MHz is prescribed in Table 6.1~~5~~6.

Table 6.165 : Transmit Intermodulation (1.28Mcps TDD Option)

Interference signal frequency offset	1.6MHz	3.2MHz
Interference signal level	-40dBc	
Minimum requirement of intermodulation products	-31 dBc	-41 dBc

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 α =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 α =0.22 and T_c is the chip duration: $T_C = \frac{1}{chiprate} \approx 0.26042\mu s$

6.8.2 Error Vector Magnitude

The Error Vector Magnitude is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). It is the square root of the ratio of the mean error vector power to the mean reference signal power expressed as a %. The measurement interval is one timeslot.

6.8.2.1 Minimum Requirement

The Error Vector Magnitude shall not exceed 17.5 % for the parameters specified in Table 6.1679.

Table 6.1769: Test parameters for Error Vector Magnitude/Peak Code Domain Error

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

6.8.3 Peak Code Domain Error

This specification is applicable for multi-code transmission only.

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 -21 dB at spreading factor 16 for the parameters specified in Table 6.9.

The requirements are defined using the UL reference measurement channel specified in subclause A.2.7.

7 Receiver characteristics

7.1 General

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

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

All the parameters in Section 7 are defined using the DL reference measurement channel specified in Annex A.2.2.

7.2 Diversity characteristics

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

Table 7.1: Diversity characteristics for UTRA/TDD

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

7.3 Reference sensitivity level

The reference sensitivity is the minimum receiver input power measured at the antenna port at which the BIT Error Ratio BER does not exceed a specific value.

7.3.1 Minimum Requirements

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 : Test parameters for reference sensitivity (3.84Mcps TDD Option)

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{or}$	-105	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 7.3.

Table 7.3: Test parameters for reference sensitivity (1.28Mcps TDD Option)

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{or}$	-108	dBm/1.28 MHz

7.4 Maximum input level

This is defined as the maximum receiver input power at the UE antenna port which does not degrade the specified BER performance.

7.4.1 Minimum Requirements

7.4.1.1 3.84 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in Table 7.43.

Table 7.43: Maximum input level (3.84Mcps TDD Option)

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	-7	dB
$\hat{I}_{or}$	-25	dBm/3.84 MHz

7.4.1.2 1.28 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in Table 7.5

Table 7.5: Maximum input level (1.28Mcps TDD Option)

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	-7	dB
$\hat{I}_{or}$	-25	dBm/1.28 MHz

7.5 Adjacent Channel Selectivity (ACS)

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

7.5.1 Minimum Requirement

7.5.1.1 3.84 Mcps TDD Option

The ACS shall be better than the value indicated in Table 7.64 for the test parameters specified in Table 7.75 where the BER shall not exceed 0.001

Table 7.64: Adjacent Channel Selectivity (3.84Mcps TDD Option)

Power Class	Unit	ACS
2	dB	33
3	dB	33

Table 7.75: Test parameters for Adjacent Channel Selectivity (3.84Mcps TDD Option)

Parameter	Unit	Level
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	dB	0
$\hat{I}_{or}$	dBm/3.84 MHz	-91
I_{oac}	dBm/3.84 MHz	-52
F_{uw} offset	MHz	+5 or –5

7.5.1.2 1.28 Mcps TDD Option

The ACS shall be better than the value indicated in Table 7.8 for the test parameters specified in Table 7.9 where the BER shall not exceed 0.001

Table7.8: Adjacent Channel Selectivity (1.28Mcps TDD Option)

Power Class	Unit	ACS
2	dB	33
3	dB	33

Table 7.9: Test parameters for Adjacent Channel Selectivity (1.28Mcps TDD Option)

Parameter	Unit	Level
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	dB	0
$\hat{I}_{or}$	dBm/1.28MHz	-91
I_{oac}	dBm/1.28 MHz	-54

F_{uw} offset	MHz	+1.6 or –1.6

7.6 Blocking characteristics

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

7.6.1 Minimum Requirement

7.6.1.1 3.84 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in table 7.106 and table 7.117.

Table 7.106: In-band blocking (3.84Mcps TDD Option)

Parameter	**Offset**	**Offset**	**Unit**
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3.84 MHz
Unwanted Signal Level (modulated)	-56	-44	dBm/3.84 MHz
F_{uw} (offset)	+10 or –10	+15 or -15	MHz

Table 7.117: Out of band blocking (3.84Mcps TDD Option)

Parameter	**Band 1**	**Band 2**	**Band 3**	**Unit**
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3.84 MHz
Unwanted Signal Level (CW)	-44	-30	-15	dBm
F_{uw} For operation in frequency bands as definded in subclause 5.2(a)	1840 <f <1885 1935 <f <1995 2040 <f <2085	1815 <f <1840 2085 <f <2110	1< f <1815 2110< f <12750	MHz
F_{uw} For operation in frequency bands as definded in subclause 5.2(b)	1790 < f < 1835 2005 < f < 2050	1765 < f < 1790 2050 < f < 2075	1 < f < 1765 2075 < f < 12750	MHz
F_{uw} For operation in frequency bands as definded in subclause 5.2(c)	1850 < f < 1895 1945 < f < 1990	1825 < f < 1850 1990 < f < 2015	1 < f < 1825 2015 < f < 12750	MHz

Note:
1. For operation referenced in 5.2(a), from 1885 <f< 1900 MHz, 1920 <f< 1935 MHz, 1995 <f< 2010 MHz and 2025<f< 2040 MHz , the appropriate in-band blocking or adjacent channel selectivity in section 7.5.1.1 shall be applied.
2. For operation referenced in 5.2(b), from 1835 < f < 1850 MHz and 1990< f < 2005 MHz, the appropriate in-band blocking or adjacent channel selectivity in section 7.5.1.1 shall be applied.
3. For operation referenced in 5.2(c), from 1895 < f < 1910 MHz and 1930< f < 1945 MHz, the appropriate in-band blocking or adjacent channel selectivity in section 7.5.1.1 shall be applied.

7.6.1.2 1.28 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in table 7.12 and table 7.13.

Table 7.12: In-band blocking (1.28Mcps TDD Option)

Parameter	**Offset**	**Offset**	**Unit**
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/1.28 MHz
Unwanted Signal Level (modulated)	-61	-49	dBm/1.28 MHz
F_{uw} (offset)	+3.2 or –3.2	+4.8 or –4.8	MHz

Table 7.13: Out of band blocking (1.28Mcps TDD Option)

Parameter	**Band 1**	**Band 2**	**Band 3**	**Unit**
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/1.28 MHz
Unwanted Signal Level (CW)	-44	-30	-15	dBm
F_{uw} For operation in frequency bands as definded in subclause 5.2(a)	1840 <f <1895.2 1924.8 <f <2005.2 2029.8 <f <2085	1815 <f <1840 2085 <f <2110	1< f <1815 2110< f <12750	MHz
F_{uw} For operation in frequency bands as definded in subclause 5.2(b)	1790 < f < 1845.2 1994.8 < f < 2050	1765 < f < 1790 2050 < f < 2075	1 < f < 1765 2075 < f < 12750	MHz
F_{uw} For operation in frequency bands as definded in subclause 5.2(c)	1850 < f < 1905.2 1934.8 < f < 1990	1825 < f < 1850 1990 < f < 2015	1 < f < 1825 2015 < f < 12750	MHz

Note: 1. For operation referenced in 5.2(a), from 1895.2 <f< 1900 MHz, 1920 <f< 1924.8 MHz, 2005.2 <f< 2010 MHz and 2025<f< 2029.8 MHz , the appropriate in-band blocking or adjacent channel selectivity in section 7.5.1.2shall be applied.

2. For operation referenced in 5.2(b), from 1845.2 < f < 1850 MHz and 1990< f < 1994.8 MHz, the appropriate in-band blocking or adjacent channel selectivity in section 7.5.1.2 shall be applied.

3. For operation referenced in 5.2(c), from 1905.2 < f < 1910 MHz and 1930< f < 1934.8 MHz, the appropriate in-band blocking or adjacent channel selectivity in section 7.5.1.2 shall be applied.

7.7 Spurious response

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

7.7.1 Minimum Requirement

7.7.1.1 3.84 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in Table 7.148.

Table 7.~~8~~14: Spurious Response (3.84Mcps TDD Option)

Parameter	Level	Unit
Wanted Signal Level	<REFSENS> + 3 dB	dBm/3.84 MHz
Unwanted Signal Level (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

7.7.1.2 1.28 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in Table 7.15.

Table 7.15: Spurious Response (1.28Mcps TDD Option)

Parameter	Level	Unit
Wanted Signal Level	<REFSENS> + 3 dB	dBm/1.28 MHz
Unwanted Signal Level (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

7.8 Intermodulation characteristics

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

7.8.1 Minimum Requirements

7.8.1.1 3.84 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in table 7.16~~9~~.

Table 7.16~~9~~: Receive intermodulation characteristics (3.84Mcps TDD Option)

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	dBm/3.84 MHz
$I_{ouw1\ (CW)}$	-46	dBm
I_{ouw2} (modulated)	-46	dBm/3.84 MHz
F_{uw1} (CW)	10	MHz
F_{uw2} (Modulated)	20	MHz

7.8.1.2 1.28 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in table 7.17

Table 7.17: Receive intermodulation characteristics (1.28Mcps TDD Option)

Parameter	**Level**	**Unit**
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	dBm/1.28 MHz
$I_{ouw1\ (CW)}$	-46	dBm
I_{ouw2} (modulated)	-46	dBm/1.28 MHz
F_{uw1} (CW)	3.2	MHz
F_{uw2} (Modulated)	6.4	MHz

7.9 Spurious emissions

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

7.9.1 Minimum Requirement

7.9.1.1 3.84 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 7.180: Receiver spurious emission requirements (3.84Mcps TDD Option)

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1.9 GHz and 1.92 GHz – 2.01 GHz and 2.025 GHz – 2.11 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 UE.
1.9 GHz – 1.92 GHz and 2.01 GHz – 2.025 GHz and 2.11 GHz – 2.170 GHz	-60 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 UE.
2.170 GHz – 12.75 GHz	-47 dBm	1 MHz	

7.9.1.2 1.28 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 7.19: Receiver spurious emission requirements (1.28Mcps TDD Option)

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1.9 GHz and 1.92 GHz – 2.01 GHz and 2.025 GHz – 2.11 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 UE.
1.9 GHz – 1.92 GHz and 2.01 GHz – 2.025 GHz and 2.11 GHz – 2.170 GHz	-64 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 UE.
2.170 GHz – 12.75 GHz	-47 dBm	1 MHz	

8 Performance requirement

8.1 General

The performance requirements for the UE in this section are specified for the measurement channels specified in Annex A and the propagation condition specified in Annex B.

Table 8.1: Summary of UE performance targets

Test Chs.	Information Data Rate	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}
BCH	12.3kbps		BLER< 10^{-2}		

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 Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

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: DCH parameters in static propagation conditions (3.84Mcps TDD Option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	-6	-3	0	0
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.3: Performance requirements in AWGN channel. (3.84Mcps TDD Option)

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	0.1	10^{-2}
2	2.3	10^{-1}
	2.6	10^{-2}
3	2.2	10^{-1}
	2.4	10^{-2}
4	1.6	10^{-1}
	1.8	10^{-2}

8.2.1.1.2 1.28 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.

Table 8.4: DCH parameters in static propagation conditions (1.28Mcps TDD Option)

Parameters	**Unit**	**Test 1**	**Test 2**	**Test 3**	**Test 4**
Number of $DPCH_o$		8	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-10	-10	-10	0
I_{oc}	DBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 8.5: Performance requirements in AWGN channel (1.28Mcps TDD Option)

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	3.1	10^{-2}
2	2.1	10^{-1}
	2.4	10^{-2}
3	2.5	10^{-1}
	2.8	10^{-2}
4	2.8	10^{-1}

8.3 Demodulation of DCH in multipath fading conditions

8.3.1 Multipath fading Case 1

The performance requirement of DCH is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

8.3.1.1 Minimum requirement

8.3.1.1.1 3.84 Mcps TDD Option

For the parameters specified in Table 8.64 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.57. These requirement are applicable for TFCS size 16.

Table 8.46: DCH parameters in multipath Case 1 channel (3.84Mcps TDD Option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	DB	-6	-3	0	0
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.75: Performance requirements in multipath Case 1 channel (3.84Mcps TDD Option).

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	13.5	10^{-2}
2	13.3	10^{-1}
	19.6	10^{-2}
3	13.3	10^{-1}
	19.7	10^{-2}
4	13.5	10^{-1}
	20.2	10^{-2}

8.3.1.1.2 1.28 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.

Table 8.8: DCH parameters in multipath Case 1 channel (1.28Mcps TDD Option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		8	2	2	0

$\frac{DPCH_o\_E_c}{I_{or}}$	DB	-10	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 8.8: Performance requirements in multipath Case 1 channel (1.28Mcps TDD Option)

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	22.2	10^{-2}
2	15.0	10^{-1}
	22.0	10^{-2}
3	16.0	10^{-1}
	23.0	10^{-2}
4	16.0	10^{-1}
	23.0	10^{-2}

8.3.2 Multipath fading Case 2

The performance requirement of DCH is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

8.3.2.1 Minimum requirement

8.3.2.1.1 3.84 Mcps TDD Option

For the parameters specified in Table 8.69 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.107. These requirements are applicable for TFCS size 16.

Table 8.96: DCH parameters in multipath Case 2 channel (3.84Mcps TDD Option)

Parameters	**Unit**	**Test 1**	**Test 2**	**Test 3**	**Test 4**
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	DB	-3	0	0	0
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.710: Performance requirements in multipath Case 2 channel (3.84Mcps TDD Option).

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	5.5	10^{-2}

2	5.8	10^{-1}
	9.7	10^{-2}
3	9.5	10^{-1}
	13.2	10^{-2}
4	8.5	10^{-1}
	12.6	10^{-2}

8.3.2.1.2 1.28 Mcps TDD Option

For the parameters specified in Table 8.11 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.12.

Table 8.11: DCH parameters in multipath Case 2 channel (1.28Mcps TDD Option)

Parameters	**Unit**	**Test 1**	**Test 2**	**Test 3**	**Test 4**
Number of $DPCH_o$		8	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-10	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 8.12: Performance requirements in multipath Case 2 channel (1.28Mcps TDD Option)

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	13.2	10^{-2}
2	9.5	10^{-1}
	13.7	10^{-2}
3	10.0	10^{-1}
	14.0	10^{-2}
4	10.0	10^{-1}
	14.0	10^{-2}

8.3.3 Multipath fading Case 3

The performance requirement of DCH is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

8.3.3.1 Minimum requirement

8.3.3.1.1 3.84 Mcps TDD Option

For the parameters specified in Table 8.138 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.149. These requirements are applicable for TFCS size 16.

Table 8.138: DCH parameters in multipath Case 3 channel (3.84Mcps TDD Option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	-3	0	0	0
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.149: Performance requirements in multipath Case 3 channel (3.84Mcps TDD Option).

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
12.2 kbps	4.7	10^{-2}
64 kbps	5.2	10^{-1}
	8.4	10^{-2}
	12.1	10^{-3}
144 kbps	11.7	10^{-1}
	15.2	10^{-2}
	17.8	10^{-3}
384 kbps	8.2	10^{-1}
	11.3	10^{-2}
	13.0	10^{-3}

8.3.3.1.2 1.28 Mcps TDD Option

For the parameters specified in Table 8.15 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.16.

Table 8.15: DCH parameters in multipath Case 3 channel (1.28Mcps TDD Option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		8	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-10	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 8.16: Performance requirements in multipath Case 3 channel (1.28Mcps TDD Option)

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.8	10^{-2}
2	8.3	10^{-1}
	11.1	10^{-2}
	13.8	10^{-3}
3	8.7	10^{-1}
	10.6	10^{-2}
	11.8	10^{-3}
4	8.8	10^{-1}
	10.3	10^{-2}
	11.5	10^{-3}

8.4 Base station transmit diversity mode for 3.84Mcps TDD Option

8.4.1 Demodulation of BCH in Block STTD mode

The performance requirement of BCH is determined by the maximum Block Error Rate (BLER). The BLER is specified for the BCH. BCH is mapped into the Primary Common Control Physical Channel (P-CCPCH).

8.4.1.1 Minimum requirement

For the parameters specified in Table 8.1~~0~~7 the BLER should not exceed the BLER specified in Table 8.1~~1~~8.

Table 8.1~~0~~7: P-CCPCH parameters in multipath Case 1 channel

Parameters	**Unit**	**Test 1**
$\frac{PCCPCH\_E_c}{I_{or}}$	dB	-3
I	dBm/3.84 MHz	-60
Information Data Rate	Kbps	12.3

Table 8.1~~1~~8: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	8.4	10^{-2}

8.5 Power control in downlink for 3.84Mcps TDD Option

Power control in the downlink is the ability of the UE receiver to converge to the required link quality set by the network while using minimum downlink power.

8.5.1 Minimum requirements

For the parameters specified in Table 8.19~~2~~ the average downlink $\hat{I}_{or}/I_{oc}$ power shall not exceed the values specified in Table 8.20~~13~~. Downlink power control is ON during the test.

Table 8.19~~2~~: Test parameters for downlink power control

Parameter	Unit	Test 1	Test 2
$\frac{DPCH\_E_c}{I_{or}}$	dB	0	[ ]
I_{oc}	dBm/3.84 MHz	-60	
Information Data Rate	kbps	12.2	
Target quality value on DTCH	BLER	0.01	
Propagation condition		Case 4	

Table 8.20~~13~~: Requirements for downlink power control

Parameter	Unit	Test 1	Test 2
$\hat{I}_{or}/I_{oc}$	dB	[ ]	[ ]
Measured quality on DTCH	BLER	0.01±30%	0.01±30%

Annex A (normative): Measurement channels

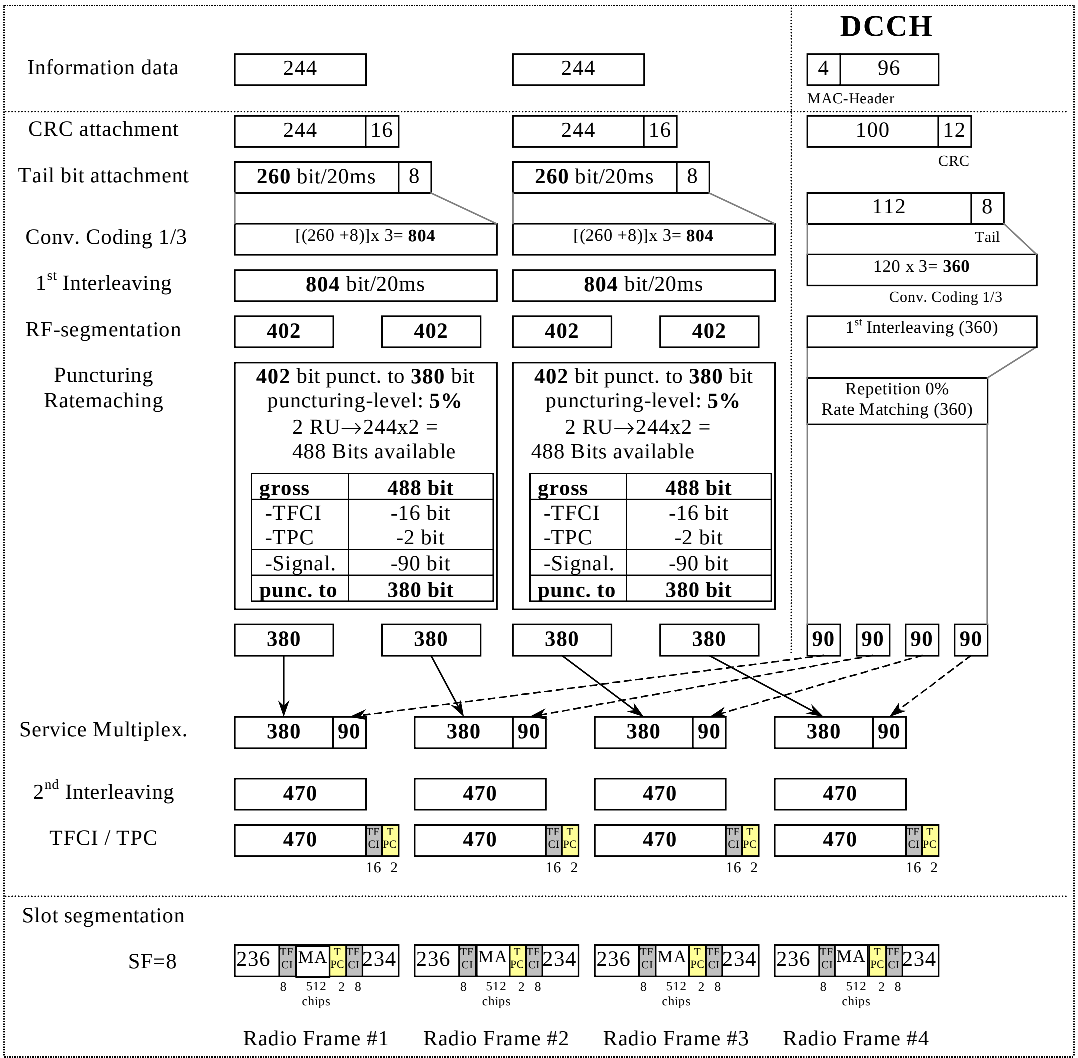
A.1 General

A.2 Reference measurement channel

A.2.1 3.84 Mcps TDD Option

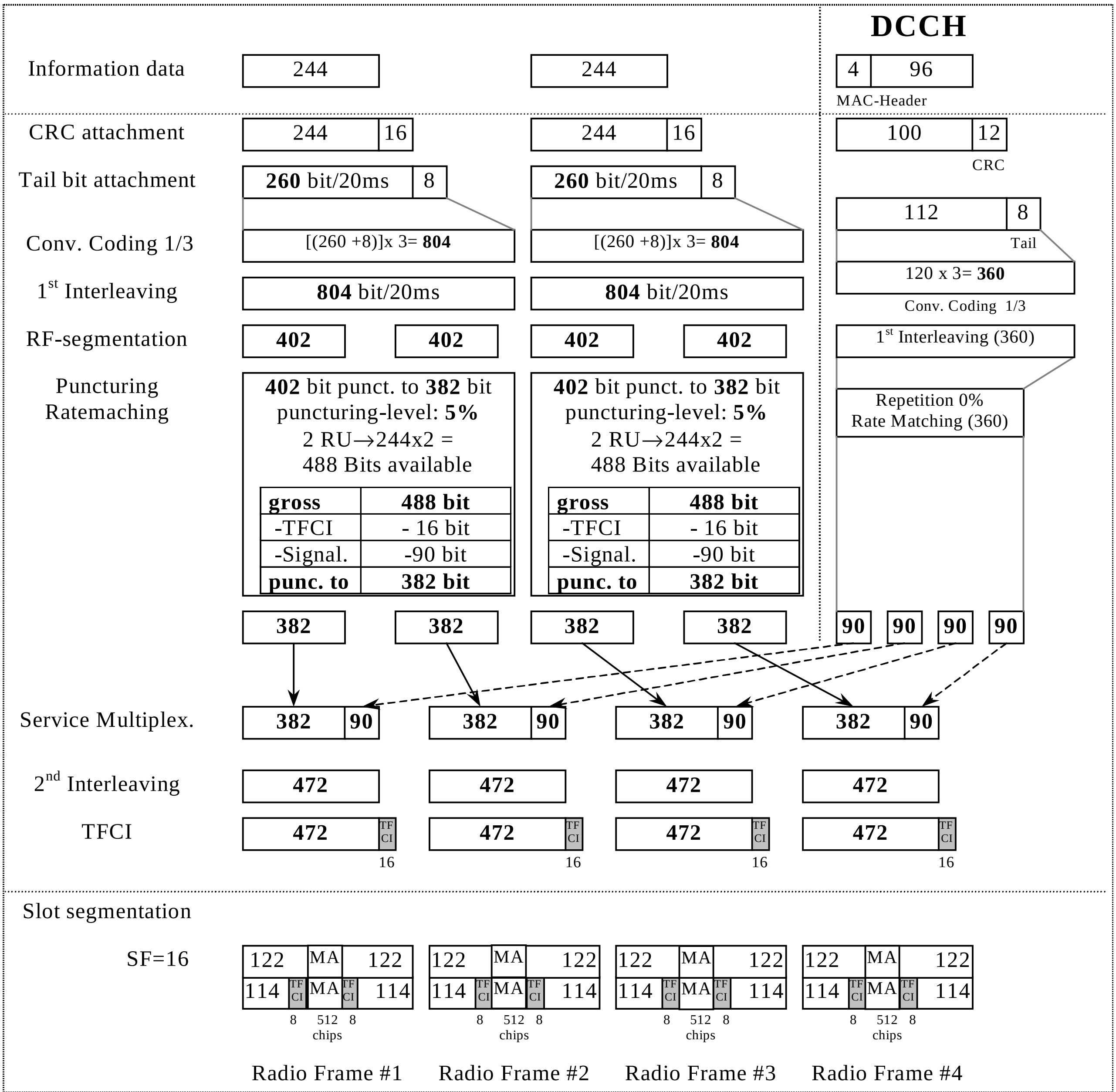
A.2.1.1 UL reference measurement channel (12.2 kbps)

Parameter	
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%



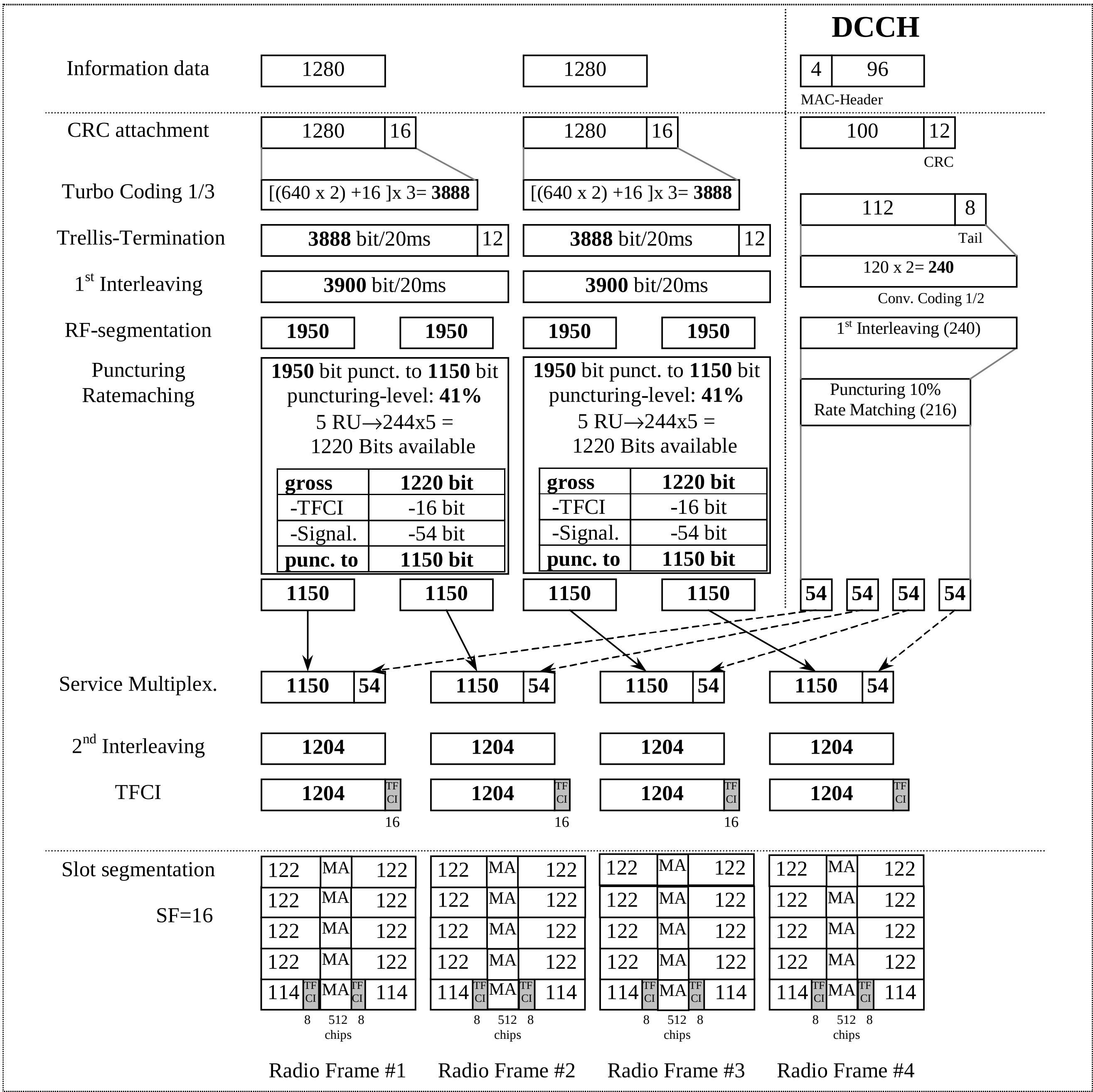
A.2.1.2 DL reference measurement channel (12.2 kbps)

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



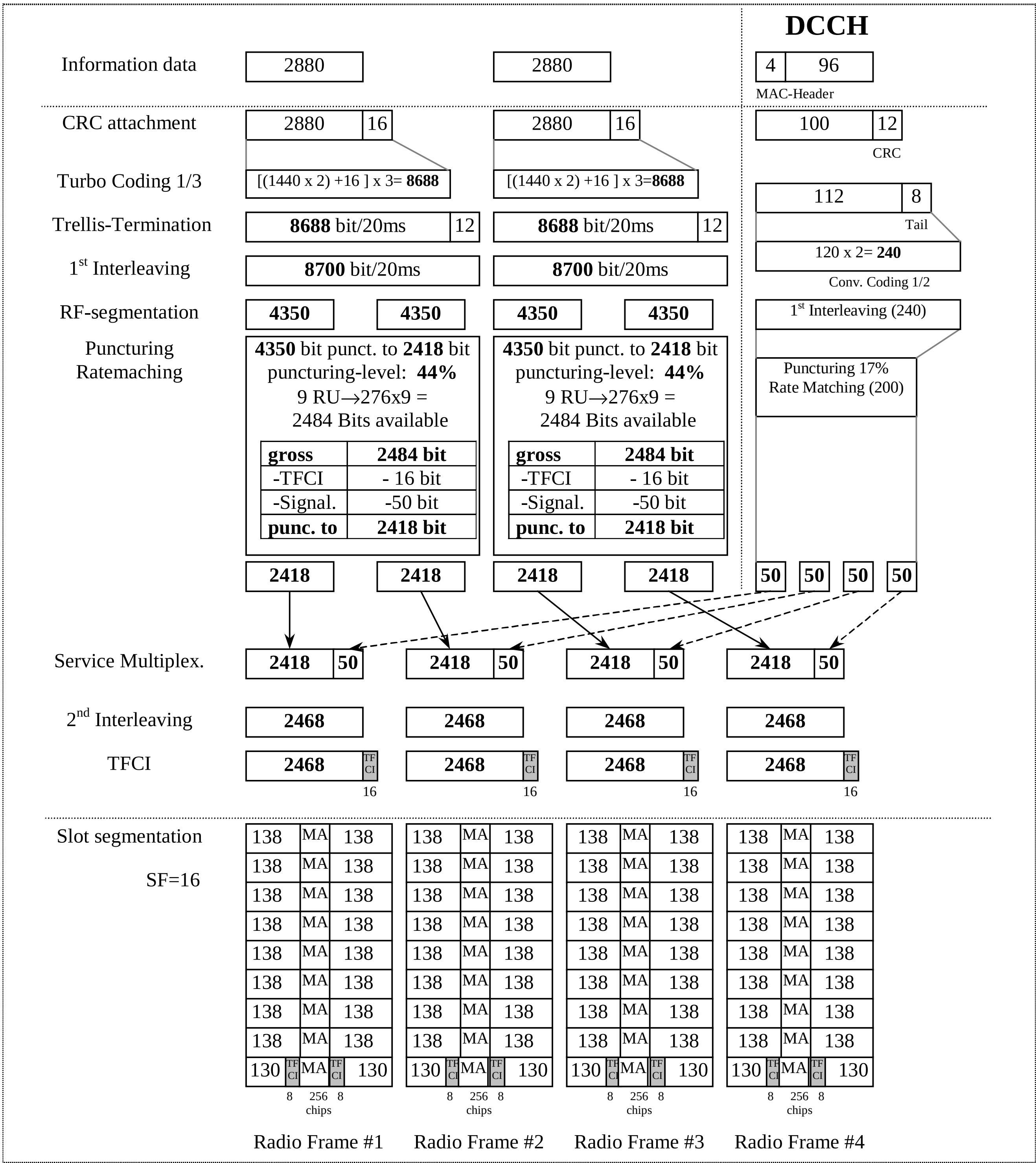
A.2.1.3 DL reference measurement channel (64 kbps)

Parameter	
Information data rate	64 kbps
RU´s allocated	5 codes SF16 = 5RU
Midamble	512 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH / ½ DCCH	41.1% / 10%



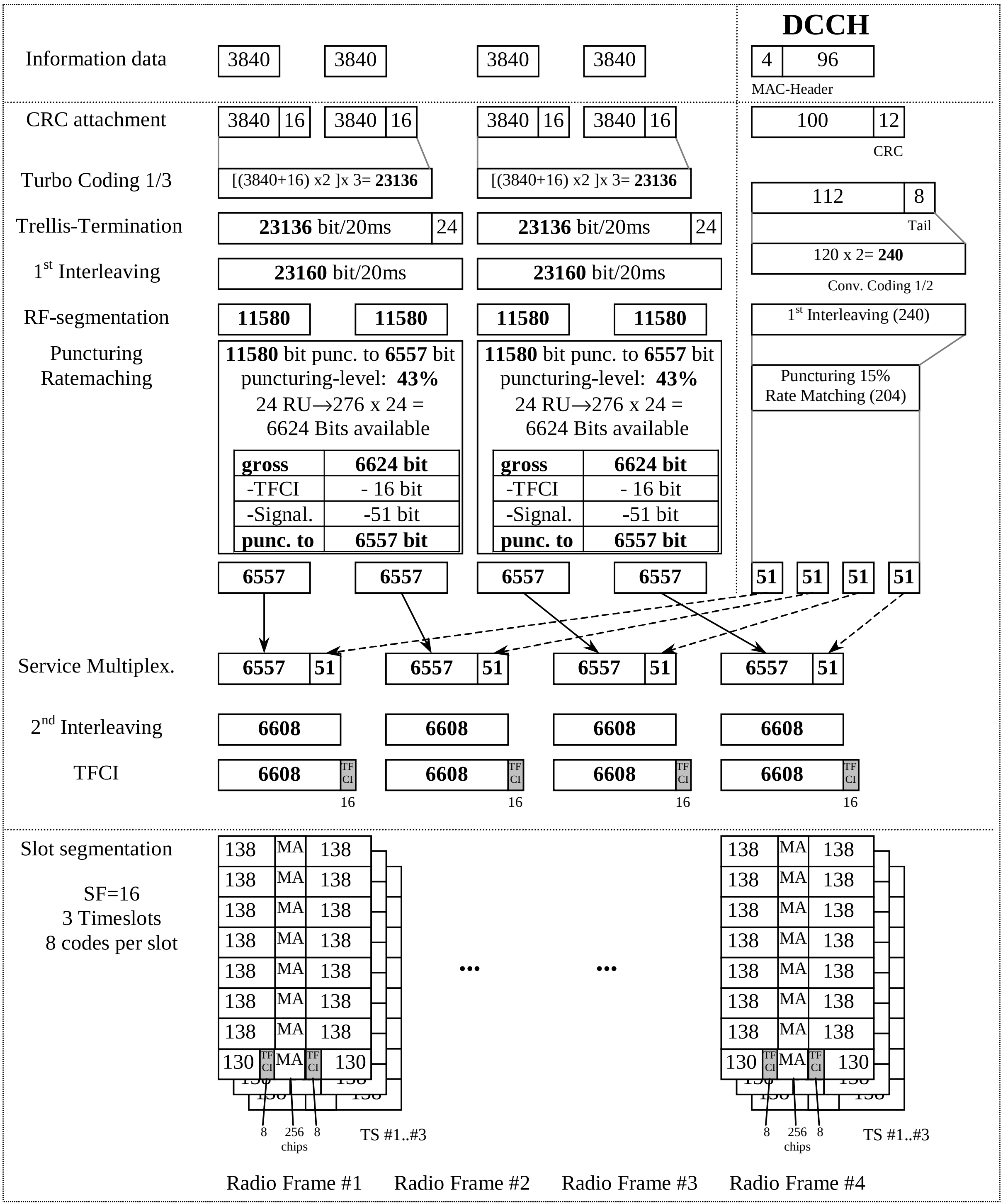
A.2.1.4 DL reference measurement channel (144 kbps)

Parameter	
Information data rate	144 kbps
RU´s allocated	9 codes SF16 = 9RU
Midamble	256 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	44.5% / 16.6%


DCCH
Information data
2880
2880
4
96
MAC-Header
CRC attachment
2880
16
2880
16
100
12
CRC
Turbo Coding 1/3
[(1440 x 2) +16] x 3= 8688
[(1440 x 2) +16] x 3=8688
112
8
Tail
Trellis-Termination
8688 bit/20ms
12
8688 bit/20ms
12
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
8700 bit/20ms
8700 bit/20ms
1st Interleaving (240)
RF-segmentation
4350
4350
4350
4350
Puncturing
Ratemaching
4350 bit punct. to 2418 bit
puncturing-level: 44%
9 RU→276x9 =
2484 Bits available
gross 2484 bit
-TFCI - 16 bit
-Signal. -50 bit
punc. to 2418 bit
Puncturing 17%
Rate Matching (200)
2418
50
Service Multiplex.
2418 50
2nd Interleaving
2468
TFCI
2468
TFCI
16
Slot segmentation
SF=16
138 MA 138
130 TFCI MA TFCI 130
8 256 8
chips
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

A.2.1.5 DL reference measurement channel (384 kbps)

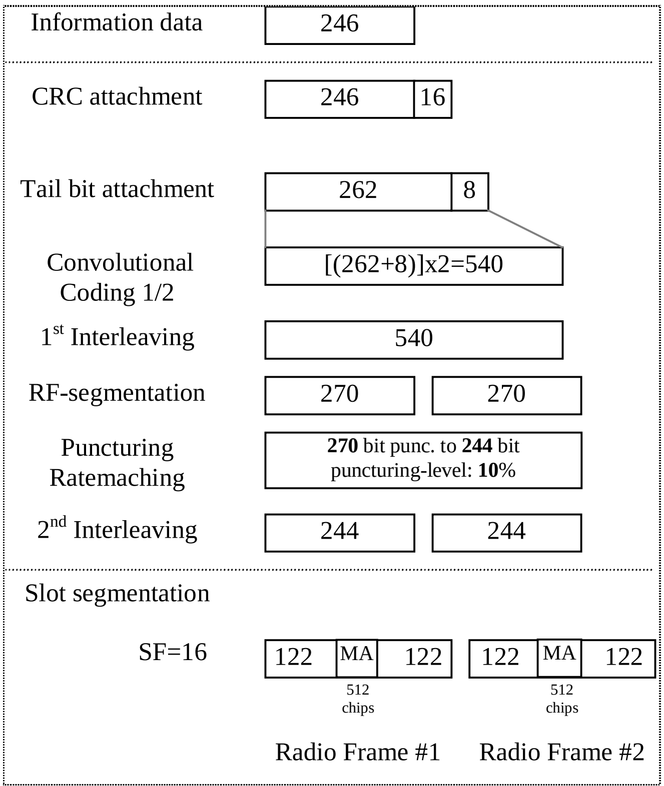
Parameter	
Information data rate	384 kbps
RU´s allocated	8*3TS = 24RU
Midamble	256 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH / ½ DCCH	43.4% / 15.3%


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
Conv. Coding 1/2
1st Interleaving
23160 bit/20ms
23160 bit/20ms
RF-segmentation
11580
11580
11580
11580
1st Interleaving (240)
Puncturing Ratemaching
11580 bit punc. to 6557 bit
puncturing-level: 43%
24 RU→276 x 24 =
6624 Bits available
gross 6624 bit
-TFCI - 16 bit
-Signal. -51 bit
punc. to 6557 bit
Puncturing 15%
Rate Matching (204)
6557
51
Service Multiplex.
6557 51
2nd Interleaving
6608
TFCI
6608 TFCI
16
Slot segmentation
SF=16
3 Timeslots
8 codes per slot
138 MA 138
130 TFCI MA TFCI 130
8 256 chips 8
TS #1..#3
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

A.2.1.6 BCH reference measurement channel

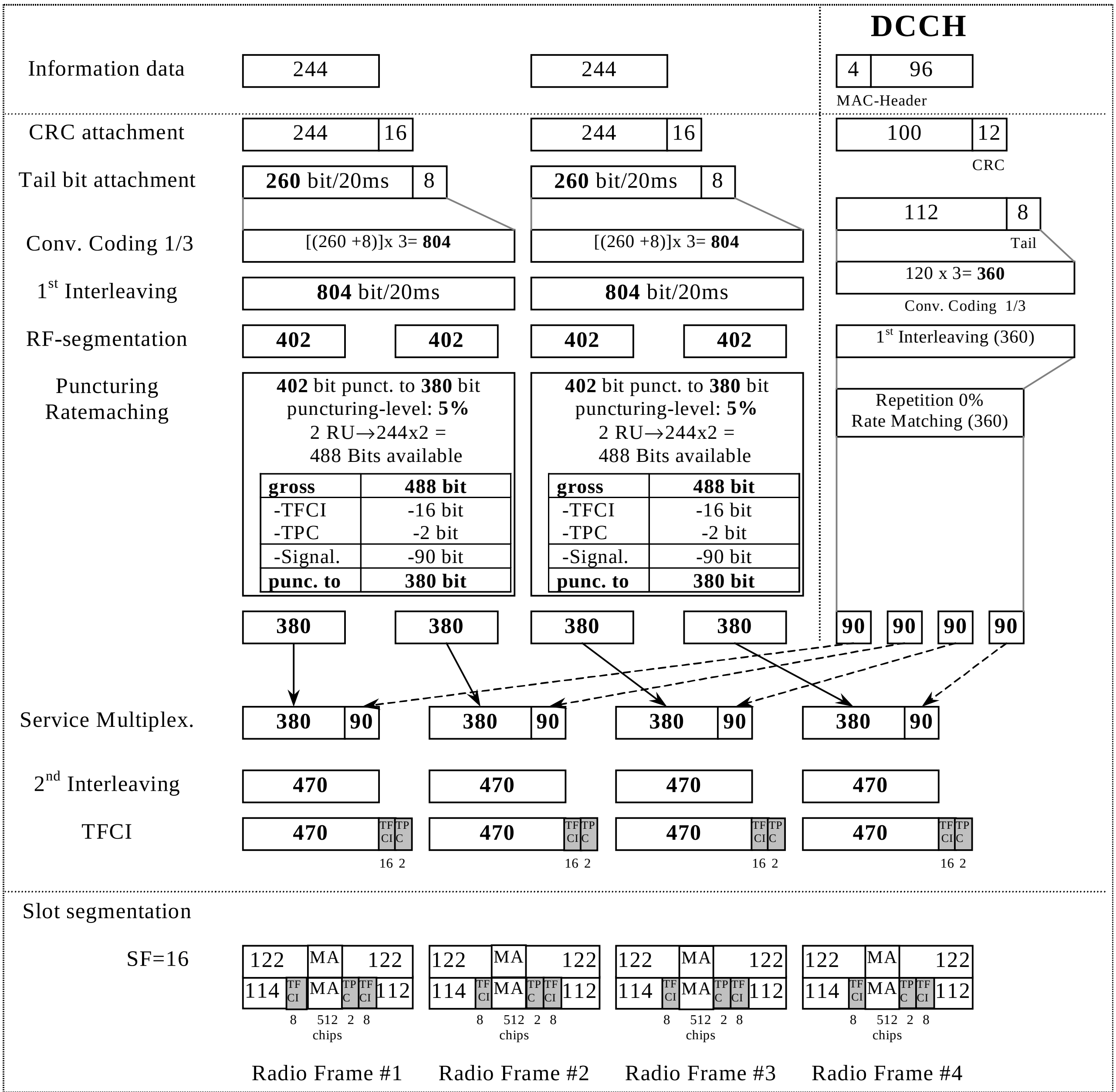
[mapped to 1 code SF16]

Parameter	
Information data rate:	12.3 kbps
RU´s allocated	1 RU
Midamble	**512** chips
Interleaving	20 ms
Power control	0 bit
TFCI	0 bit
Puncturing level	10%



A.2.1.7 UL multi code reference measurement channel (12.2 kbps)

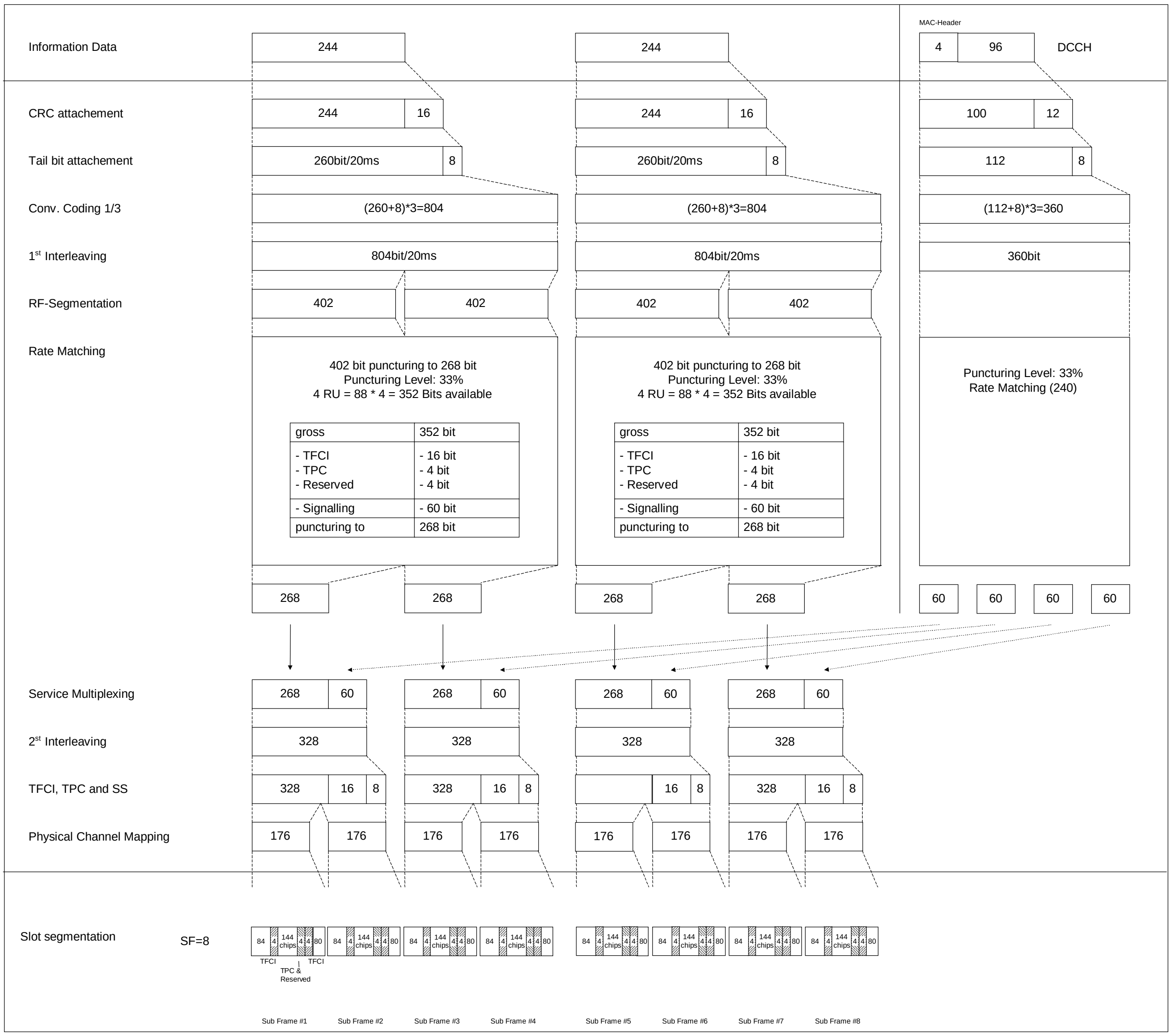
Parameter	
Information data rate	12.2 kbps
RU´s allocated	2 RU
Midamble	512 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH / DCCH	5% / 0 %



A2.2 1.28 Mcps TDD Option

A.2.2.1 UL reference measurement channel (12.2 kbps)

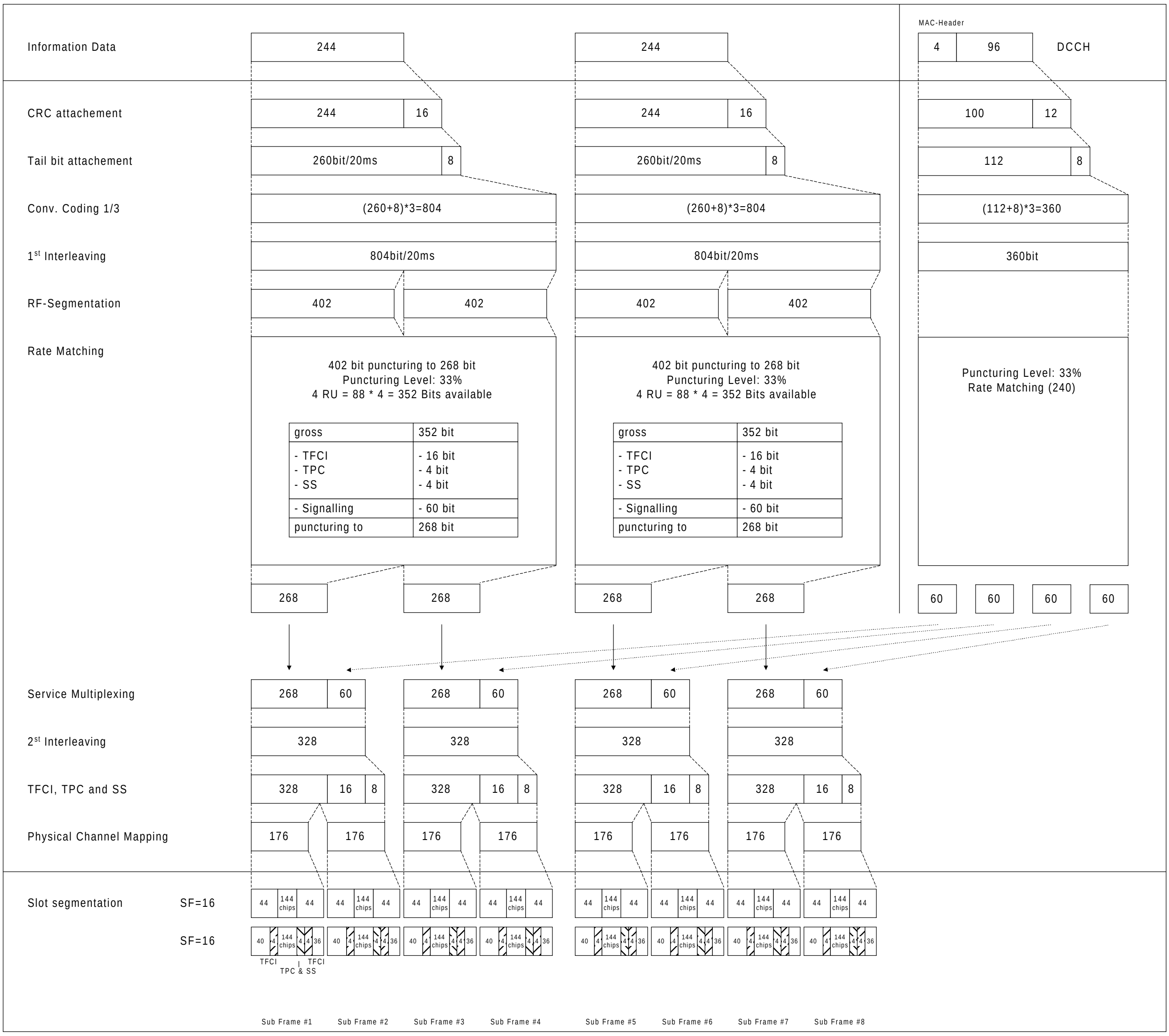
Parameter	
Information data rate	12.2 kbps
RU's allocated	1TS (1*SF8) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
4 Bit reserved for future use (place of SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH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



A.2.2.2 DL reference measurement channel (12.2 kbps)

Parameter	
Information data rate	12.2 kbps
RU's allocated	1TS (2*SF16) = 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

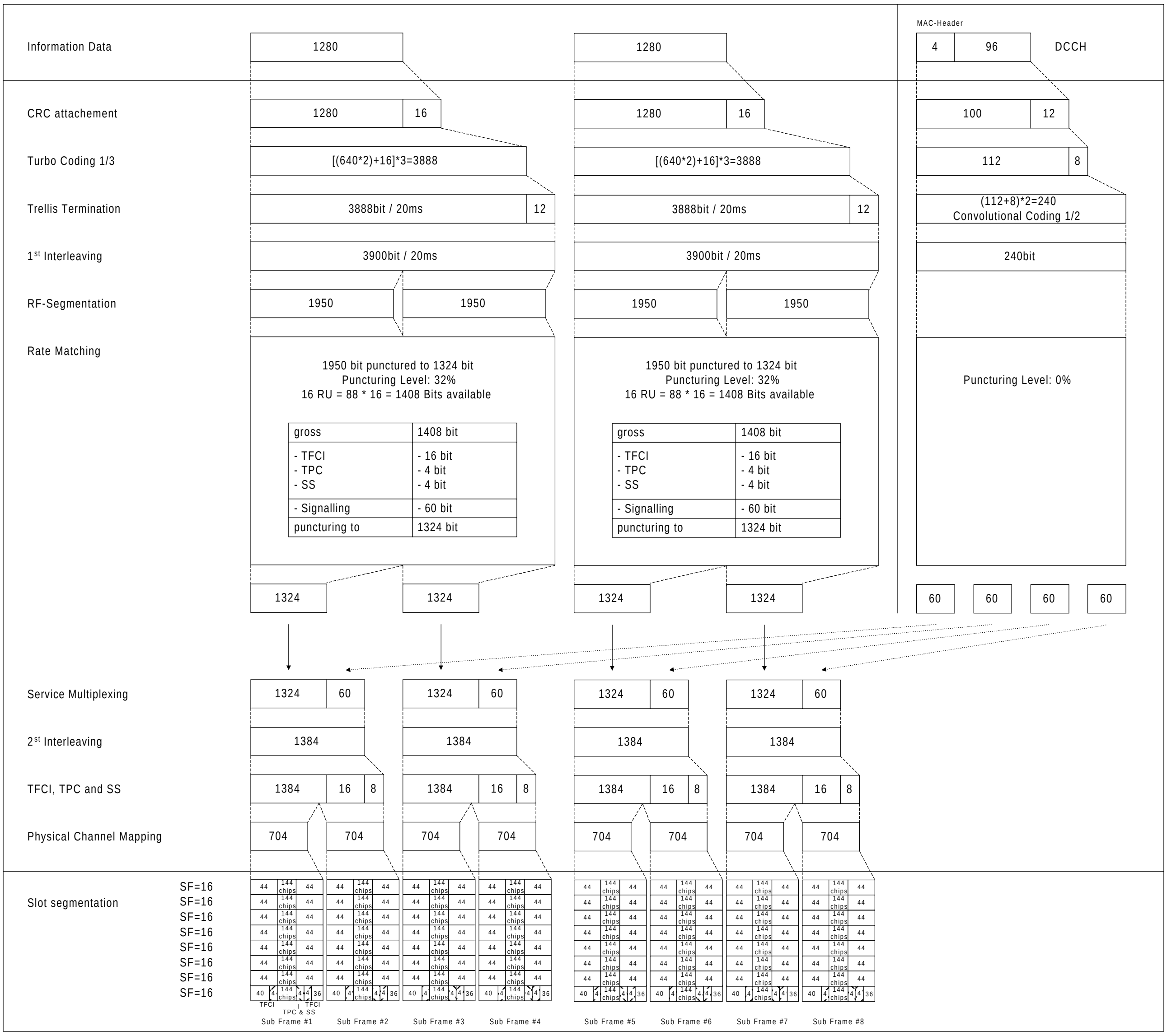
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH / DCCH	33% / 33%



A.2.2.32 DL reference measurement channel (64 kbps)

Parameter	
Information data rate	64 kbps
RU's allocated	1TS (8*SF16) = 8RU/5ms
Midamble	144
Interleaving	20 ms

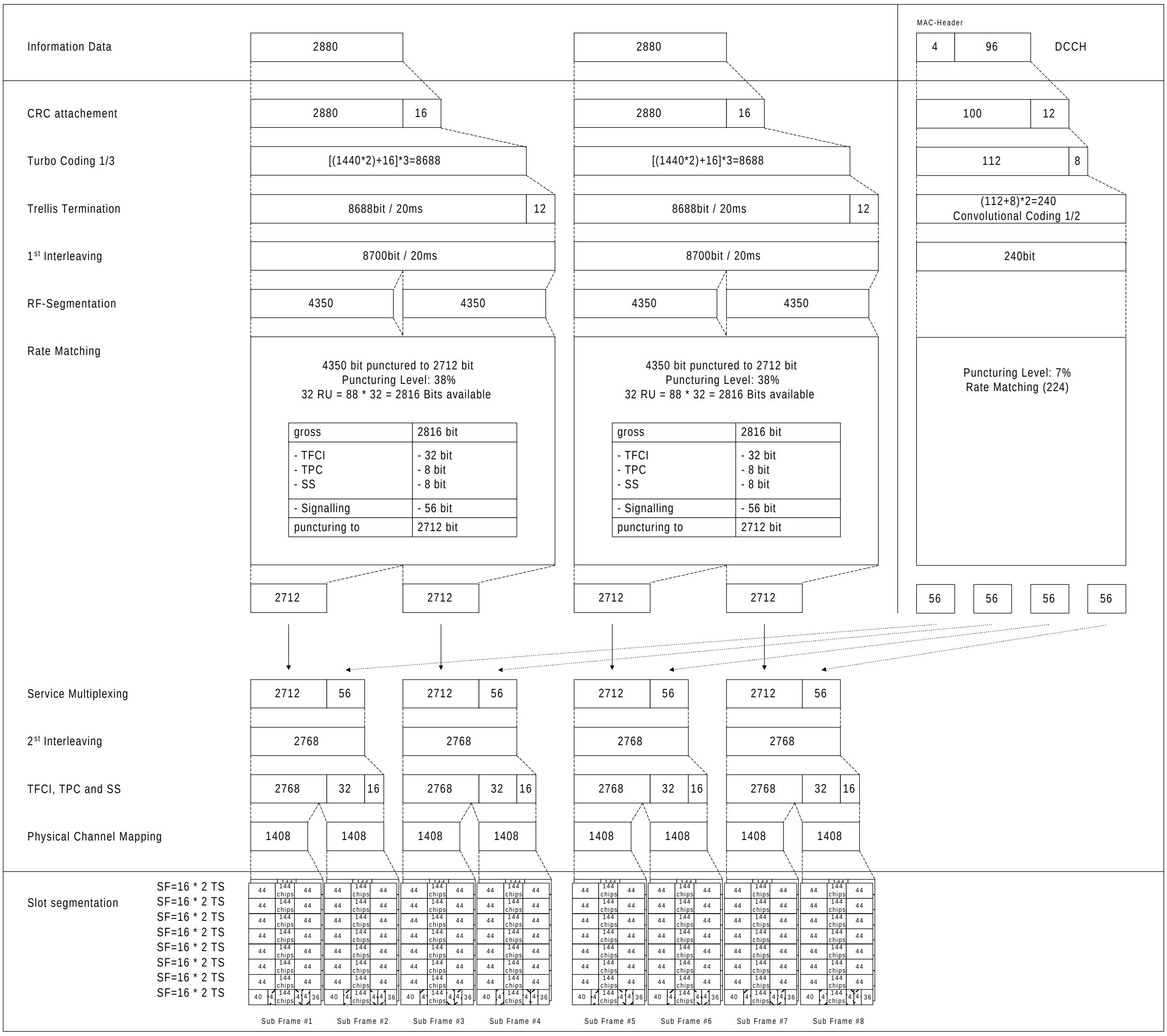
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	32% / 0



A.2.2.43 DL reference measurement channel (144 kbps)

Parameter	
Information data rate	144 kbps
RU's allocated	2TS (8*SF16) = 16RU/5ms
Midamble	144

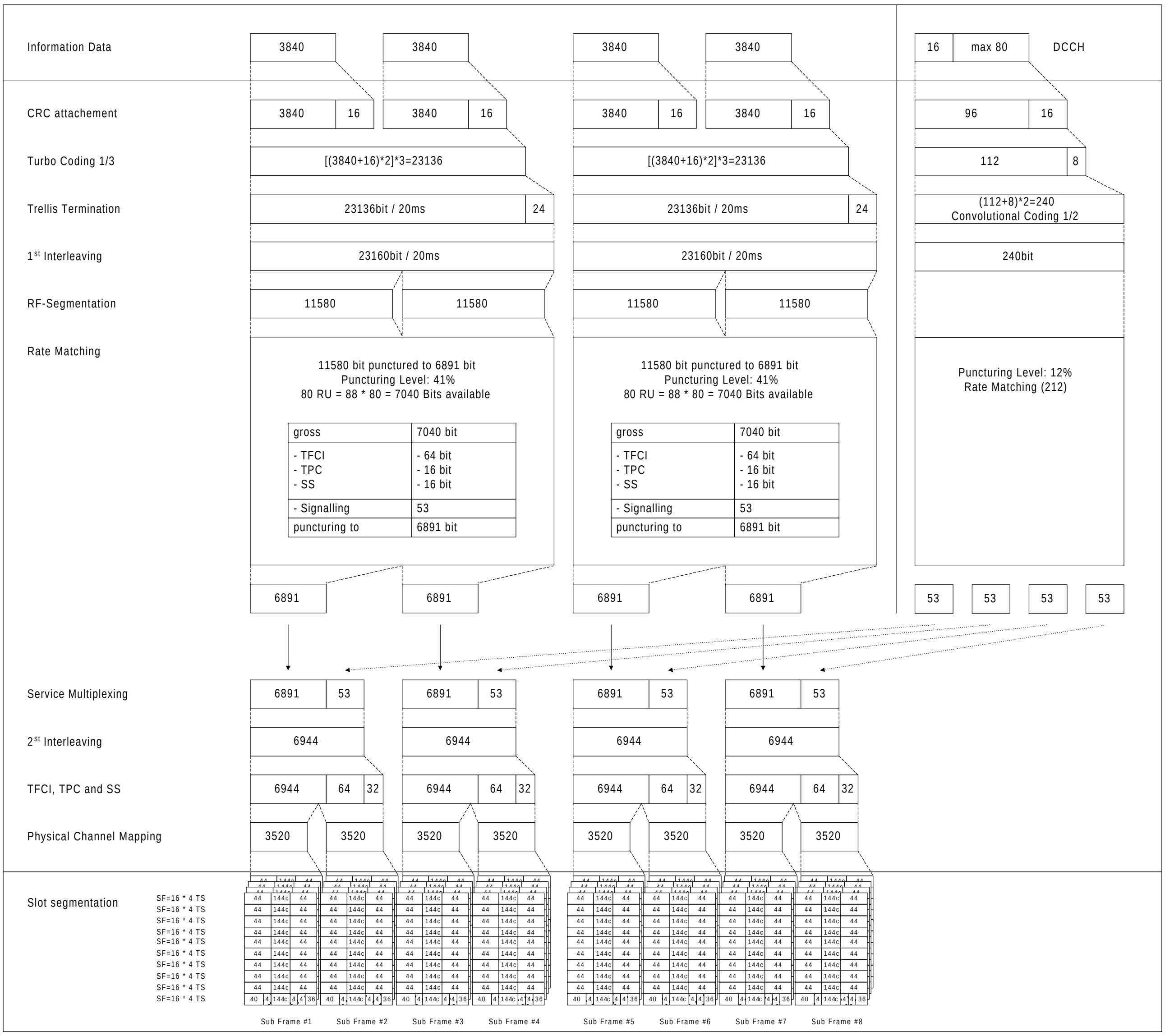
Interleaving	20 ms
Power control (TPC)	8 Bit/user/10ms
TFCI	32 Bit/user/10ms
Synchronisation Shift (SS)	8 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	38% / 7%



A.2.2.54 DL reference measurement channel (384 kbps)

Parameter	
Information data rate	384 kbps
RU's allocated	4TS (10*SF16) = 40RU/5ms

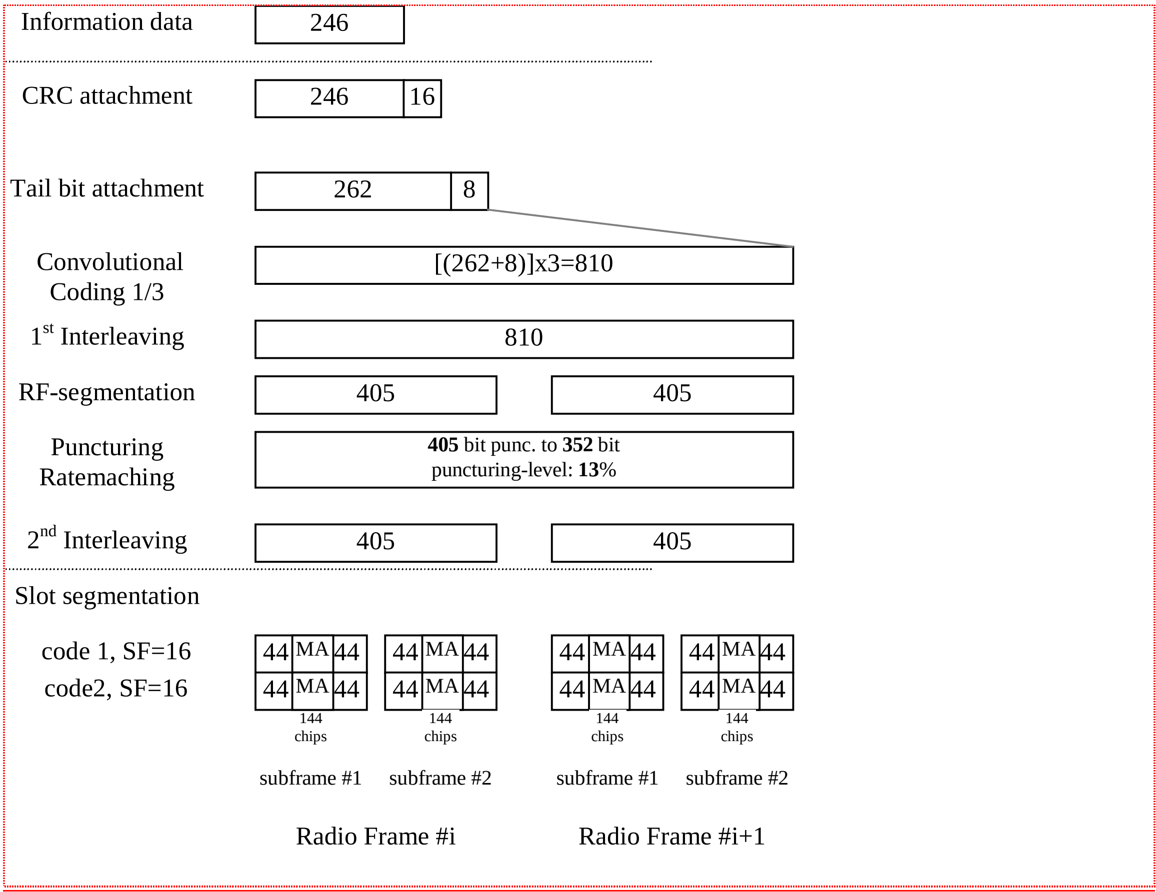
Midamble	144
Interleaving	20 ms
Power control (TPC)	16 Bit/user/10ms
TFCI	64 Bit/user/10ms
Synchronisation Shift (SS)	16 Bit/user/10ms
Inband signalling DCCH	max.2 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	41% / 12%



A.2.2.6 BCH reference measurement channel

[mapped to 2 code SF16]

Parameter	
Information data rate:	12.3 kbps
RU´s allocated	2 RU
Midamble	144 chips
Interleaving	20 ms
Power control	0 bit
TFCI	0 bit
Puncturing level	13%



A.2.2.7 UL multi code reference measurement channel (12.2 kbps)

Parameter	
Information data rate	12.2 kbps

RU's allocated	1TS (2*SF16) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
4 Bit reserved for future use (place of SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH / DCCH	33% / 33%

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 3.84Mcps TDD Option

Table B2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table B2: Propagation Conditions for Multi path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3 km/h		Case 3, 120 km/h		Case 4, 3 km/h	
Relative Delay [ns]	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**
0	0	0	0	0	0	0	0
976	-10	976	0	260	-3	976	0
		12000	0	521	-6		
				781	-9		

B.2.2 1.28Mcps TDD Option

Table B3 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table B3: 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 (normative): Environmental conditions

C.1 General

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

C.2 Environmental requirements for the UE

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

C.2.1 Temperature

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

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

Outside this temperature range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in S25.102 for extreme operation.

C.2.2 Voltage

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

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

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

Outside this voltage range the UE if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in S4.01A for extreme operation. In particular, the UE shall inhibit all RF transmissions when the power supply voltage is below the manufacturer declared shutdown voltage.

C.2.3 Vibration

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

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

Outside the specified frequency range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in S4.01A for extreme operation.

Annex D (informative): Terminal capabilities (TDD)

This section provides the UE capabilities related to 25.102.

This section shall be aligned with TS25.306, UE Radio Access Capabilities regarding TDD RF parameters. These RF UE Radio Access capabilities represent options in the UE, that require signalling to the network.

Table D.1 provides the list of UE radio access capability parameters and possible values for 25.102

Table D.1: RF UE Radio Access Capabilities	**UE radio access capability parameter**	**Value range**
TDD RF parameters	UE power class (25.102 section 6.2.1)	2, 3 NOTE: Only power classes 2 and 3 are part of R99
	Radio frequency bands (25.102 section 5.2)	a), b), c), a+b), a+c), a+b+c)
	Chip rate capability (25.102)	3.84Mcps,1.28Mcps respectively

~~Notes:~~

~~This section shall be aligned with TR25.926, UE Radio Access Capabilities regarding TDD RF parameters. These RF UE Radio Access capabilities represent options in the UE, that require signalling to the network.~~

~~Table D.1 provides the list of UE radio access capability parameters and possible values for 25.102~~

~~Table D.1: RF UE Radio Access Capabilities~~	~~**UE radio access capability parameter**~~	~~**Value range**~~
~~TDD RF parameters~~	~~UE power class~~ ~~(25.102 section 6.2.1)~~	~~2, 3~~
	~~Radio frequency bands~~ ~~(25.102 section 5.2)~~	~~a) lower band, a) upper band, a), b), c)~~

Annex E (informative): Change request history

CRs approved at TSG#6.

RAN doc	Spec	CR	Re	Phas	Subject	Cat	Current	New
RP-99775	25.102	001		R99	Corrections to 25.102 version 3.0.0	F	3.0.0	3.1.0
RP-99774	25.102	004		R99	Open item list in Annex D of 25.102v3.0.0	D	3.0.0	3.1.0
RP-99775	25.102	003		R99	Receiver spurious emissions for UE TDD	C	3.0.0	3.1.0
RP-99775	25.102	002		R99	TDD Uplink Power control requirements	F	3.0.0	3.1.0
RP-99775	25.102	005		R99	Change of propagation conditions recommendations	C	3.0.0	3.1.0
RP-99776	25.102	006		R99	Performance Requirements	B	3.0.0	3.1.0
RP-99775	25.102	007		R99	Corrections to 25.102 v.3.0.0	F	3.0.0	3.1.0
RP-99774	25.102	008		R99	Editorial changes to 25.102v3.0.0	D	3.0.0	3.1.0
RP-99776	25.102	009		R99	Peak Code Domain Error	B	3.0.0	3.1.0
RP-99775	25.102	010		R99	TDD uplink power control requirements	C	3.0.0	3.1.0
RP-99775	25.102	011		R99	Update of ITU Region 2 Specific Specifications and	C	3.0.0	3.1.0
RP-99776	25.102	012		R99	Transmit Template, should to shall	B	3.0.0	3.1.0
RP-99775	25.102	013		R99	UE power classes	F	3.0.0	3.1.0
RP-99775	25.102	014		R99	Update of UE RF capabilities	F	3.0.0	3.1.0

CRs approved at TSG#7.

RAN doc	Spec	CR	Rev	Phas	Subject	Cat	Current	New
RP-000016	25.102	015		R99	Description of Signal Levels for Receiver	D	3.1.0	3.2.0
RP-000016	25.102	016		R99	Editorial corrections	D	3.1.0	3.2.0
RP-000016	25.102	017		R99	Spurious emission correction	F	3.1.0	3.2.0
RP-000016	25.102	018		R99	Performance requirement for base station transmit	C	3.1.0	3.2.0
RP-000016	25.102	019		R99	Corrections for UE TDD Blocking Requirements	F	3.1.0	3.2.0
RP-000016	25.102	020		R99	Correction to the UL power control “differential	F	3.1.0	3.2.0
RP-000016	25.102	021		R99	Clarification of ACLR	F	3.1.0	3.2.0
RP-000016	25.102	022		R99	Clock Accuracy	C	3.1.0	3.2.0
RP-000016	25.102	023		R99	Peak Code Domain Error	C	3.1.0	3.2.0
RP-000016	25.102	024		R99	Modulation Accuracy	C	3.1.0	3.2.0
RP-000016	25.102	025		R99	Out-of-synchronization handling of the UE in TS	C	3.1.0	3.2.0

CRs approved at TSG#8.

RAN doc	Spec	CR	Rev	Phas	Subject	Cat	Current	New
RP-000205	25.102	026		R99	Correction of DL measurement channels for TDD-	F	3.2.0	3.3.0
RP-000205	25.102	027		R99	Reference Measurement Channel for UE Peak Code	F	3.2.0	3.3.0
RP-000205	25.102	028		R99	Correction for Uplink power control	F	3.2.0	3.3.0
RP-000205	25.102	029		R99	UE TDD P-CCPCH Block STTD performance	F	3.2.0	3.3.0
RP-000205	25.102	030		R99	Modification to the handling of UE TDD Measurement	F	3.2.0	3.3.0
RP-000205	25.102	031		R99	Clarification of the specification on Peak Code	F	3.2.0	3.3.0

CRs approved at TSG RAN #9

RAN doc	Spec	CR	Rev	Phas	Subject	Cat	Current	New
RP-000395	25.102	32		R99	Performance requirements with TFCI decoding for TDD UE	F	3.3.0	3.4.0
RP-000395	25.102	33		R99	Performance test for UE power control in downlink	F	3.3.0	3.4.0
RP-000395	25.102	34		R99	Definition of period for frequency error	F	3.3.0	3.4.0
RP-000395	25.102	35		R99	Handling of measurement uncertainties in UE radio conformance testing (TDD)	F	3.3.0	3.4.0

CRs approved at TSG RAN #10

RAN doc	Spec	CR	Rev	Phase	Subject	Cat	Current	New
R4-000788	25.102	36		R99	Correction for 25.102 concerning UE maximum output power classes	F	3.4.0	3.5.0
R4-000789	25.102	37		R99	Correction for 25.102 concerning the coexistence of TDD and FDD in the same band	F	3.4.0	3.5.0
R4-000830	25.102	38		R99	Correction of Out-of-Sync criteria in 25.102	F	3.4.0	3.5.0
R4-000939	25.102	39		R99	Clarification of the mentioned parameter alpha	F	3.4.0	3.5.0
R4-000982	25.102	40		R99	Correction for 25.102 concerning the channel number calculation	F	3.4.0	3.5.0

3GPP TSG RAN WG4 Meeting #16 **R4-01-029**

Vienna, Austria 19th - 23rd February 2001

CR-Form-v3

CHANGE REQUEST

⌘	**25.105**	**CR**	**52**	⌘ rev	**-**	⌘ Current version:	**3.5.0**	⌘

For ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title: ⌘	UTRA (BS) TDD; Radio transmission and Reception			
Source: ⌘	RAN WG4			
Work item code: ⌘	LCRTDD-RF		***Date:*** ⌘	19 February 2001
Category: ⌘	**B**		***Release:*** ⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change: ⌘	This CR collects the principally agreed wording of the changes necessary for introducing the feature '1.28Mcps TDD option' in the TS25.105. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.
Summary of change: ⌘	Based on the approved contents of TR25.945, the '1.28Mcps TDD option' related descriptions are added in the corresponding sections in existing TS25.105
Consequences if not approved: ⌘	

Clauses affected: ⌘		
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications	
Other comments: ⌘		

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3GPP TS 25.105 V3.5.0 (2000-12)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Radio Access Networks;
UTRA (BS) TDD; Radio transmission and Reception
(Release 1999)

Keywords

UMTS, radio, base station, TDM

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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:

Version 3.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

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 boths 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.

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ITU-R Recommendation SM.329-7 "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 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 Test tolerances

The 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 then added to the limits in this specification to create test limits. The measurement results are compared against the test limits 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.329-7 [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.329-7 [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.

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 respectively.

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 3,84Mcps 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 1,28Mcps 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 3,84Mcps 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 1,28Mcps 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:

$N_t = 5 * F$ $\quad 0.0 \le F \le 3276.6$ MHz $\quad$ 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

6.3.1.1 3,84Mcps TDD Option

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.

6.3.1.2 1,28Mcps TDD Option

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

6.5.1.1.1 3,84Mcps TDD Option

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 α=0.22 and a bandwidth equal to the chip rate.

6.5.1.1.2 1,28Mcps TDD Option

The requirement of transmitOFF power shall be better than –82 dBm measured with a filter that has a Root Raised Cosine (RRC) filter response with a roll off α=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 3,84Mcps TDD Option

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

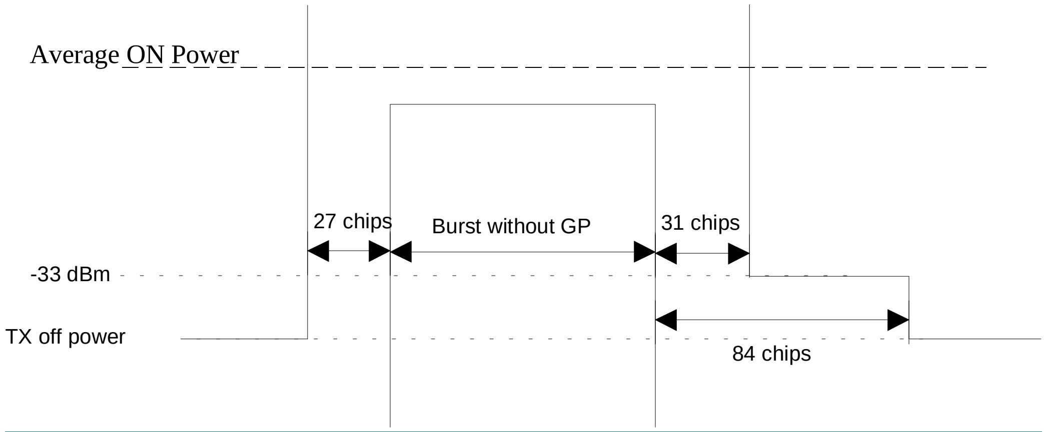


Figure 6.1: Transmit ON/OFF template

6.5.2.1.2 1,28Mcps TDD Option

The transmit power level versus time should meet the mask specified in figure6.2.

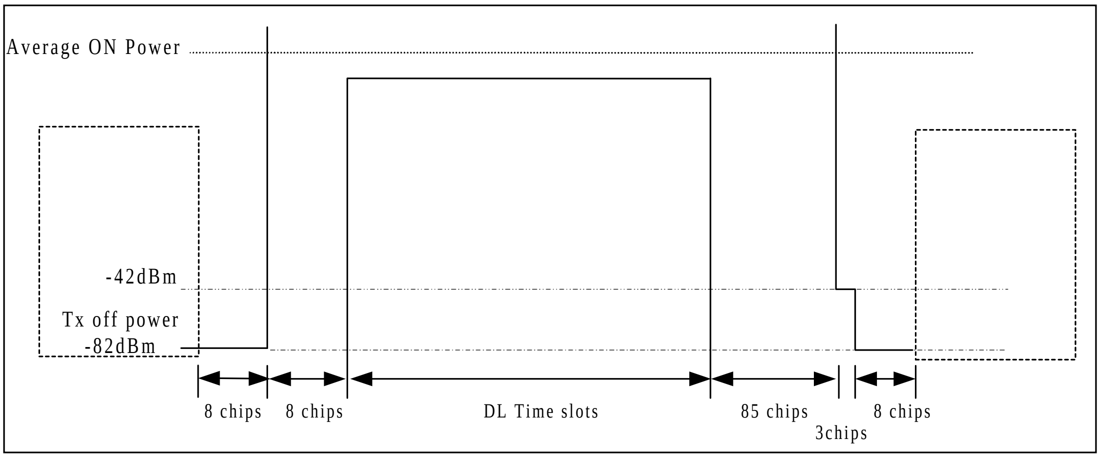


Figure 6.2 Transmit ON/OFF template

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

6.6.1.1 3,84Mcps 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 1,28Mcps 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.

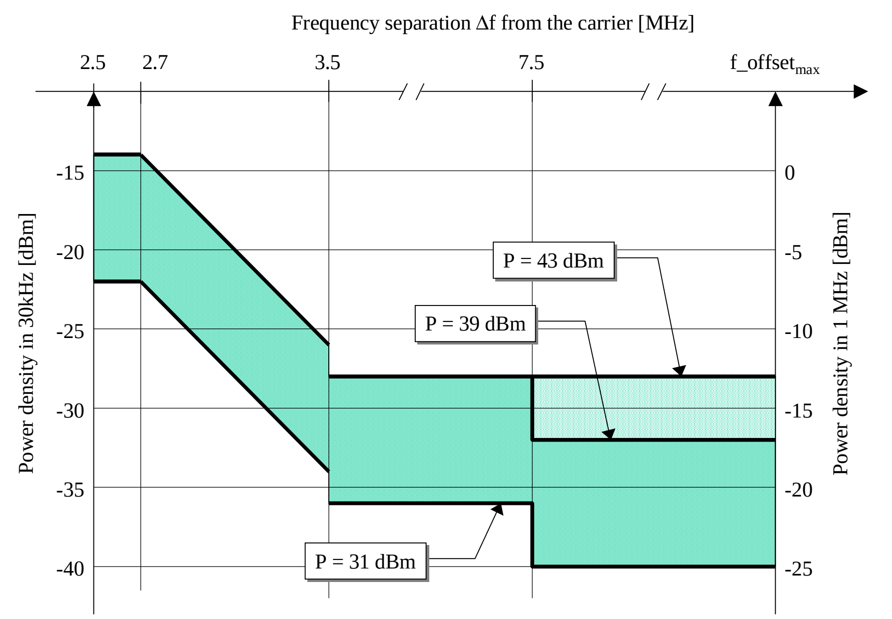
6.6.2.1 Spectrum emission mask

6.6.2.1.1 3,84Mcps 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 Δf = 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.



Illustrative diagram of spectrum emission mask

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
	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

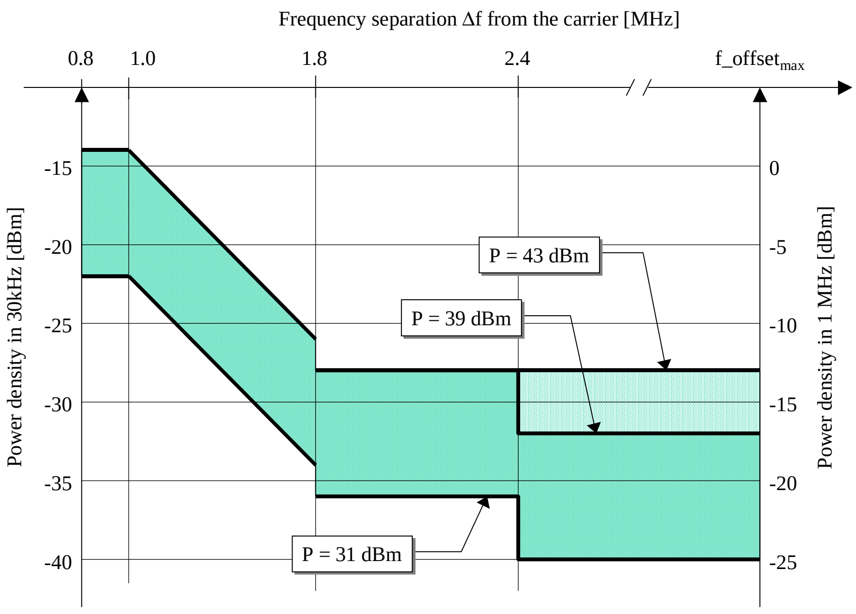
NOTE: This frequency range ensures that the range of values of f_offset is continuous.

6.6.2.1.2 1,28Mcps TDD Option

The mask defined in Table 6.7 to 6.10 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 6.7 to 6.10 for the appropriate BS maximum output power, in the frequency range from Δf = 0.8 MHz to f_offset_{max} from the carrier frequency, where:

- 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.



Illustrative diagram of spectrum emission mask

Table 6.7: 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
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	-14 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	- 14 - 15·(f_offset – 1.015) dBm	30 kHz
See note	1.815MHz ≤ f_offset < 2.3MHz	-28 dBm	30 kHz
1.8 ≤ Δf MHz	2.3MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.8: 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
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	-14 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	-14 - 15·(f_offset – 1.015)	30 kHz

		dBm	
1.8 ≤ Δf < 2.4 MHz	1.815MHz ≤ f_offset < 2.415MHz	-28 dBm	30 kHz
See note	2.415MHz ≤ f_offset < 2.9MHz	P-71 dBm	30 kHz
2.4 ≤ Δf MHz	2.9MHz ≤ f_offset < f_offset$_{max}$	P - 56 dBm	1 MHz

Table 6.9: 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
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	P - 53 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	P - 53 - 15·(f_offset – 1.015) dBm	30 kHz
1.8 ≤ Δf < 2.4 MHz	1.815MHz ≤ f_offset < 2.415MHz	P - 67 dBm	30 kHz
See note	2.415MHz ≤ f_offset < 2.9MHz	P - 71 dBm	30 kHz
2.4 ≤ Δf MHz	2.9MHz ≤ f_offset < f_offset$_{max}$	P - 56 dBm	1 MHz

Table 6.10: 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
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	-22 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	-22 - 15·(f_offset – 1.015) dBm	30 kHz
1.8 ≤ Δf < 2.4 MHz	1.815MHz ≤ f_offset < 2.415MHz	-36 dBm	30 kHz
See note	2.415MHz ≤ f_offset < 2.9MHz	-40 dBm	30 kHz
2.4 ≤ Δf MHz	2.9MHz ≤ f_offset < f_offset$_{max}$	-25 dBm	1 MHz

- - f_offset$_{max}$ is either 4.0 MHz or the offset to the UMTS Tx band edge as defined in section 6.1.2 of TR25.945 whichever is the greater.

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.

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 3,84Mcps TDD Option

The ACLR shall be higher than the value specified in Table 6.11.

Table 6.11: BS ACLR

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

6.6.2.2.1.2 1,28Mcps TDD Option

For the 1.28Mcps chip rate option, the ACLR shall be better than the value specified in Table 6.12

Table 6.12: BS ACLR (1.28Mcps chip rate)

BS adjacent channel offset	ACLR limit
± 1.6 MHz	40 dB
± 3.2 MHz	50 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.

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

6.6.2.2.2.1 3,84Mcps 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 shall be higher than the value specified in Table 6.13.

Table 6.13: 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.

6.6.2.2.2.2 1,28Mcps 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 6.14.

Table 6.14: BS ACLR in case of operation in proximity

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas	Measurement Bandwidth

	the interference powers shall be summed at all antenna connectors)	
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

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

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

6.6.2.2.3.1 3,84Mcps 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 shall not exceed the limit in Table 6.15.

Table 6.15: 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

6.6.2.2.3.2 1,28Mcps 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 6.16.

Table 6.16 : BS ACLR in case of co-siting

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	-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

Or 1.28 Mcps TDD carrier		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

1. 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_{actual} is higher than 30dB, this requirement may be relaxed by the amount MCL_{actual} – 30dB.

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

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.329-7 [1], are applied.

6.6.3.1.1.1 Minimum Requirement

6.6.3.1.1.1.1 3,84Mcps TDD Option:

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. The power of any spurious emission shall not exceed:

Table 6.17: BS Mandatory spurious emissions limits, Category A

Band	Minimum requirement	Measurement Bandwidth	Note
9kHz – 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz		10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz		100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz – 12.75 GHz		1 MHz	Upper frequency as in ITU SM.329-7, s2.6

6.6.3.1.1.1.2 1,28Mcps TDD Option

either requirement applies at frequencies within the specified frequency ranges which are more than 4MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used. The power of any spurious emission shall not exceed:

Table 6.18: BS Mandatory spurious emissions limits, Category A

Band	Minimum requirement	Measurement Bandwidth	Note
9kHz – 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz		10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz		100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz – 12.75 GHz		1 MHz	Upper frequency as in ITU SM.329-7, s2.6

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.329-7 [1], are applied.

6.6.3.1.2.1 Minimum Requirement

6.6.3.1.2.1.1 3,84Mcps TDD Option

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. The power of any spurious emission shall not exceed:

Table 6.19: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz ↔ Fc1-60 MHz or Fl -10 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-7, s4.1
Fc1 - 60 MHz or Fl -10 MHz	-25 dBm	1 MHz	Specification in accordance with ITU-

whichever is the higher ↔ Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher*			R SM.329-7, s4.1
Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher* ↔ Fc2 + 50 MHz or Fu +10 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 50 MHz or Fu + 10 MHz *whichever is the lower* ↔ Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower* ↔ 12,5 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-7, s4.1. Upper frequency as in ITU-R SM.329-7, s2.6

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 1,28Mcps TDD Option:

either requirement applies at frequencies within the specified frequency ranges which are more than 4MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used. The power of any spurious emission shall not exceed:

Table 6.20: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz ↔ Fc1-19.2 MHz or Fl –3.2 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-7, s4.1

Fc1 – 19.2 MHz or Fl -3.2MHz *whichever is the higher* ⇔ Fc1 - 16 MHz or Fl –3.2 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc1 - 16 MHz or Fl –3.2 MHz *whichever is the higher* ⇔ Fc2 + 16 MHz or Fu +3.2 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 16 MHz or Fu + 3.2MHz *whichever is the lower* ⇔ Fc2 +19.2 MHz or Fu + 3.2MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 19.2 MHz or Fu +3.2 MHz *whichever is the lower* ⇔ 12,5 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-7, s4.1. Upper frequency as in ITU-R SM.329-7, s2.6

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 6.21: 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 6.22: 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 6.23: 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 6.24: 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 6.25: 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 6.26: 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

6.7.1.1 3,84Mcps TDD Option

The frequency of the interference signal shall be ±5 MHz, ±10 MHz and ±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 1,28Mcps TDD Option:

The frequency of the interference signal shall be ±1.6 MHz, ±3.2 MHz and ±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 α =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 α =0.22 and the T_c is the chip duration. : $T_C = \frac{1}{chiprate} \approx 0.26042 \mu s$

6.8.2 Modulation Accuracy

The modulation accuracy is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). It is the square root of the ratio of the mean error vector power to the mean reference signal power expressed as %. The measurement interval is one timeslot. The requirement is valid over the total power dynamic range as specified in section 6.4.3.

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 3,84Mcps 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 1,28Mcps TDD Option:

For the measurement channel specified in Annex A, the reference sensitivity level and performance of the BS shall be as specified in table7.2

Table7.2: 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 3,84Mcps TDD Option

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

Table 7.3: 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 1,28Mcps TDD Option:

The BER shall not exceed 0.001 for the parameters specified in Table7.4.

Table 7.4: 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 3,84Mcps TDD Option:

The BER shall not exceed 0.001 for the parameters specified in table 7.53.

Table 7.53 : 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 1,28Mcps TDD Option:

The BER shall not exceed 0.001 for the parameters specified in table7.6.

Table 7.6: 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 shall apply at all frequencies as specified in the tables below, using a 1MHz step size.

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

7.5.1 Minimum requirement

7.5.1.1 3,84Mcps TDD Option

Table 7.74 (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	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 7.74(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	-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 7.74(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	-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

7.5.1.2 1,28Mcps TDD Option

Table 7.8(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 7.8(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	-40 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.8(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	-40 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.

7.6.1 Minimum requirement:

7.6.1.1 3,84Mcps TDD Option

Table 7.95 : 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 1,28Mcps TDD Option

Table7.10: Intermodulation requirement

Interfering Signal Level	Offset	Type of Interfering Signal
- 48 dBm	3.2 MHz	CW signal
- 48 dBm	6.4 MHz	1,28Mcps 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 3,84Mcps TDD Option:

The power of any spurious emission shall not exceed:

Table 7.117.6 : 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.

7.7.1.2 1,28Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 7.12: 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 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.

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

8.2.1.1.1 3,84Mcps 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 $DPCH_o$		6	4	0	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-9	-9.5	0	0
I_{oc}	dBm/3.84 MHz	-89			
Information Data Rate	kbps	12.2	64	144	384

Table 8.3: Performance requirements in AWGN channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER Required E_b/N_0
1	-1.9	10^{-2}
2	-0.3	10^{-1}
	0.0	10^{-2}
3	0.0	10^{-1}
	0.2	10^{-2}
4	-0.5	10^{-1}
	-0.3	10^{-2}

8.2.1.1.2 1,28Mcps TDD Option

For the parameters specified in Table8.4 the BLER should not exceed the piece-wise linear BLER curve specified in Table8.5. These requirements are applicable for TFCS size 16.

Table 8.4: Parameters in static propagation conditions

Parameters	**Unit**	**Test 1**	**Test 2**	**Test 3**	**Test 4**
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	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

Table 8.5: Performance requirements in AWGN channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER Required E_b/N_0
1	0.6	10^{-2}
2	-0.9	10^{-1}
	-0.4	10^{-2}
3	-0.3	10^{-1}
	-0.1	10^{-2}
4	0.5	10^{-1}
	0.6	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 3,84Mcps TDD Option

For the parameters specified in Table 8.68.4 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.7.8.5. These requirements are applicable for TFCS size 16.

Table 8.68.4: 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			
Information Data Rate	kbps	12.2	64	144	384

Table 8.78.5: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.3	10^{-2}
2	5.5	10^{-1}
	9.4	10^{-2}
3	5.6	10^{-1}
	9.4	10^{-2}
4	5.5	10^{-1}
	8.7	10^{-2}

8.3.1.1.2 1,28Mcps 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 1 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	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

Table 8.9: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.4	10^{-2}
2	5.3	10^{-1}
	9.4	10^{-2}
3	5.7	10^{-1}
	10.1	10^{-2}
4	6.0	10^{-1}
	10.0	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 3,84Mcps TDD Option:

For the parameters specified in Table 8.108.6 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.118.7. These requirements are applicable for TFCS size 16.

Table 8.108.6: 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			
Information Data Rate	kbps	12.2	64	144	384

Table 8.118.7: Performance requirements in multipath Case 2 channel.

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

	2.8	10^{-2}
3	3.6	10^{-1}
	6.0	10^{-2}
4	3.0	10^{-1}
	5.4	10^{-2}

8.3.2.1.2 1,28Mcps TDD Option

For the parameters specified in Table 8.12 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.13. These requirements are applicable for TFCS size 16.

Table 8.12: Parameters in multipath Case 2 channel

Parameters	**Unit**	**Test 1**	**Test 2**	**Test 3**	**Test 4**
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	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

Table 8.13: Performance requirements in multipath Case 2 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.7	10^{-2}
2	3.6	10^{-1}
	5.9	10^{-2}
3	4.2	10^{-1}
	6.3	10^{-2}
4	4.6	10^{-1}
	6.0	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

8.3.3.1.1 3,84Mcps TDD Option

For the parameters specified in Table8.14 ~~8.8~~ the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.15~~8.9~~. These requirements are applicable for TFCS size 16.

Table 8.14~~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			
Information Data Rate	Kbps	12.2	64	144	384

Table 8.15~~8.9~~: Performance requirements in multipath Case 3 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER	
1	-0.6	10^{-2}	
2	0.7	10^{-1}	
	2.4	10^{-2}	
	3.8	10^{-3}	
3	3.9	10^{-1}	
	5.9	10^{-2}	
	7.3	10^{-3}	
4	2.8	10^{-1}	
	4.2	10^{-2}	
	4.8	10^{-3}	

8.3.3.1.2 1,28Mcps TDD Option

For the parameters specified in Table 8.16 the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.17. These requirements are applicable for TFCS size 16.

Table 8.16: Parameters in multipath Case 3 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	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

Table 8.17: Performance requirements in multipath Case 3 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	5.6	10^{-2}
2	3.2	10^{-1}
	4.6	10^{-2}
	5.9	10^{-3}
3	3.7	10^{-1}
	4.8	10^{-2}
	5.9	10^{-3}
4	4.2	10^{-1}
	5.1	10^{-2}
	5.9	10^{-3}

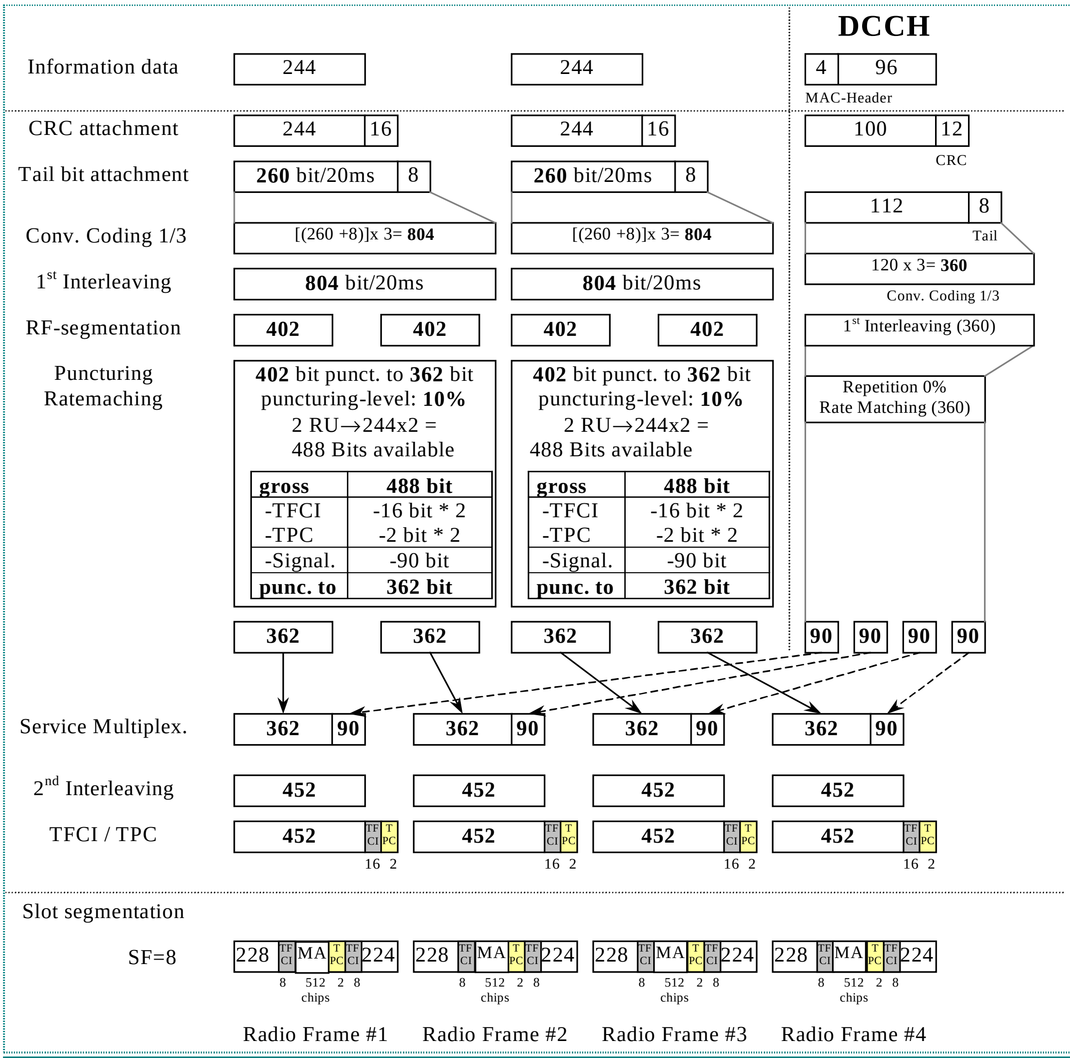
Annex A (normative): Measurement Channels

A.1 General

A.2 3,84Mcps TDD Option Reference measurement channel

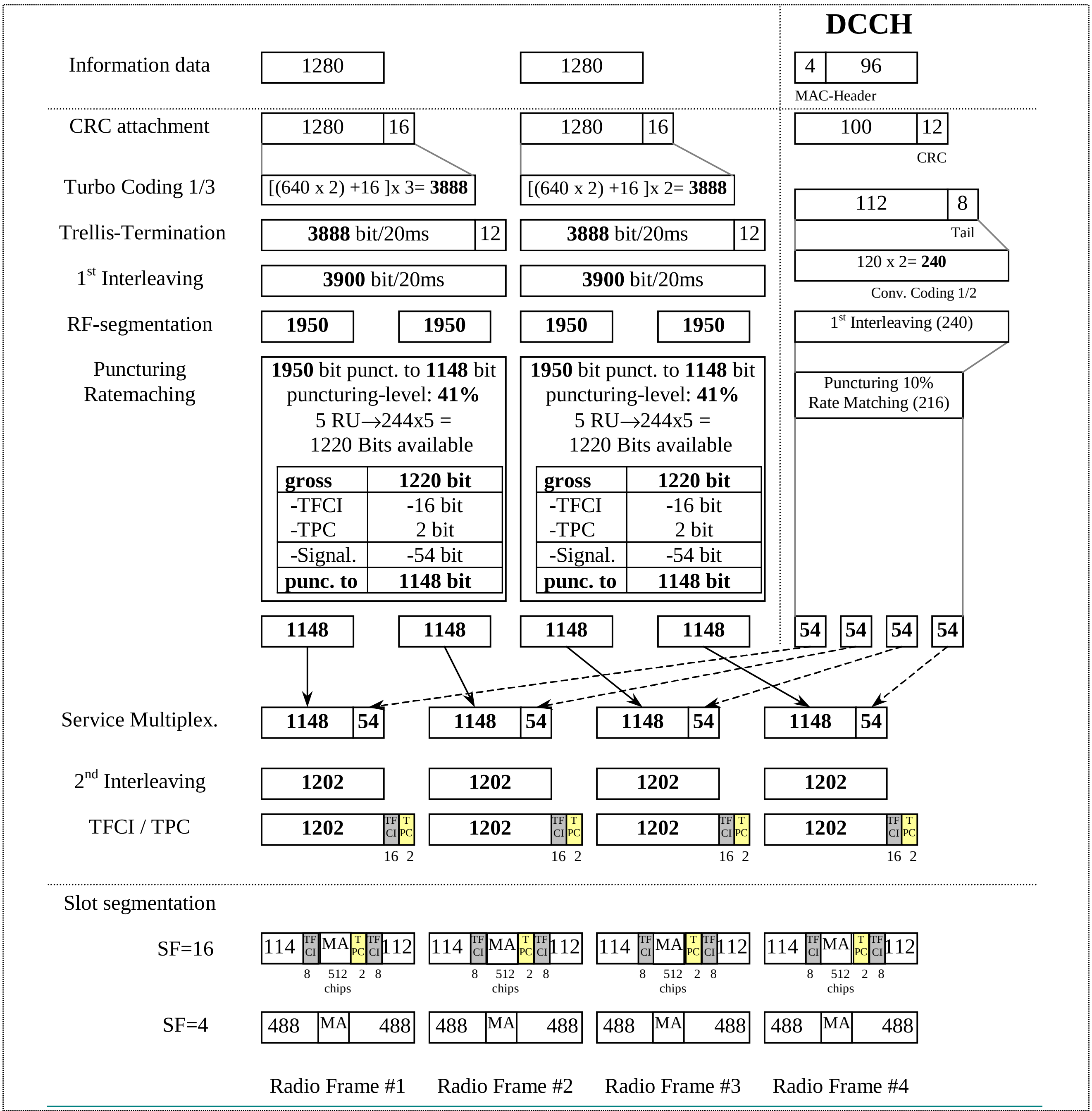
A.2.1 UL reference measurement channel (12.2 kbps)

Parameter	
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%



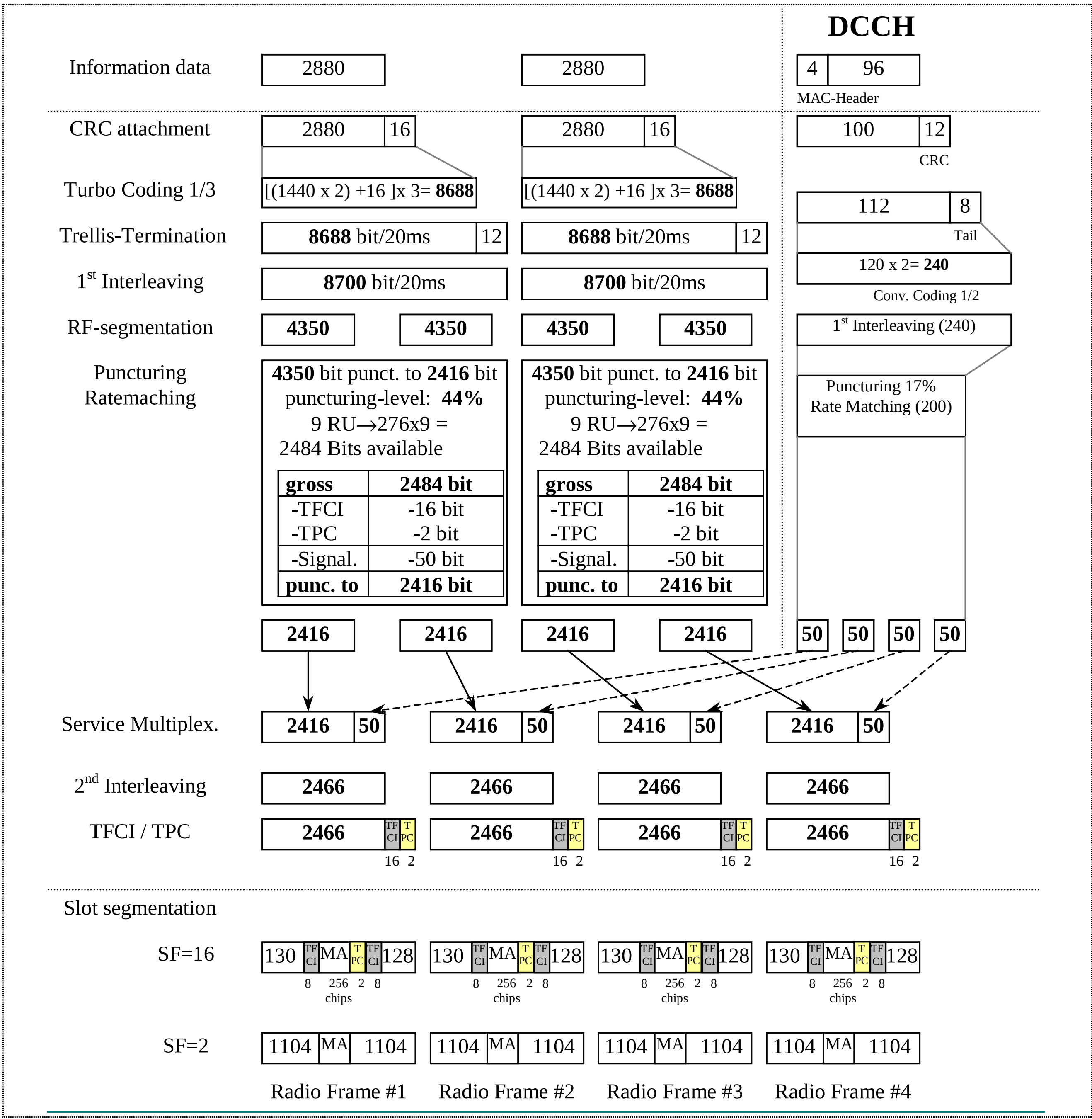
A.2.2 UL reference measurement channel (64 kbps)

Parameter	
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%



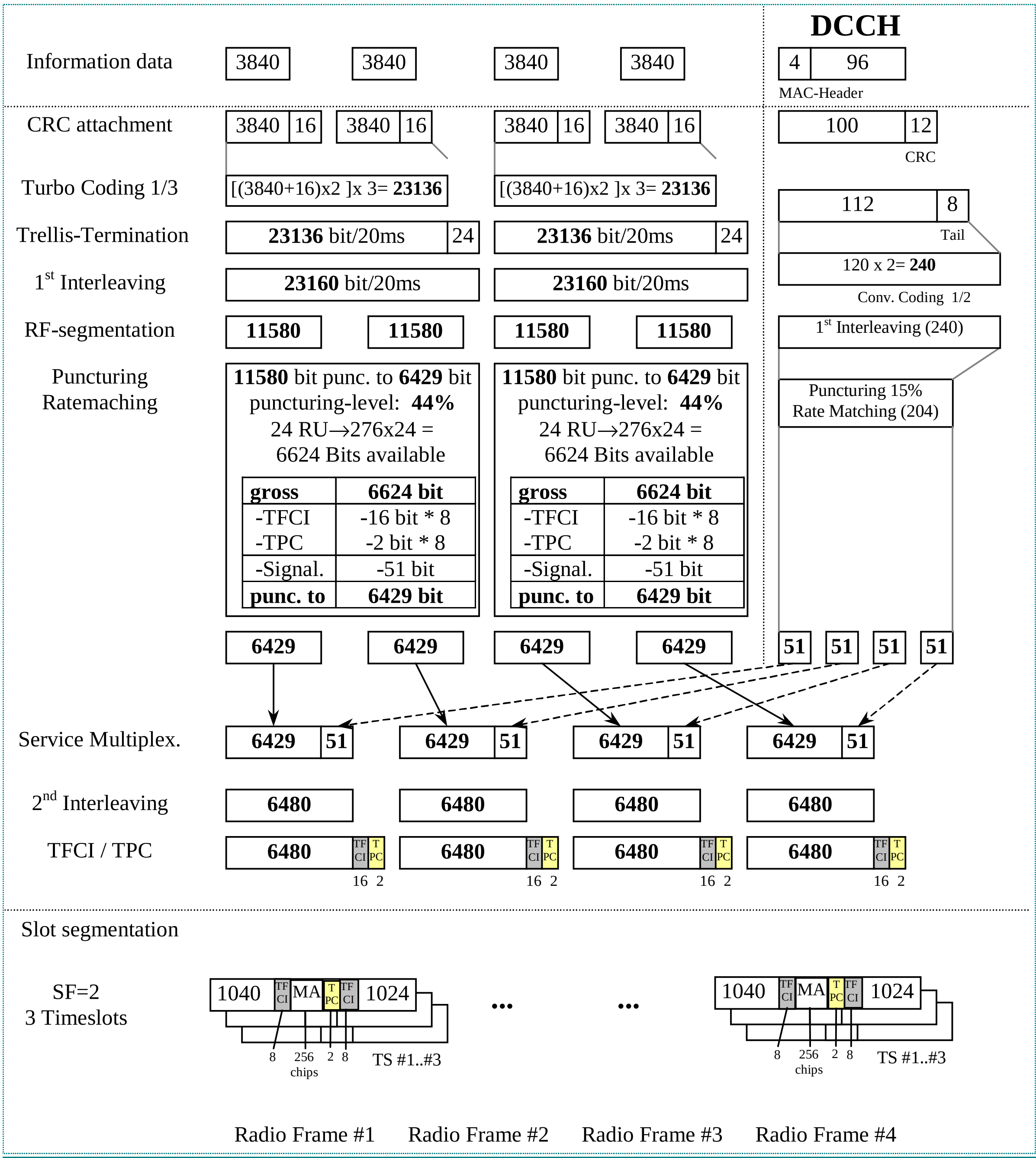
A.2.3 UL reference measurement channel (144 kbps)

Parameter	
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%



A.2.4 UL reference measurement channel (384 kbps)

Parameter	
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%



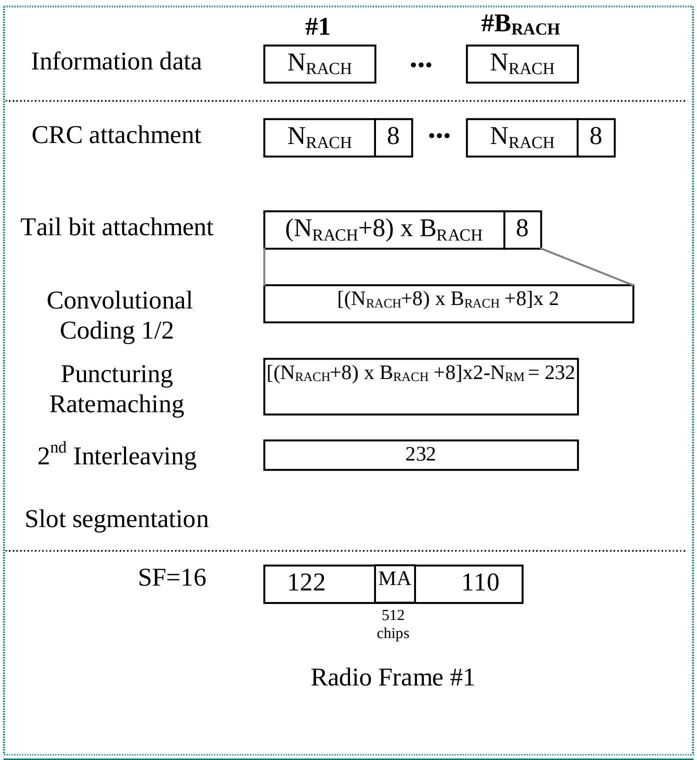
A.2.5 RACH reference measurement channel

Parameter	
Information data rate e.g. 2 TBs (B_{RACH}=2): **SF16:** 0% puncturing rate at CR=1/2 10% puncturing rate at CR=1/2 $N_{RACH} = \frac{\frac{232+N_{RM}}{2}-8}{B_{RACH}}-8$ **SF8:** 0% puncturing rate at CR=1/2 10% puncturing rate at CR=1/2 $N_{RACH} = \frac{\frac{464+N_{RM}}{2}-8}{B_{RACH}}-16$	 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

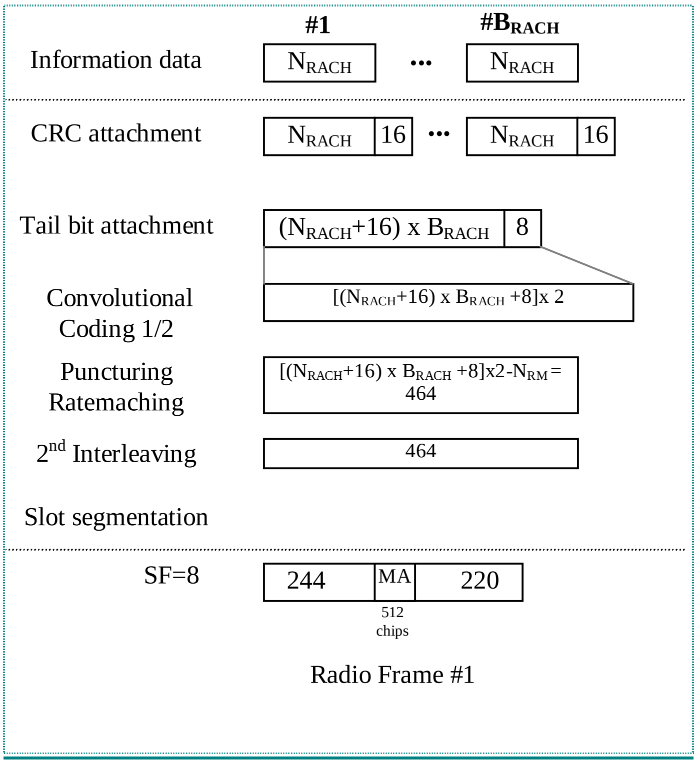
N_{RACH} = number of bits per TB

B_{RACH} = number of TBs

A.2.5.1 RACH mapped to 1 code SF16



A.2.5.2 RACH mapped to 1 code SF8



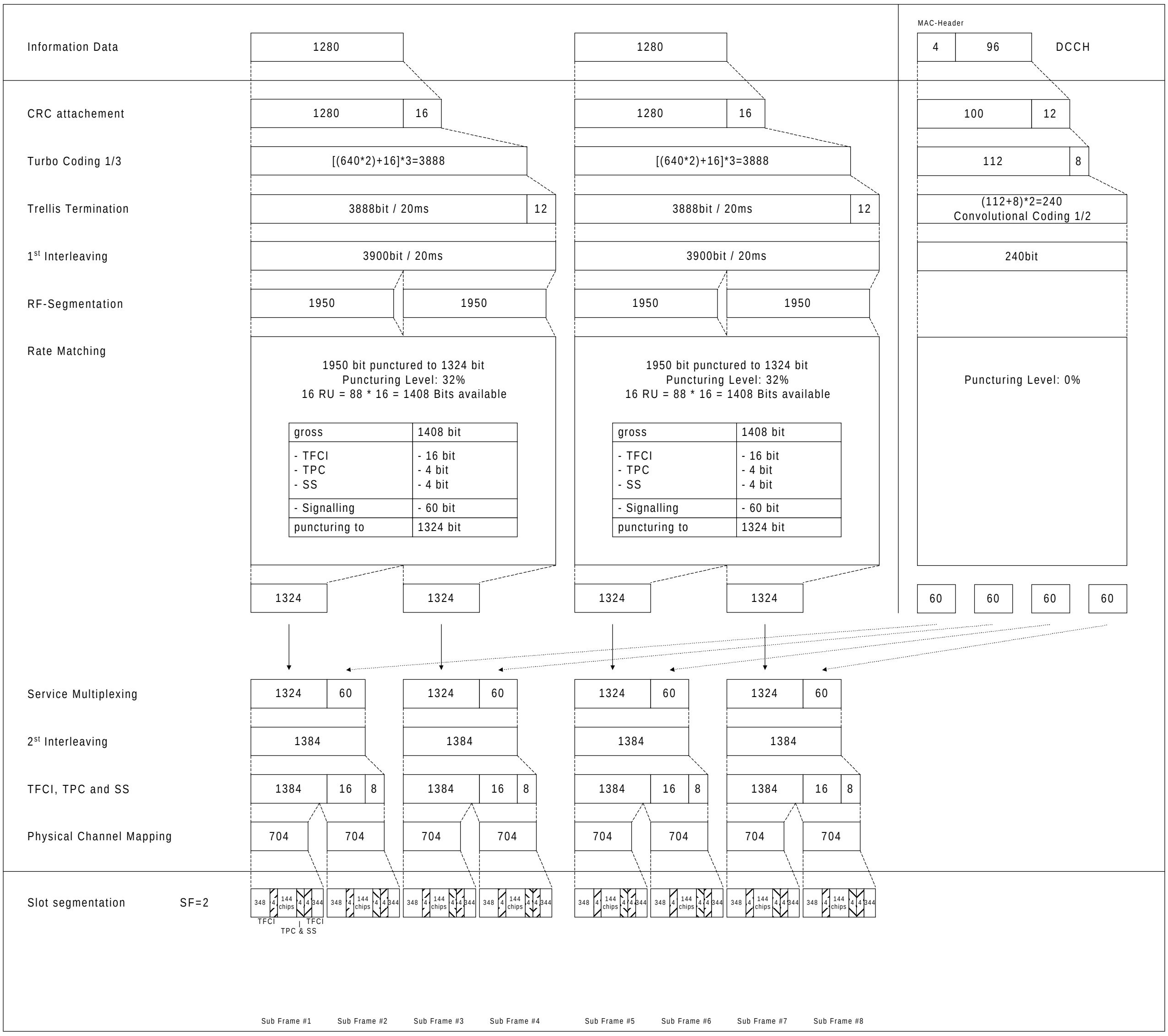
A.3 1,28Mcps TDD Option Reference measurement channels

A.3.1 UL reference measurement channel (12.2 kbps)

Parameter	
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%

A.3.2 UL reference measurement channel (64 kbps)

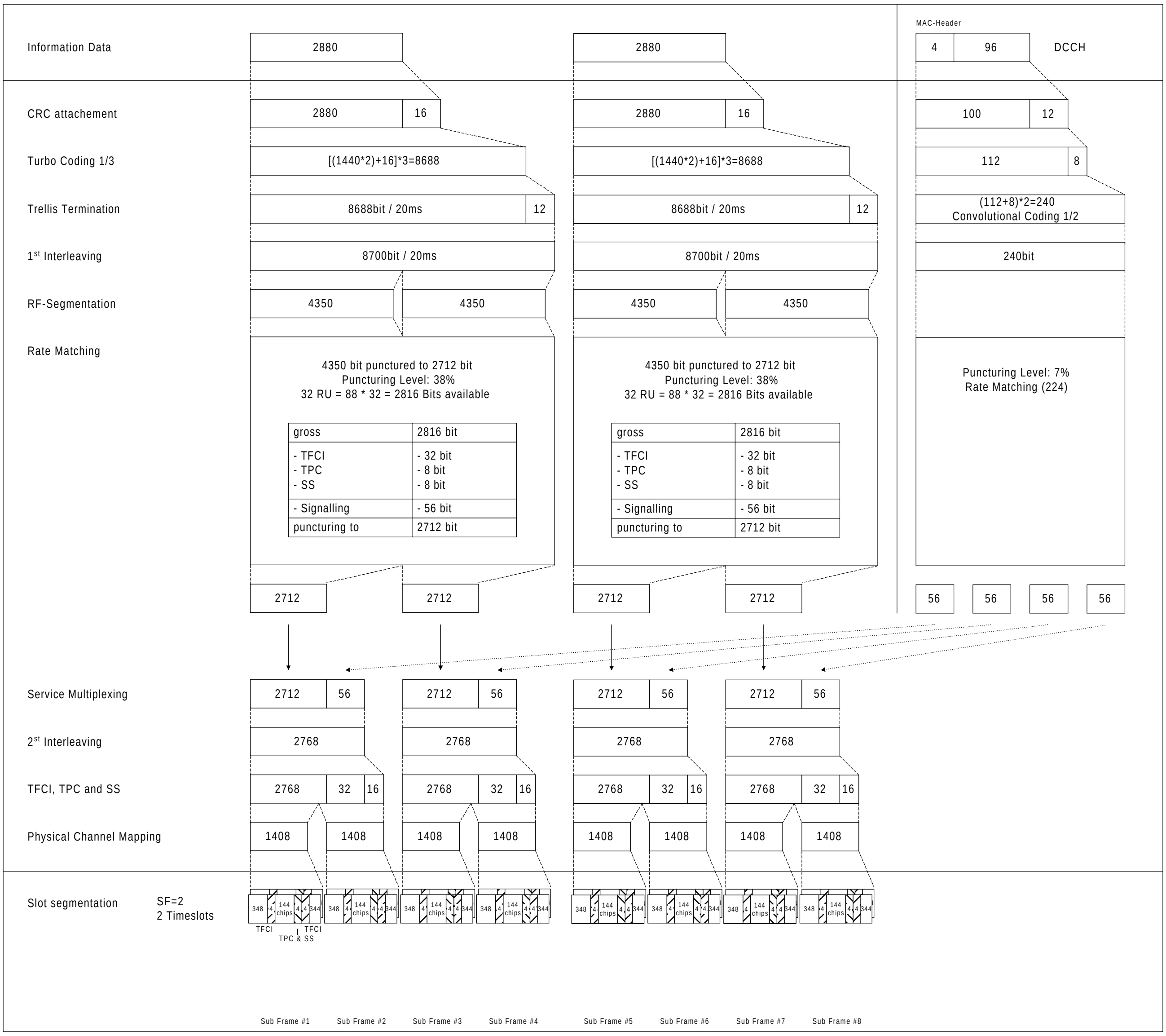
Parameter	
Information data rate	64 kbps
RU's allocated	1TS (1*SF2) = 8RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	32% / 0



A.3.3 UL reference measurement channel (144 kbps)

Parameter	
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

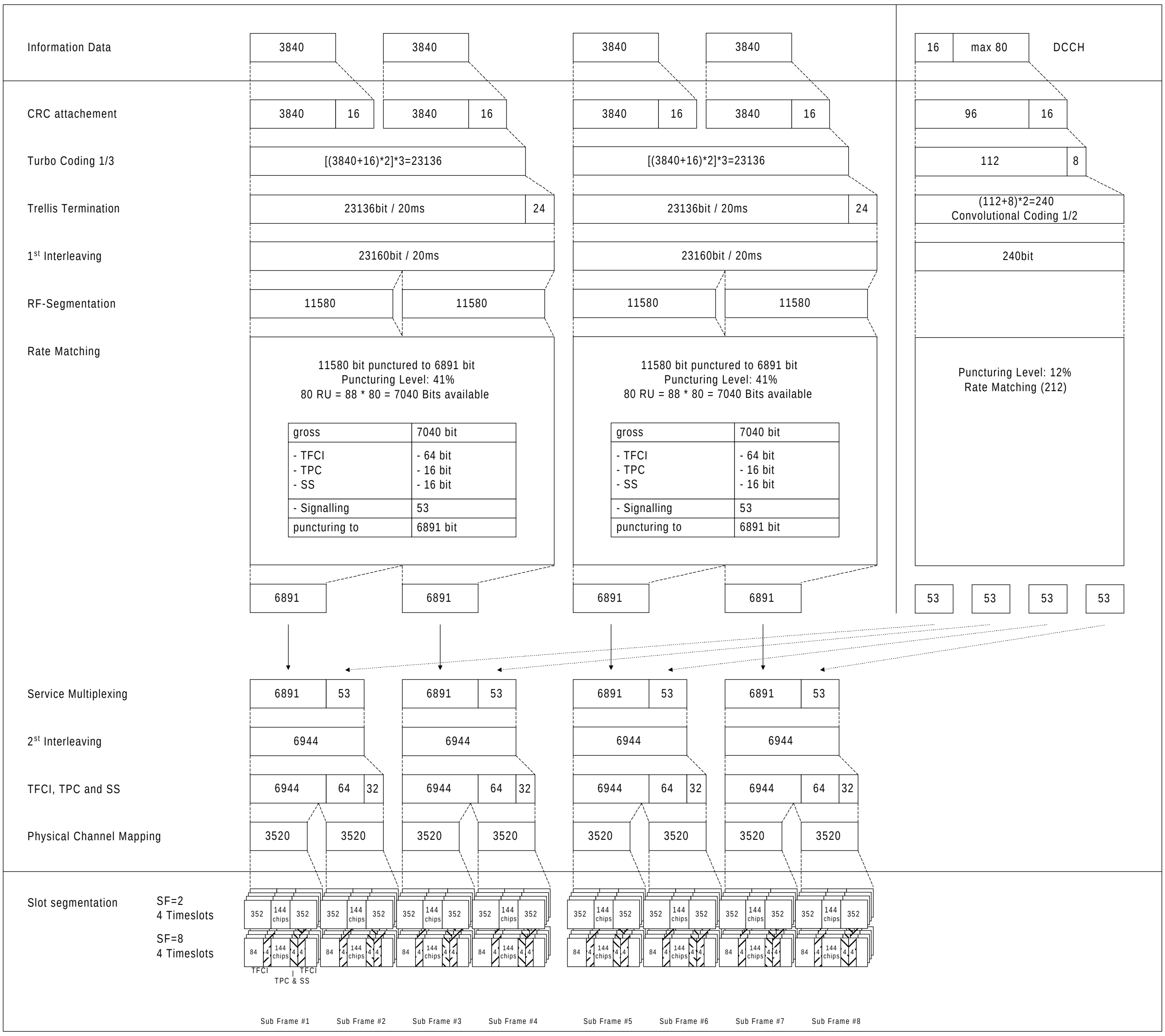
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	38% / 7%



A.3.4 UL reference measurement channel (384 kbps)

Parameter	
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 / ½ DCCH	41% / 12%



A.3.5 RACH reference measurement channel

Parameter	
Information data rate:	B_{RACH}=1

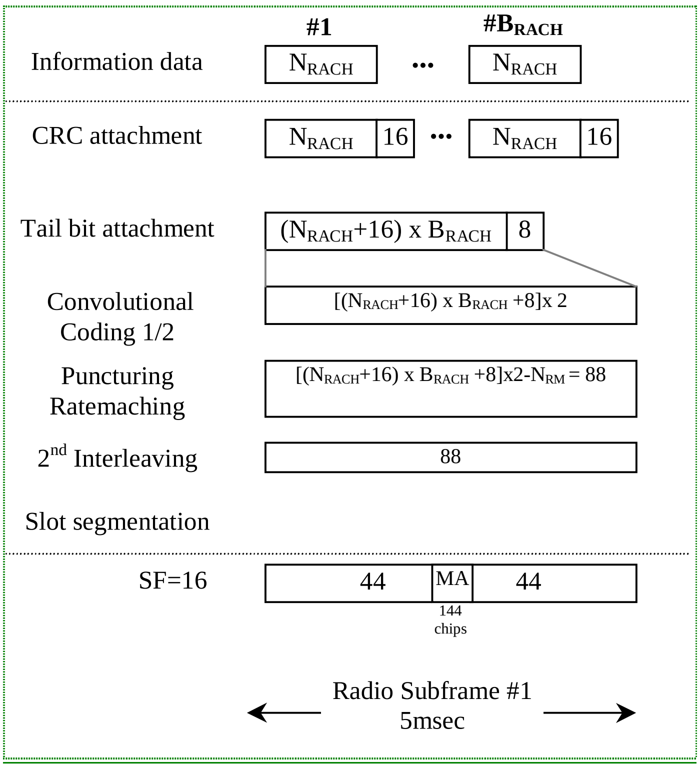
$N_{RACH} = \dfrac{\dfrac{88*\dfrac{16}{SF}\left(\dfrac{N_{RM}}{100}+1\right)}{2}-8}{B_{RACH}}-16$	CRC length = 16 Tail Bits = 8
SF16 (RU's allocated:1):	
0% puncturing rate at CR=1/2	20 bits per frame and TB
~10% puncturing rate at CR=1/2	24 bits per frame and TB
SF8 (RU's allocated:2):	
0% puncturing rate at CR=1/2	64 bits per frame and TB
~10% puncturing rate at CR=1/2	73 bits per frame and TB
SF4 (RU's allocated:4):	
0% puncturing rate at CR=1/2	152 bits per frame and TB
~10% puncturing rate at CR=1/2	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

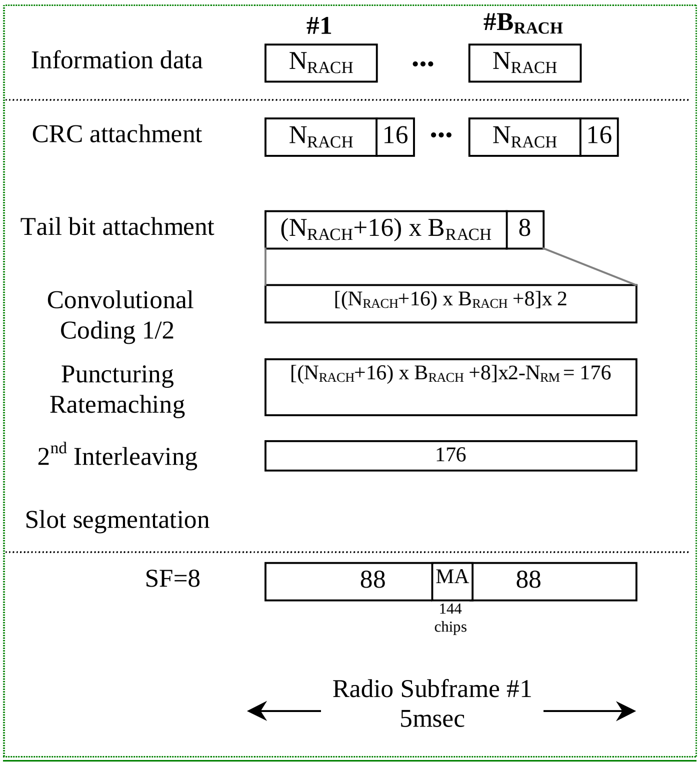
B_{RACH} = number of TBs

N_{RM} = puncturing rate

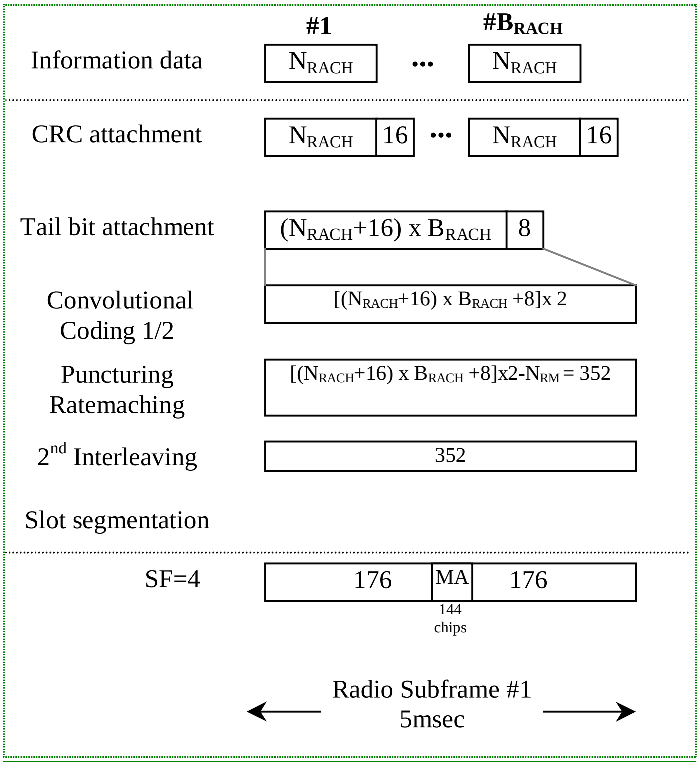
A.3.5.1 RACH mapped to 1 code SF16



A.3.5.2 RACH mapped to 1 code SF8



A.3.5.3 RACH mapped to 1 code SF4



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 3,84Mcps 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.

Table B1: 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 1,28Mcps TDD Option:

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

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

CRs approved at TSG#6

Doc-1st-	Spec	CR	Re	Phas	Subject	Cat	Versio	Versio
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	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	F	3.0.0	3.1.0
RP-99780	25.105	012		R99	Corrections to 25.105 v.3.0.0 (change ME to	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	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	B	3.0.0	3.1.0

CRs approved at TSG#7.

RAN doc	Spec	CR	Re	Phas	Subject	Cat	Current	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	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	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

CRs approved at TSG#8.

Doc-1st-	Spec	CR	Re	Phas	Subject	Cat	Versio	Versio
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	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	F	3.2.0	3.3.0

CRs approved at TSG#9.

Doc-1st-	Spec	CR	Re	Phas	Subject	Cat	Version	Versio
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

CRs approved at TSG#10

Doc-1st-	Spec	CR	Re	Phas	Subject	Cat	Version	Versio
RP-000397	25.105	46		R99	Correction for 25.105 concerning the channel	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

3GPP TSG RAN WG4 Meeting #16 **R4-01-029**

Vienna, Austria 19th - 23rd February 2001

CR-Form-v3

CHANGE REQUEST

⌘	TS 25.113	CR	10	⌘	rev	-	⌘	Current version:	3.4.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title:	⌘ Base station electromagnetic compatibility (EMC) for 1.28Mcps TDD			
Source:	⌘ RAN WG4			
Work item code:	⌘ LCRTDD-RF		***Date:*** ⌘	19 February 2001
Category:	⌘ **B**		***Release:*** ⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2* *(GSM Phase 2)*
- *R96* *(Release 1996)*
- *R97* *(Release 1997)*
- *R98* *(Release 1998)*
- *R99* *(Release 1999)*
- *REL-4* *(Release 4)*
- *REL-5* *(Release 5)*

Reason for change: ⌘	This CR collects the principally agreed wording of the changes necessary for introducing the feature '1.28Mcps TDD option' in the TS25.113. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.
Summary of change: ⌘	Based on the approved contents of TR25.945, the '1.28Mcps TDD option' related descriptions are added in the corresponding sections in existing TS25.113
Consequences if not approved: ⌘	

Clauses affected: ⌘	1; 4.3; A.1.3.1.2	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘		

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

1 Scope

The present document covers the assessment of base stations and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC).

The present document specifies the applicable test conditions, performance assessment and performance criteria for base stations and associated ancillary equipment in one of the following categories:

- base stations for the FDD mode of UTRA meeting the requirements of TS 25.104 [1], with conformance demonstrated by compliance to TS 25.141 [3].
- base stations for ~~the~~ both options of the TDD modes of UTRA meeting the requirements of TS 25.105 [2], with conformance demonstrated by compliance to TS 25.142 [4]. The two ~~modes~~ options are the 3,84Mcps ~~TDD~~ and 1,28Mcps ~~TDD~~ options respectively. The requirements are listed ~~only~~ in different subsections only if the parameters deviate.

Technical requirements related to the antenna port of base stations are not included in the present document. These are found in the relevant product standards [1], [2], [3], [4].

The environment classification used in the present document refers to the environment classification used in IEC 61000-6-1 [5] and IEC 61000-6-3 [6].

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

2 References

3 Definitions, symbols and abbreviations

4 Test conditions

4.1 General

4.2 Arrangements for establishing a communication link

4.3 Narrow band responses on receivers

4.3.1 FDD and 3,84Mcps TDD option

Responses on receivers or duplex transceivers occurring during the immunity test at discrete frequencies which are narrow band responses (spurious responses), are identified by the following method:

- if during an immunity test the quantity being monitored goes outside the specified tolerances (clause 6), it is necessary to establish whether the deviation is due to a narrow band response or to a wide band (EMC) phenomenon. Therefore, the test shall be repeated with the unwanted signal frequency increased, and then decreased by 10 MHz;
- if the deviation disappears in either or both of the above 10 MHz offset cases, then the response is considered as a narrow band response;

- if the deviation does not disappear, this may be due to the fact that the offset has made the frequency of the unwanted signal correspond to the frequency of another narrow band response. Under these circumstances the procedure is repeated with the increase and decrease of the frequency of the unwanted signal set to 12,5 MHz;
- if the deviation does not disappear with the increased and/or decreased frequency, the phenomenon is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses are disregarded.

4.3.2 1,28Mcps TDD option

For 1.28Mcps chip rate TDD option, responses on receivers or duplex transceivers occurring during the test at discrete frequencies which are narrow band responses (spurious responses), are identified by the following method:

- if during an immunity test the quantity being monitored goes outside the specified tolerances, it is necessary to establish whether the deviation is due to a narrow band response or to a wide band (EMC) phenomenon. Therefore, the test shall be repeated with the unwanted signal frequency increased, and then decreased by 3.2MHz;
- if the deviation disappears in either or both of the above 3.2 MHz offset cases, then the response is considered as a narrow band response;
- if the deviation does not disappear, this may be due to the fact that the offset has made the frequency of the unwanted signal correspond to the frequency of another narrow band response. Under these circumstances the procedure is repeated with the increase and decrease of the frequency of the unwanted signal set to 4MHz;
- if the deviation does not disappear with the increased and/or decreased frequency, the phenomenon is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses are disregarded.

5 Performance assessment

6 Performance Criteria

7 Applicability overview

Annex A (normative): Methods of measurement

Note: References cited in this annex relate to those listed in in clause A.3 of this annex, and not to the main references given in clause 2 above.

A.1 Emission

A.1.1 Methods of measurement and limits for EMC emissions

A.1.2 Test configurations

A.1.3 Radiated spurious emission from Base station and ancillary equipment

A.1.3.1 Radiated spurious emission, Base stations

This test is applicable to Base station. This test shall be performed on a representative configuration of the Base station.

A.1.3.1.1 Definition

This test assesses the ability of BS to limit unwanted emission from the enclosure port.

A.1.3.1.2 Test method

A.1.3.1.2.1 FDD and 3,84Mcps TDD option

a) A test site fulfilling the requirements of ITU-R SM. 329-8 [1] shall be used. The BS shall be placed on a non-conducting support and shall be operated from a power source via a RF filter to avoid radiation from the power leads.

Radiation of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyzer). At each frequency at which a component is detected, the BS shall be rotated and the height of the test antenna adjusted to obtain maximum response, and the effective radiated power of that component determined by a substitution measurement. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.

b) The BS shall transmit with maximum power declared by the manufacturer with all transmitters active. Set the base station to transmit a signal as stated in table 6.1 (Test model 1) in the TS25.141 [2] and table 6.2.4.1.1 in the TS25.142 [3].

c) The received power shall be measured over the frequency range 30 MHz to 12.75 GHz, excluding 12.5MHz below the first carrier frequency to 12.5 MHz above the last carrier frequency used. The measurement bandwidth shall be 100 kHz between 30 MHz and 1 GHz and 1 MHz above 1 GHz as given in ITU-R SM.329-8 [1]. The video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the measuring receiver, it shall be the maximum available and at least 1 MHz. At each frequency at which a component is detected, the maximum effective radiated power of that component shall be determined, as described in step a.

A.1.3.1.2.2 1,28Mcps TDD option

a) A test site fulfilling the requirements of ITU-R SM. 329-8 [1] shall be used. The BS shall be placed on a non-conducting support and shall be operated from a power source via a RF filter to avoid radiation from the power leads.

Radiation of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyser). At each frequency at which a component is detected, the BS shall be rotated and the height of the test antenna adjusted to obtain maximum response, and the effective radiated power of that component determined by a substitution measurement. The measurement shall be repeated with the test antenna in the orthogonal polarisation plane.

b) The BS shall transmit with maximum power declared by the manufacturer with all transmitters active. Set the base station to transmit a signal as stated in table 6.2.4.1.2 of TS25.142.

c) The received power shall be measured over the frequency range 30 MHz to 12.75 GHz, excluding 4MHz below the first carrier frequency to 4 MHz above the last carrier frequency used. The measurement bandwidth shall be 100 kHz between 30 MHz and 1 GHz and 1 MHz above 1 GHz as given in ITU-R SM.329-7 [1]. The video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the measuring receiver, it shall be the maximum available and at least 1 MHz. At each frequency at which a component is detected, the maximum effective radiated power of that component shall be determined, as described in step a.

A.1.3.1.3 Limits

The BS shall meet the limits below:

Table 5: Limits for radiated emissions from BS

Frequency range	Power limit
30 MHz-1000 MHz	-36 dBm
1 GHz-12,75 GHz	-30 dBm

A.1.3.2 Radiated spurious emission, Ancillary equipment

This test is applicable to ancillary equipment. This test shall be performed on a representative configuration of the ancillary equipment.

A.1.3.2.1 Definition

This test assesses the ability of ancillary equipment to limit unwanted emission from the enclosure port.

A.1.3.2.2 Test method

The test method shall be in accordance with CISPR 22 [4]

A.1.3.2.3 Limits

The ancillary equipment shall meet the limits according to CISPR 22 [4] (10 m measuring distance) shown in table 2:

Table 6: Limits for radiated emissions from ancillary equipment, measured on a stand alone basis

Frequency range	**Quasi-peak**
30 MHz-230 MHz	30 dBµV/m
230 MHz-1000 MHz	37 dBµV/m

A.1.4 Conducted emission DC power input/output port

A.1.5 Conducted emissions, AC mains power input/output port

A.1.6 Harmonic Current emissions (AC mains input port)

A.1.7 Voltage fluctuations and flicker (AC mains input port)

A.2 Immunity

A.3 References

Annex B (informative): Change history

3GPP TSG RAN WG4 Meeting #16 **R4-010443**

Vienna, Austria 19th - 23rd February 2001

CR-Form-v3

CHANGE REQUEST

⌘	**25.123**	**CR**	**44**	⌘ rev	**-**	⌘	Current version:	**3.4.0** ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Requirements for Support of Radio Resources Management (TDD) for 1.28Mcps TDD	
Source:	⌘	RAN WG4	
Work item code:	⌘	LCRTDD-RF	***Date:*** ⌘ 19 February 2001
Category:	⌘	**B**	***Release:*** ⌘ REL-4
		Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(Addition of feature),* ***C*** *(Functional modification of feature)* ***D*** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	This CR collects the principally agreed wording of the changes necessary for introducing the feature '1.28Mcps TDD option' in the TS25.123.
Summary of change:	⌘	Based on the approved contents of TR25.945, the '1.28Mcps TDD option' related descriptions are added in the corresponding sections in existing TS25.123.
Consequences if not approved:	⌘	Inconsistency might exist between different working group's output documents; the radio resource management and co-ordinate between FDD and TDD and even that between both TDD option could be impossible;

Clauses affected:	⌘	4.2;5.1~3;5.5~6;6.3;7.1;9.1~2;10;A.4.2~3;A.5.4;A.5.6;A.8.1;A.8.3;A.9.1~2	
Other specs Affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments:	⌘		

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.2 Cell-Re-selection

Next changed section! Comment: Common section not affected

4.2.2 Requirements

4.2.2.1 Number of cells to be monitored

4.2.2.1.1 3.84Mcps TDD option

The UE shall be capable of monitoring at least [x] neighbour cells per carrier frequency for at least [x] carriers.

4.2.2.1.2 1.28Mcps TDD option

Measurement and evaluation on cell selection criteria S of serving cell for low chip rate TDD

The UE shall measure the PCCPCH RSCP level of the serving cell and evaluate the cell selection criterion S defined in TS25.304 for the serving cell once per DRX cycle. The UE shall filter the PCCPCH RSCP level of the serving cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureNTDD}/2$ (see table 4.5).

If the UE has evaluated in N_{serv} successive measurements that the serving cell does not fulfil the cell selection criterion S the UE shall initiate the measurements of all neighbour cells indicated in the measurement control system information, regardless of the measurement rules currently limiting UE measurement activities.

If the UE has not found any new suitable cell based the on searches and measurements of the neighbour cells indicated in the measurement control system information for [TBD] s, the UE shall initiate cell selection procedures for the selected PLMN as defined in TS25.304.

4.2.2.2 Cell re-selection delay

Comment: Common section not affected

4.2.2.2.1 Single carrier case

4.2.2.2.1.1 3.84Mcps TDD option

In a single carrier case, the cell re-selection delay shall be equal or less than [5] seconds.

4.2.2.2.1.2 Measurement of intra-frequency cells 1.28Mcps TDD option

The UE shall measure PCCPCH RSCP at least every $T_{measureNTDD}$ (see table 4.5) for intra-frequency cells that are detected and measured according to the measurement rules. $T_{measureNTDD}$ is defined in Table 4.5. The UE shall filter PCCPCH RSCP measurements of each measured intra-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureNTDD}/2$.
The filtering shall be such that the UE shall be capable of evaluating that an intra-frequency cell has become better than the serving cell within $T_{evaluateNTDD}$ (see table 4.5), from the moment the intra-frequency cell became at least [2] dB better ranked than the current serving cell, provided that Treselection timer is set to zero and PCCPCH RSCP is used as measurement quantity for cell reselection.
If parameter Treselection has value different from zero, the UE shall evaluate an intra-frequency cell better than the serving cell during the Treselection time, before the UE shall reselect the new cell.

4.2.2.2.2 Multi carrier case

4.2.2.2.2.1 3.84Mcps TDD option

In a multi carrier case, the cell re-selection delay shall be equal or less than [Nt] seconds.

4.2.2.2.2.2 Measurement of 1,28Mcps TDD inter-frequency cells 1.28Mcps TDD option

The UE shall measure PCCPCH RSCP at least every ($N_{carrier}$-1) * $T_{measureNTDD}$ (see table 4.5) for inter-frequency cells that are detected and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for 1.28Mcps TDD OPTION cells. The maximum number of carriers is [3] including the carrier the UE is camped on. The UE shall filter PCCPCH RSCP measurements of each measured inter-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureNTDD}$/2.

The filtering of PCCPCH RSCP shall be such that the UE shall be capable of evaluating that an already detected inter-frequency cell has become better ranked than the serving cell within ($N_{carrier}$-1) * $T_{evaluateNTDD}$ from the moment the inter-frequency cell became at least [3] dB better than the current serving cell provided that Treselection timer is set to zero. For non-detected inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least [3] dB better than the current serving cell provided that Treselection timer is set to zero.
If Treselection timer has a value different from zero, the UE shall evaluate an inter-frequency cell better than the serving cell during the Treselection time, before the UE shall reselect the new cell.

4.2.3 -1.28Mcps TDD to 3.84 Mcps TDD cell re-selection

This requirement only applies to 1.28 Mcps UEs supporting this mode.

The ranking of the low and high chip rate TDD cells shall be made according to the cell reselection criteria specified in TS25.304. The use of mapping functions is indicated in the broadcast.
The UE shall measure PCCPCH RSCP at least every $N_{TDDcarrier}$ * $T_{measureTDD}$ (see table 4.5) for inter-frequency cells that are detected and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for 3.84Mcps TDD cells. The maximum number of carriers is 3.The UE shall filter PCCPCH RSCP measurements of each measured high chip rate TDD cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureTDD}$/2.
The filtering of PCCPCH RSCP shall be such that the UE shall be capable of evaluating that a high chip rate TDD cell has become better ranked than the serving cell within $N_{TDDcarrier}$ * $T_{evaluateTDD}$ from the moment the inter-frequency cell became at least [3] better ranked than the current serving cell provided that Treselection timer is set to zero. For non-detected inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least [3] dB better than the current serving cell provided that Treselection timer is set to zero.

4.2.4 FDD Cell re-selection for 1.28Mcps TDD UE

This requirement only applies to 1.28Mcps UEs supporting this mode.

The UE shall measure the signal level CPICH RSCP of each FDD neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in TS25.304, at least every $T_{measureFDD}$ (see table 4.5). The UE shall filter CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

CPICH RSCP is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already detected inter-frequency cell has become better ranked than the serving cell within $NFDD_{carrier}$ * $T_{evaluateFDD}$ from the moment the inter-frequency cell became at least [5] dB better than the

current serving cell provided that Treselection timer is set to zero. For non-detected inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least [5] dB better than the current serving cell provided that Treselection timer is set to zero.
The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304. The use of mapping functions is indicated in the broadcast.

4.3 UTRAN to GSM CellRe-Selection

Next changed section! Comment: Common section not affected

4.3.2.1 Cell Re-Selection delay 3.84Mcps TDD option

The cell re-selection delay is defined as the time between the occurence of any event which will trigger Cell Reselection Evaluation process, as specified in 25.304, and the moment in time when the UE starts sending the RR Channel Request message for location update to GSM.
The UTRAN to GSM cell re-selection delay shall be equal or less than [x].

4.3.2.2 1.28Mcps TDD option

The UE shall measure the signal level of each GSM neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in TS25.304, at least every $T_{measureGSM}$ (see table 4.5). The UE shall maintain a running average of 4 measurements for each cell. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.
The UE shall attempt to verify the BSIC for each of the 4 best ranked GSM BCCH carriers (the best ranked according to the cell reselection criteria defined in TS25.304) at least every 30 seconds if GSM cells are measured according to the measurement rules. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell.

If the UE detects a BSIC, which is not indicated in the measurement control system information, the UE shall not consider that GSM BCCH carrier in cell reselection. The UE also shall not consider the GSM BCCH carrier in cell reselection, if the UE can not demodulate the BSIC of that GSM BCCH carrier.

4.4 Evaluation of cell reselection criteria for 1.28Mcps TDD

The UE shall evaluate the cell re-selection criteria defined in TS 25.304 for the cells, which have new measurement results available, at least every DRX cycle.
Cell reselection shall take place immediately after the UE has found a better suitable cell unless the UE has made cell reselection within the last 1 second.

4.5 Maximum interruption time in paging reception for 1.28Mcps TDD

UE shall perform the cell re-selection with minimum interruption in monitoring downlink channels for paging reception.
At intra-frequency cell re-selection, the UE shall monitor the downlink of current serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency cell for paging reception. The interruption time shall not exceed [50] ms.

At inter-frequency and inter-RAT cell re-selection, the UE shall monitor the downlink of current serving cell for paging reception until the UE is capable to start monitoring downlink channels for paging reception of the target inter-frequency cell. The interruption time must not exceed T_REP + [50] ms. T_REP is the longest repetition period for the system information required to be read by the UE to camp on the cell.

These requirements assume sufficient radio conditions, so that decoding of system information can be made without errors.

Table 4.5 $T_{measureNTDD}$, $T_{evaluateNTDD}$, $T_{measureTDD}$, $T_{evaluateTDD}$, $T_{measureFDD}$, $T_{evaluateFDD}$ and $T_{measureGSM}$

DRX cycle length [s]	N_{serv} [number of successive measurements]	$T_{measureNTDD}$ [s] (number of DRX cycles)	$T_{evaluateNTDD}$ [s] (number of DRX cycles)	$T_{measureTDD}$ [s] (number of DRX cycles)	$T_{evaluateTDD}$ [s] (number of DRX cycles)
0.08	4	0.64 (8 DRX cycles)	2.56 (32 DRX cycles)	0.64 (8 DRX cycles)	2.56 (32 DRX cycles)
0.16	4	0.64 (4)	2.56 (16)	0.64 (4)	2.56 (16)
0.32	4	1.28 (4)	5.12 (16)	1.28 (4)	5.12 (16)
0.64	4	1.28 (2)	5.12 (8)	1.28 (2)	5.12 (8)
1.28	2	1.28 (1)	6.4 (5)	1.28 (1)	6.4 (5)
2.56	2	2.56 (1)	7.68 (3)	2.56 (1)	7.68 (3)
5.12	1	5.12 (1)	10.24 (2)	5.12 (1)	10.24 (2)

DRX cycle length [s]	N_{serv} [number of successive measurements]	$T_{measureFDD}$ [s] (number of DRX cycles)	$T_{evaluateFDD}$ [s] (number of DRX cycles)	$T_{measureGSM}$ [s] (number of DRX cycles)
0.08	4	0.64 (8 DRX cycles)	2.56 (32 DRX cycles)	2.56 (32 DRX cycles)
0.16	4	0.64 (4)	2.56 (16)	2.56 (16)
0.32	4	1.28 (4)	5.12 (16)	5.12 (16)
0.64	4	1.28 (2)	5.12 (8)	5.12 (8)
1.28	2	1.28 (1)	6.4 (5)	6.4 (5)
2.56	2	2.56 (1)	7.68 (3)	7.68 (3)
5.12	1	5.12 (1)	10.24 (2)	10.24 (2)

In idle mode, UE shall support DRX cycles lengths 0.64, 1.28, 2.56 and 5.12 s.

4.6 Numbers of cells in neighbouring cell list for 1.28Mcps TDD option

The UE shall be capable of monitoring [32] intra-frequency 1.28Mcps TDD OPTION cells (including serving cell),
- [32] inter-frequency cells including low and high chip rate TDD Mode cells and FDD Mode cells if FDD and/or high chip rate TDD is supported by the UE

- the 1.28Mcps TDD OPTION inter-frequency cells can be located on [x] additional frequencies besides the serving cell.
- the inter-frequency cells can be located on up to [x] carriers.

In addition the UE shall be able to monitor 32 GSM carriers if GSM is supported by the UE. UE measurement activity is controlled by measurement rules defined in in TS25.304, allowing the UE to limit its measurement activity if certain conditions are fulfilled.

5 UTRAN Connected Mode Mobility

5.1 TDD/TDD Handover

5.1.1 Introduction

Next changed section! Comment: Common section not affected

For 1.28Mcps TDD, at the beginning of the measurement process the UE shall find synchronisation to the cell to measure using the synchronisation channel (DwPCH). This is described under 'cell search' in 3GPP RAN TS25.201, TS25.221 TS25.222, TS25.223, TS25.224, TS25.225' if the monitored cell is a 1.28Mcps TDD cell. For a TDD cell to monitor after this procedure the exact timing of the midamble of the P-CCPCH is known and the measurements can be performed. Depending on the UE implementation and if timing information about the cell to monitor is available, the UE may perform the measurements on the P-CCPCH directly without prior DwPCH synchronisation.

5.1.2 Requirements

5.1.2.1 TDD/TDD Handover delay

5.1.2.1.1 3.84Mcps TDD option

When the UE receives a RRC message that implies a handover, the UE shall start transmission of the new uplink DPCCH within [X ms] from the end of the last TTI containing the RRC command. However, if the command includes an indicated activation time, the UE shall start transmission of the new uplink DPCCH at the designated starting time, or within the time interval defined above, whichever is the later.

5.1.2.1.2 1.28Mcps TDD option

Procedure delay for all procedures, that can command a hard handover, are specified in TS25.331.
When the UE receives a RRC message that implies a handover, with the activation time "now" or earlier than $D_{handover}$ seconds from the end of the last TTI containing the RRC command,,the UE shall start transmission $D_{handover}$ seconds from the end of the last TTI containing the RRC command.
If the access is delayed to an indicated activation time later than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH at the designated activation time.
where:$D_{handover}$ equals the RRC procedure delay defined in TS25.331 Section 13.5.2 plus the interruption time stated in section 5.1.2.2.

5.1.2.2 Interruption time

5.1.2.2.1 3.84Mcps TDD option

The interruption time i.e. the time between the last TTI containing a transport block on the old DTCH and the time the UE starts transmission of the new uplink DPCCH, shall be less than the value in table 5.1-1. This requirement does not include a delay due to SFN decoding of the new cell when this is needed. There is different requirement on the handover delay depending on if the cell has been within the monitored setor not.

Table 5.12 TDD/TDD handover – interruption time

Number of new cells present in the handover command message	Maximum update delay [ms]	
	Cells within monitored set	Cells outside monitored set
1	[20]	[4000]

5.1.2.2.2 1.28Mcps TDD option

The interruption time i.e. the time between the last TTI containing a transport block on the old DPCH and the time the UE starts transmission of the new uplink DPCCH, shall be less than the value in table 5.1.2.2.2. There is different requirement on the interruption time depending on if the cell is known or not.
A cell shall be regarded as known by the UE if

it has been measured during the last 5 seconds or
a dedicated connection existed between the UE and the cell during the last 5 seconds.

Table 5.1.2.2.2 TDD/ TDD handover – interruption time

cell in the handover command message	Maximum delay [ms]	
	Known Cell	Unknown Cell
1	[40]	[350]

The interruption time includes the time that can elapse till the appearance of the channel required for the synchronisation. And the the time that can elapse till the appearance of the DwPTS in which the new uplink SYNC1 shall be transmitted ,or in case of high chip rate TDD the new uplink DPCH, shall be transmitted , which can be up to one frame (10ms).

.

The requirement in Table 5.1.2.2.2 for the CATT USER cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.
NOTE:
One synchronisation attempt can consist of coherent averaging using several frames.

5.2 TDD/FDD Handover

5.2.1 Introduction

Next changed section! Comment: Common section not affected

5.2.2 Requirements

Next changed section! Comment: Common section not affected

5.2.2.1 Handover delay

5.2.2.1.1 3.84Mcps TDD option

When the UE receives a RRC message that implies a handover, the UE shall start transmission of the new uplink DPCCH within [X ms] from the end of the last TTI containing the RRC command.
However, if the command includes an indicated activation time, the UE shall start transmission of the new uplink DPCCH at the designated starting time, or within the time interval defined above, whichever is the later.

5.2.2.1.2 1.28Mcps TDD option

When the UE receives a RRC message that implies a handover, with the activation time "now" or earlier than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.
If the access is delayed to an indicated activation time later than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH at the designated activation time.
where:
$D_{handover}$ equals the RRC procedure delay defined in TS25.331 Section 13.5.2 plus the interruption time stated in section 5.2.3.2 plus the time required for any kind of baseband or RF reconfiguration due to the change of the UTRAN mode.

5. 2.3 Interruption time

5.2.3.1 3.84Mcps TDD option

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old DTCH and the time the UE starts transmission of the new uplink DPCCH , shall be less than the value in table 5-3. These requirement do not include a delay due to SFN decoding of the new cell when this is needed.

There is different requirement on the handover delay depending on if the cell has been within the monitored set or not.

Table 5.2 3 TDD/FDD interruption time

Number of new cells present in the handover command message	Maximum update delay [ms]	
	Cells within monitored set	Cells outside monitored set
1	[ ]	[ ]

5.2.3.2 1.28Mcps TDD option

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old DPCH and the time the UE starts transmission of the new uplink DPCCH, shall be less than the value in table 5.2.3.2 There is different requirement on the depending on if the cell is known or not.

Table 5.2.3.2 1.28Mcps TDD/FDD interruption time

cell in the handover command message	Maximum update delay [ms]	
	Known Cell	Unknown Cell
1	[100]	[350]

The interruption time includes the interruption uncertainty when changing the timing from the old 1.28Mcps TDD OPTION to the new FDD cell, which can be up to one frame (10ms) and the time required for measuring the downlink DPCCH channel as stated in TS 25.214 section 4.3.1.2 into account.

The requirement in Table 5.2.3.2 for the unknown cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

5. 3 TDD/GSM Handover

Next changed section! Comment: Common section not affected

5. 3.1 Introduction

Next changed section! Comment: Common section not affected

5.3.2 Requirements

Next changed section! Comment: Common section not affected

5.3.2.1 Inter-system handover delay

5.3.2.1.1 3.84Mcps TDD option

When the UE receives a RRC INTER-SYSTEM HANDOVER COMMAND it shall be ready to transmit (as specified in GSM 05.10) on the new channel within 120 ms from the last TTI containing the RRC command, unless the access is delayed to an indicated starting time, in which case it shall be ready to transmit on the new channel at the designated starting time, or within the time interval defined above, whichever is the later.

5.3.2.1.2 1.28Mcps TDD option

When the UE receives a RRC HANDOVER COMMAND with the activation time "now" or earlier than the value in Table 5.3.2.1.2 from the end of the last TTI containing the RRC command, the UEit shall be ready to transmit (as specified in GSM 05.10) on the new channel within the new RAT within the value in Table 5.3.2.1.2 from the last TTI containing the RRC command, If the access is delayed to an indicated activation time later than the value in Table 5.3.2.1.2 from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in GSM 05.10) on the channel of the new RAT at the designated activation time.
The UE shall process the RRC procedures for the RRC HANDOVER FROM UTRAN COMMAND within 50 ms. If the activation time is used, it corresponds to the CFN of the UTRAN channel.

Table 5.3.2.1.2: 1,28Mcps TDD/GSM handover –handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	90
The UE has not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	190

5.3.2.2 Interruption time

5.3.2.2.1 3.84Mcps TDD option

The interruption time, i.e. the time between the last TTI containing a transport block on the old channel and the time the UE is ready to transmit on the new channel, shall be less than 40 ms.

5.3.2.2.2 1.28Mcps TDD option

The interruption time, i.e. the time between the end of last TTI containing a transport block on the old channel and the time the UE is ready to transmit on the new channel, shall be less than the value in Table 5.3.2.2.2. The requirement in Table 5.3.2.2.2 for the case, that UE is not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received, is valid when the signal quality of the GSM cell is good enough for successful synchronisation with one attempt.
~~40 ms.~~

Table 5.3.2.2.2: TDD/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	40
The UE has not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	140

5.4 Cell Re-selection in Cell_FACH

5.4.1 Introduction

When a Cell Re-selection process is triggered according to 25.331, the UE shall evaluate the cell re-selection criteria specified in TS 25.304, based on radio measurements, and if a better cell is found that cell is selected.

5.4.2 Requirements

Cell reselection delays are applicable when the repetition period of all relevant system information blocks is not more than 1280 ms.

NOTE: For Inter-frequency cell re-selection in CELL_FACH state, the cell re-selection delay is dependent on the amount of Measurement Occasions that is provided by the network.

5.4.2.1 Cell re-selection delay

When the UE is camped in Cell_FACH state on one of the cells, the UE shall be capable of re-selecting a new cell according the cell re-selection criteria. The cell re-selection delay is then defined as a time between the occurence of an event which will trigger Cell Reselection process and to the moment in time when the UE starts sending the RRC Cell Update message to the UTRAN.

5.4.2.1.1 All cells in the neighbour list belong to the same frequency

The cell re-selection delay in CELL_FACH state shall be less than [x] seconds when all cells in the neighbour list belong to the same frequency

5.4.2.1.2 The cells in the neighbour list belong to different frequencies

NOTE: This requirement should be reconsidered based on RAN2 decisions.
The cell re-selection delay in CELL_FACH state shall be less than [x] seconds when the cells in the neighbour list belong to less than [x] frequencies.

5.5 Cell Re-selection in Cell_PCH

5.5.1 Introduction

When a Cell Re-selection process is triggered according to 25.331, the UE shall evaluate the cell re-selection criteria specified in TS 25.304, based on radio measurements, and if a better cell is found that cell is selected.

5.5.2 Requirements

5.5.2.1 1.28Mcps TDD option

Same requirements as for cell re-selection in idle mode shall apply.

5.5.2.2 3.84Mcps TDD option

5.5.2.2.1 Cell re-selection delay

5.5.2.2.1.1 All cells in the neighbour list belong to the same frequency

The cell re-selection delay in CELL_PCH state shall be less than [x] seconds when all cells in the neighbour list belong to the same frequency

5.5.2.2.1.2 The cells in the neighbour list belong to different frequencies

The cell re-selection delay in CELL_PCH state shall be less than [x] seconds when the cells in the neighbour list belong to less than [x] frequencies.

5.6 Cell Re-selection in URA_PCH

5.6.1 Introduction

When a Cell Re-selection process is triggered according to 25.331, the UE shall evaluate the cell re-selection criteria specified in TS 25.304, based on radio measurements, and if a better cell is found that cell is selected.

5.6.2 Requirements

5.6.2.1 1.28Mcps TDD option

Same requirements as for cell re-selection in idle mode shall apply.

5.6.2.2 3.84Mcps TDD option

Cell reselection delays are applicable when the repetition period of all relevant system information blocks is not more than 1280 ms and the length of DRX cycle is not longer than [640] ms.

5.6.2.2.1 Cell re-selection delay

When the UE is camped URA_PCH state on one of the cells, the UE shall be capable of re-selecting a new cell according the cell re-selection criteria. The cell re-selection delay is then defined as the time between the occurence of an event which will trigger Cell Reselection process and the moment in time when the UE starts sending the RRC Cell Update message to the UTRAN.

5.6.2.2.1.1 All cells in the neighbour list belong to the same frequency

The cell re-selection delay in URA_PCH state shall be less than [x] seconds when all cells in the neighbour list belong to the same frequency..

5.6.2.2.1.2 The cells in the neighbour list belong to different frequencies

The cell re-selection delay in URA_PCH state shall be less than [x] seconds when the cells in the neighbour list belong to less than [x] frequencies.

6 Dynamic channel allocation

6.1 Introduction

The channel assignment algorithm will be implemented on network side in the RNC. It will be distributed, interference adapted approach where each base station makes the channel assignment based on local signal strength measurements performed in the UE and the Node B. A priori knowledge about the used channels of the other base stations in the vicinity can be implicitly used without additional signalling traffic.

6.2 Implementation requirements

The purpose of DCA is on one side the limitation of the interference (keeping required QoS) and on the other side to maximise the system capacity due to minimising reuse distance. The details on channel assignment policy are given in [12].

6.3 Number of timeslots to be measured

6.3.1 3.84Mcps TDD option

The number of down link timeslots to be measured in the UE is broadcasted on the BCH in each cell. In general, the number of downlink timeslots in question will be less than 14, but in worst case the UE shall be capable to measure 14 downlink timeslots. In case of "simple UE" [FFS] timeslots shall at least be measured.

6.3.2 1.28Mcps TDD option

The number of down link timeslots to be measured in the UE is broadcasted on the BCH in each cell. In general, the number of downlink timeslots in question will be less than [6], but in worst case the UE shall be capable to measure [6] downlink timeslots. In case of "simple UE [FFS] timeslots shall at least be measured.

6.4 Measurement reporting delay

In order to save battery life time, in idle mode no measurements are performed for DCA. ISCP measurements are started at call establishment. Taking into account that the measured interference of the timeslots is preferable averaged over [FFS] frames, the measurement reporting delay in connecting phase shall not exceed [FFS] milliseconds.

7 Timing characterisitics

7.1 Timing Advance (TA) requirements

7.1.1 3.84Mcps TDD option

To update timing advance of a moving UE the UTRAN measures "RX Timing deviation". The measurements are reported to higher layers, where timing advance values are calculated and signaled to the UE. The measurement for timing advance is defined in 3GPP TS25.225 "Physical Layer Measurements (TDD)", the requirements on the measurement is specified in clause 11.2.9 "RX Timing Deviation". The UE shall adjust the timing of its transmissions within ±0.5 chip of the signalled timing advance value.

7.1.2 1.28Mcps TDD option

For 1.28 Mcps TDD the timing advance in the UE is adjusted by means of uplink synchronization. For the random access procedure the node B commands the UE to adjust its synchronisation shift by means of signaling the received position of the UpPTS in the FPACH. During the connection the node B measures the timing in the uplink and transmits a SS (Synchronization Shift) command to the UE at least once per sub-frame.

These SS commands determined whether the UE synchronization shift is either left unchanged, or adjusted 1 step up or 1 step down. The step size of the SS adjustment is (k/8)Tc where k (=1,2, …,8) is signaled by higher layer signaling.

7.1.2.1 Uplink synchronization control requirements for UE for 1.28Mcps TDD option

Uplink synchronization control is the ability of the UE transmitter to adjust its TX timing in accordance with one or more SS commands received in the downlink.

7.1.2.1.1 Uplink synchronization control steps

The SS step is the change in UE transmission timing in response to a single SS command, SS_cmd, received by the UE.

7.1.2.1.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the transmission timing with a step size of 1/8, 2/8, 3/8, …, 1 chip according to the value of Δ_{SS}, n=(1,2,…,14) time slot after the SS_cmd arrived (closed loop). For the open loop any step being a multiple of 1/8 chip has to be allowed.

(a) The minimum transmission timing step $\Delta_{SS,min}$ due to closed loop uplink synchronization control shall be within the range shown in Table **7.1.2.1.1.1**.

(b) In case uplink synchronization control implies to perform a bigger step than the minimum step the UE shall perform the a multiple number of minimum steps m. Within the implementation grid of the applicable timing steps of the UE the step being closest to the required step should be executed.

Table 7.1.2.1.1.1: Uplink synchronisation control range

SS_cmd	Uplink synchronisation control range for minimum step 1/8 chip step size	
	Lower	Upper
Up	1/9 chip – 0.1 ppm	1/7 chip + 0.1 ppm
Down	1/9 chip – 0.1 ppm	1/7 chip + 0.1 ppm

7.1.2.1.2 Timing Advance (T_{ADV}) for 1.28 Mcps TDD

This measurement refers to TS25.225 subsection 5.1.14.

7.1.2.1.2.1 Accuracy requirements

Table 7.1.2.1.2.1

Parameter	Unit	Accuracy	Conditions
			Range [chips]
Timing Advance	Chips period	+/- 0.125	0, …, 255.875

7.1.2.1.2.2 Range/mapping

The reporting range for *Timing Advance* is from 0 ... 255.875 chips.
In table 7.1.2.1.2.2 the mapping of the measured quantity is defined. The signalling range may be larger than the guaranteed accuracy range.

Table 7.1.2.1.2.2

Reported value	Measured quantity value	Unit
TIMING_ADVANCE_0000	Timing Advance < 0	chip
TIMING_ADVANCE_0001	0 ≤ Timing Advance < 0.125	chip
TIMING_ADVANCE_0002	0.125 ≤ Timing Advance < 0.25	chip
…	…	…
TIMING_ADVANCE_1024	127.875≤ Timing Advance < 128	chip
…	…	…
TIMING_ADVANCE_2045	255.625 ≤ Timing Advance < 255.75	chip
TIMING_ADVANCE_2046	255.75 ≤ Timing Advance < 255.875	chip
TIMING_ADVANCE_2047	255.875 ≤ RX Timing Advance	chip

NOTE: This measurement can be used for timing advance (synchronisation shift) calculation for uplink synchronisation or location services.

7.2 Cell synchronization accuracy

7.2.1 Definition

Cell synchronization accuracy is defined as the maximum deviation in frame start times between any pair of cells that have overlapping coverage areas.

7.2.2 Minimum requirements

The cell synchronization accuracy shall be better than or equal to 3µs.

8 UE Measurements Procedures

8.1 Measurements in CELL_DCH State

8.1.1 3.84 Mcps option

unchanged

8.1.2 1.28 Mcps option

empty

8.2 Parallel Measurements in CELL_DCH State

8.2.1 3.84 Mcps option

unchanged

8.2.2 1.28 Mcps option

empty

8.3 Measurements in CELL_FACH State

8.3.1 3.84 Mcps option

unchanged

8.3.2 1.28 Mcps option

empty

9 Measurements performance requirements

unchanged

9.1 Measurements performance for UE

9.1.1 Performance for UE measurements in downlink (RX)

unchanged

9.1.1.8 SFN-SFN observed time difference

The measurement period for CELL_DCH state can be found in section 8.

9.1.1.8.1 Accuracy requirements

9.1.1.8.1.1 3.84Mcps TDD option

Table 9.16 SFN-SFN observed time difference accuracy

Parameter	Unit	Accuracy [chip]	Conditions
			Io [dBm]
SFN-SFN observed time difference	chip	+/-0,5 for both type 1 and 2	-94...-50

9.1.1.8.1.2 1.28Mcps TDD option

Table 9.1.1.8.1.2 SFN-SFN observed time difference accuracy

Parameter	Unit	Accuracy	Conditions
			Io [dBm]
SFN-SFN observed time difference	Chip	+/-0,5 for type 1 but +/- 0.125 for type 2	-94...-50

9.1.1.8.2 Range/mapping

9.1.1.8.2.1 3.84Mcps TDD option

The reporting range for *SFN-SFN observed time difference type 1* is from 0 ... 9830400 chip.
In table 9.17 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.17

Reported value	Measured quantity value	Unit
T1_SFN-SFN_TIME _0000000	0 ≤ SFN-SFN observed time difference type 1 < 1	chip
T1_SFN-SFN_TIME _0000001	1 ≤ SFN-SFN observed time difference type 1 < 2	chip
T1_SFN-SFN_TIME _0000002	2 ≤ SFN-SFN observed time difference type 1 < 3	chip
…	…	…
T1_SFN-SFN_TIME _9830397	9830397 ≤ SFN-SFN observed time difference type 1 < 9830398	chip
T1_SFN-SFN_TIME _9830398	9830398 ≤ SFN-SFN observed time difference type 1 < 980399	chip
T1_SFN-SFN_TIME _9830399	9830399 ≤ SFN-SFN observed time difference type 1 < 9830400	chip

The reporting range for *SFN-SFN observed time difference type 2* is from –1280 ... +1280 chip.
In table 9.18 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.18

Reported value	Measured quantity value	Unit
T2_SFN-SFN_TIME _00000	SFN-SFN observed time difference type 2 < -1280,0000	chip
T2_SFN-SFN_TIME _00001	-1280,0000 ≤ SFN-SFN observed time difference type 2 < -1279,9375	chip
T2_SFN-SFN_TIME _00002	-1279,9375 ≤ SFN-SFN observed time difference type 2 < -1279,8750	chip
…	…	…
T2_SFN-SFN_TIME _40959	1279,8750 ≤ SFN-SFN observed time difference type 2 < 1279,9375	chip
T2_SFN-SFN_TIME _40960	1279,9375 ≤ SFN-SFN observed time difference type 2 < 1280,0000	chip
T2_SFN-SFN_TIME _40961	1280,0000 ≤ SFN-SFN observed time difference type 2	chip

9.1.1.8.2.2 1.28Mcps TDD option

The reporting range for *SFN-SFN observed time difference type 1* is from 0 ... 3276800 chip.
In table 9.1.1.8.2.2-1 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.1.1.8.2.2-1

Reported value	Measured quantity value	Unit
T1_SFN-SFN_TIME _0000000	0 ≤ SFN-SFN observed time difference type 1 < 1	chip
T1_SFN-SFN_TIME _0000001	1 ≤ SFN-SFN observed time difference type 1 < 2	chip
T1_SFN-SFN_TIME _0000002	2 ≤ SFN-SFN observed time difference type 1 < 3	chip
…	…	…
T1_SFN-SFN_TIME _3276797	3276797 ≤ SFN-SFN observed time difference type 1 < 3276798	chip
T1_SFN-SFN_TIME _3276798	3276798 ≤ SFN-SFN observed time difference type 1 < 3276799	chip
T1_SFN-SFN_TIME _3276799	3276799 ≤ SFN-SFN observed time difference type 1 < 3276800	chip

The reporting range for *SFN-SFN observed time difference type 2* is from –6400 ... +6400 chip.
In table 9.1.1.8.2.2-2 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.1.1.8.2.2-2

Reported value	Measured quantity value	Unit
T2_SFN-SFN_TIME _00000	SFN-SFN observed time difference type 2 < -6390,00	chip
T2_SFN-SFN_TIME _00001	-6390,00 ≤ SFN-SFN observed time difference type 2 < -6399,75	chip
T2_SFN-SFN_TIME _00002	-6399,75 ≤ SFN-SFN observed time difference type 2 < -6399,50	chip
…	…	…
T2_SFN-SFN_TIME _51199	6399,50 ≤ SFN-SFN observed time difference type 2 < 6399,75	chip
T2_SFN-SFN_TIME _51200	6399,75 ≤ SFN-SFN observed time difference type 2 < 6400,00	chip

T2_SFN-SFN_TIME _51201	6400,00 ≤ SFN-SFN observed time difference type 2	chip

There are 3 kind of special time slot (DwPTS, UpPTS and GP) in 1.28Mcps TDD frame structure. When calculation the SFN-SFN observed time difference in type 2, it needs to consider the position and affection of these 3 special time slots.

Let us suppose:
T_{RxTSi} : time of start of timeslot#0 received of the serving TDD cell i.
T_{RxTSk} : time of start of timeslot#0 received from the target UTRA cell k that is closest in time to the start of the timeslot of the serving TDD cell i.
SFN-SFN observed time difference = T_{RxTSk} - T_{RxTSi}, in chips, which means to calculate the the time difference of the start position of the current frame in cell i to the closest starting position of one frame in cell k.

[Editor Note:]
Here in type 2 we only consider to measure the difference of two cells of 1.28Mcps TDD. The measurement method is like that in TS25.215. In type 2 measurement of TS25.215, it measures the time difference of the start position of the P-CPICH of two cells. That is just something like in 1.28Mcps TDD.

9.1.1.9 Observed time difference to GSM cell

Note: This measurement is used to determine the system time difference between UTRAN and GSM cells.

The requirements in this section are valid for terminals supporting UTRA TDD and GSM.
The measurement period for CELL_DCH state is [10 s].

9.1.1.9.1 Accuracy requirements

Table 9.19 Observed time difference to GSM cell accuracy

Parameter	Unit	Accuracy [chip]	Conditions
Observed time difference to GSM cell	chip	± 20	

9.1.1.9.2 Range/mapping

The reporting range for *Observed time difference to GSM cell* is from 0 ... 3060/13 ms.
In table 9.20 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.20

Reported value	Measured quantity value	Unit
GSM_TIME _0000	0 ≤ Observed time difference to GSM cell < 1x3060/(4096x13)	ms
GSM_TIME _0001	1x3060/(4096x13) ≤ Observed time difference to GSM cell < 2x3060/(4096x13)	ms
GSM_TIME _0002	2x3060/(4096x13)≤ Observed time difference to GSM cell < 3x3060/(4096x13)	ms
GSM_TIME _0003	3x3060/(4096x13) ≤ Observed time difference to GSM cell < 4x3060/(4096x13)	ms
…	…	…
GSM_TIME _4093	4093x3060/(4096x13) ≤ Observed time difference to GSM cell < 4094x3060/(4096x13)	ms
GSM_TIME _4094	4094x3060/(4096x13) ≤ Observed time difference to GSM cell < 4095x3060/(4096x13)	ms
GSM_TIME _4095	4095x3060/(4096x13) ≤ Observed time difference to GSM cell < 3060/13	ms

Next changed section! Comment: Common section not affected

9.2 Measurements Performance for UTRAN

9.2.1 Performance for UTRAN Measurements in Uplink (RX)

Next changed section! Comment: Common section not affected

9.2.1.6 RX Timing Deviation

The measurement period shall be [100] ms.

9.2.1.6.1 Accuracy requirements

9.2.1.6.1.1 3.84Mcps TDD option

Table 9.40 RX Timing Deviation accuracy

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
RX Timing Deviation	chip	+/- 0,5	-256, …, 256

9.2.1.6.1.2 1.28Mcps TDD option

Table 9.2.1.6.1.2

Parameter	Unit	Accuracy	Conditions
			Range [chips]
RX Timing Deviation	Chips period	+/- 0.125	-128, …, 128

9.2.1.6.2 Range/mapping

9.2.1.6.2.1 3.84Mcps TDD option

The reporting range for *RX Timing Deviation* is from -256 ... 256 chips.
In table 9.41 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.41

Reported value	Measured quantity value	Unit
RX_TIME_DEV_0001	RX Timing Deviation < –256,00	chip
RX_TIME_DEV_0002	-256,00≤ RX Timing Deviation < 255,75	chip
RX_TIME_DEV_0003	-255,75≤ RX Timing Deviation < –255,50	chip
…	…	…
RX_TIME_DEV_1024	000,00≤ RX Timing Deviation < 000,25	chip
…	…	…
RX_TIME_DEV_2046	255,5 ≤ RX Timing Deviation < 255,75	chip
RX_TIME_DEV_2047	255,75 ≤ RX Timing Deviation < 256,00	chip
RX_TIME_DEV_2048	256,00 ≤ RX Timing Deviation	chip

Note: This measurement may be used for timing advance calculation or location services.

9.2.1.6.2.2 1.28Mcps TDD option

The reporting range for *RX Timing Deviation* is from-128 ... 128 chips.
In table 9.2.1.6.2.2 mapping of the measured quantity is defined. Signaling range may be larger than the guaranteed accuracy range.

Table 9.2.1.6.2.2

Reported value	Measured quantity value	Unit
RX_TIME_DEV_0001	RX Timing Deviation < –128,000	chip
RX_TIME_DEV_0002	-128,000≤ RX Timing Deviation < -127,875	chip
RX_TIME_DEV_0003	-127,875≤ RX Timing Deviation < -127,750	chip
…	…	…
RX_TIME_DEV_1024	000,000≤ RX Timing Deviation < 000,125	chip
…	…	…
RX_TIME_DEV_2046	127,750 ≤ RX Timing Deviation < 127,875	chip
RX_TIME_DEV_2047	127,875 ≤ RX Timing Deviation < 128,000	chip
RX_TIME_DEV_2048	128,000 ≤ RX Timing Deviation	chip

NOTE: This measurement can be used for timing advance (synchronisation shift) calculation for uplink synchronisation or location services.

9.2.1.7 SYNC-UL Timing Deviation for 1.28 Mcps

This measurement refers to TS25.225 subsection 5.2.8.1.

9.2.1.7.1 Accuracy requirements

Table 9.2.1.7.1

Parameter	Unit	Accuracy	Conditions
			Range [chips]
SYNC-UL Timing Deviation	chips period	+/- 0.125	0, …, 255.875

9.2.1.7.2 Range/mapping

The reporting range for *SYNC-UL Timing Deviation* is from 0 ... 255.875 chips.
In table 9.2.1.7.2 the mapping of the measured quantity is defined. Signaling range may be larger than the guaranteed accuracy range.

Table 9.2.1.7.2

Reported value	Measured quantity value	Unit
SYNC_UL_TIME_DEV_0000	**SYNC-UL** Timing Deviation < 0	chip
SYNC_UL_TIME_DEV_0001	0 ≤ **SYNC-UL** Timing Deviation < 0.125	chip
SYNC_UL_TIME_DEV_0002	0.125 ≤ **SYNC-UL** Timing Deviation < 0.25	chip
…	…	…
SYNC_UL_TIME_DEV_1024	127.875 ≤ **SYNC-UL** Timing Deviation < 128	chip
…	…	…
SYNC_UL_TIME_DEV_2045	255.625 ≤ **SYNC-UL** Timing Deviation < 255.75	chip
SYNC_UL_TIME_DEV_2046	255.75 ≤ **SYNC-UL** Timing Deviation < 255.875	chip
SYNC_UL_TIME_DEV_2047	255.875 ≤ **SYNC-UL** Timing Deviation	chip

NOTE: This measurement can be used for timing advance (synchronisation shift) calculation for uplink synchronisation or location services.

Next changed section! Comment: Common section not affected

10 FPACH physical layer information field definition (1.28 Mcps TDD)

1.28 Mcps TDD introduces the FPACH (Forward Physical Access CHannel) which carries physical layer information. Two of these information fields are the ‘received starting position of the UpPCH’ (Uplink Pilot CHannel) and the ‘transmit power level command for the RACH message’. Both information fields are directly (received starting position of the UpPCH) or can be indirectly (transmit power level command for the RACH message) derived from measurements but are no measurements themselves.

10.1 Received starting position of the UpPCH ($UpPCH_{POS}$) (1.28 Mcps TDD)

10.1.1 Range/mapping

Table 10.1.1

Range/mapping	$UpPCH_{POS}$ FIELD is given with a resolution of 1/8 chip with the range [0,255.875] chip. $UpPCH_{POS}$ FIELD shall be transmitted in the FPACH where: $UpPCH_{POS}$ FIELD_LEV_0000: $UpPCH_{POS}$ < 0 chip $UpPCH_{POS}$ FIELD_LEV_0001: 0 chip ≤ $UpPCH_{POS}$ < 0.125 chip $UpPCH_{POS}$ FIELD_LEV_0002: 0.125 chip ≤ $UpPCH_{POS}$ < 0.25 chip … $UpPCH_{POS}$ FIELD_LEV_2045: 255.625 chip ≤ $UpPCH_{POS}$ < 255.75 chip $UpPCH_{POS}$ FIELD_LEV_2046: 255.75 chip ≤ $UpPCH_{POS}$ < 255.875 chip $UpPCH_{POS}$ FIELD_LEV_2047: 255.875 chip ≤ $UpPCH_{POS}$

10.1.2 Accuracy requirements

Table 10.1.2

Parameter	Unit	Accuracy	Conditions
			Range [chips]
Received starting position of the UpPCH	chips period	+/- 0.125	0, …, 255.875

10.2 Transmit Power Level Command for the RACH message (1.28 Mcps TDD)

10.2.1 Range/mapping

Table 10.2.1

Range/mapping	$PRX_{PRACH,des}$ FIELD is given with a resolution of 0.5 dB with the range [-120,-80] dBm. $PRX_{PRACH,des}$ FIELD shall be transmitted in the FPACH where: $PRX_{PRACH,des}$ FIELD_LEV_00: $PRX_{PRACH,des}$ < -120 dBm $PRX_{PRACH,des}$ FIELD_LEV_01: -120 dBm ≤ $PRX_{PRACH,des}$ < -119.5 dBm $PRX_{PRACH,des}$ FIELD_LEV_02: -119.5 dBm ≤ $PRX_{PRACH,des}$ < -119 dBm … $PRX_{PRACH,des}$ FIELD_LEV_78: -81 dBm ≤ $PRX_{PRACH,des}$ < -80.5 dBm $PRX_{PRACH,des}$ FIELD_LEV_79: -80.5 dBm≤ $PRX_{PRACH,des}$ < -80 dBm $PRX_{PRACH,des}$ FIELD_LEV_80: -80 dBm ≤ $PRX_{PRACH,des}$

10.2.2 Accuracy requirements:

Since this is a desired RX power at the node B and this is no measured value and the derivation of this value in the node B is implementation specific, accuracy requirements are not applicable.

Annex A (normative): Test Cases

unchanged

A.4 Idle Mode

A.4.1 Cell selection

A.4.2 Cell Re-Selection

Two scenarios are considered:

Scenario 1: Single carrier case

Scenario 2: Multi carrier case

For each of them a test is proposed.

NOTE: More scenarios will be added later.

A.4.2.1 Scenario 1: Single carrier case

A.4.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the single carrier case reported in section 4.2.2.2.1.

A.4.2.1.1.1 3.84Mcps TDD option

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.4-4 and A.4-5.

Table A.4-4: General test parameters for Cell Re-selection single carrier multi-cell case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
T1		s		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4-5: Cell re-selection single carrier multi-cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP		-74	-74			-74	-74			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/3,84 MHz	-70											
Propagation Condition		AWGN											

A.4.2.1.1.2 1.28Mcps TDD option

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.4.2.1.1.2-1 and A.4.2.1.1.2-2.

Table A. 4.2.1.1.2-1 : General test parameters for Cell Re-selection single carrier multi-cell case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value		0..1	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4.2.1.1.2-2: Cell re-selection single carrier multi-cell case

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	[-64]	[-66]			[-66]	[-64]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Sintrasearch	 S DB	[0] [0] not sent		[0] [0] not sent		[0] [0] not sent		[0] [0] not sent		[0] [0] not sent		[0] [0] not sent	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	[-74]	[-74]			[-74]	[-74]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Sintrasearch	 S DB	[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]	
I_{oc}	dBm/1.28 MHz	-70											
Propagation Condition		AWGN											

A.4.2.1.2 Test Requirements

A.4.2.1.2.1 3.84Mcps TDD option

The requirements reported in section 4.2.2.2.1 shall be verified in more than [X %] of the cases.

A.4.2.1.2.2 1.28Mcps TDD option

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateNTDD} + T_{SI}$, where:

$T_{evaluateNTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ NTDD}$ of 6.4s according to Table 4.5 in section 4.5.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A.4.2.2 Scenario 2: Multi carrier case

A.4.2.2.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the multi carrier case reported in section 4.2.2.2.2.

A.4.2.2.1.1 3.84Mcps TDD option

This scenario implies the presence of 2 carriers and 6 cells as given in Table A.4-6 and A.4-7.

Table A.4-6: General test parameters for Cell Re-selection in Multi carrier case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
T1		s		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4-7: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		0		8		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t$_{offset}$		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	3	0	3	0	0	3	0	3	-3	-3	-3	-3
PCCPCH RSCP	dBm	-70	-73			-73	-70			-76	-76		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst	dBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	dB	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
		Cell 4				Cell 5				Cell 6			
Timeslot		0		8		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t$_{offset}$		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
PCCPCH RSCP		-76	-76			-76	-76			-76	-76		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst	dBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	dB	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
I_{oc}	dBm/3,84 MHz	-70											
Propagation Condition		AWGN											

Note: P-CCPCH_RSCP is the quality measure for cell selection and re-selection.

A.4.2.2.1.2 1.28Mcps TDD option

This scenario implies the presence of 2 carriers and 6 cells as given in Table A.4.2.2.1.2-1 and A.4.2.2.1.2-2. For this test purpose the broadcast repetition period of the target cell shall be [x] s.

Table A.4.2.2.1.2-1: General test parameters for Cell Re-selection in Multi carrier case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4.2.2.1.2-2: Cell re-selection multi carrier multi cell case

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	dB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	dBm	[-64]	[-66]			[-66]	[-64]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Qintrasearch	 s dB	[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel				Channel 2				Channel			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	dB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	dBm	[-74]	[-74]			[-74]	[-74]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Qintrasearch	 s dB	[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]	
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

Note: P-CCPCH_RSCP is the quality measure for cell selection and re-selection.

A.4.2.2.2 Test Requirements

A.4.2.2.2.1 3.84Mcps TDD option

The UE shall select cell 2 within a cell re-selection delay specified in 4.2.2.2.2.

A.4.2.2.2.2 1.28Mcps TDD option

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateNTDD} + T_{SI}$, where:

$T_{evaluateNTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ NTDD}$ of 6.4s according to Table 4.51 in section 4.52.2.7.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A4.2.3 3.84Mcps TDD cell re-selection for 1.28Mcps TDD UE

A4.1.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the NTDD1.28Mcps TDD OPTION/TDD cell re-selection delay reported in section 4.1.2.3.

This scenario implies the presence of 1 low chip rate (NTDD1.28Mcps TDD OPTION) and 1 high chip rate (TDD) cell as given in Table A.4-5 and A.4-6.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the NTDD1.28Mcps TDD OPTION cell 1 is better ranked as the TDD cell 2 during T1 and the TDD cell 2 is better ranked than the NTDD1.28Mcps TDD OPTION cell 1 during T2.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4-5: General test parameters for TDD low chip rate to TDD high chip rate cell re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	NTDD1.28Mcps TDD OPTION cell
	Neighbour cell		Cell2	TDD cell
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.

DRX cycle length	s	1,28	
T1	s	15	Cell 1 better ranked than cell 2
T2	s	15	Cell2 better ranked than cell 1

Table A.4-6: Test parameters for TDD low chip rate to TDD high chip rate cell re-selection

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		DwPts		0		8	
		T1	**T2**	**T 1**	**T 2**	**T1**	**T2**	**T 1**	**T 2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0	n.a.		n.a.	
SCH_Ec/Ior	dB	n.a.		n.a.		-9	-9	-9	-9
SCH_t$_{offset}$		n.a.		n.a.		0	0	0	0
PICH_Ec/Ior								-3	-3
OCNS	dB	n.a.		n.a.		-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	[10]	[7]			[7]	[10]	[7]	[10]
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dBm	[-63]	[-66]			[-66]	[-63]		
Treselection	s	0				0			
Propagation Condition		AWGN				AWGN			

A.4.~~1~~.2.3.4 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.
The cell re-selection delay shall be less than 8 s.

Note: The re-selection delay equals $T_{TDDevaluate}$ + T_{rep} repetition period of the broadcast information of the selected cell

A4.2.4 FDD cell re-selection for 1.28Mcps TDD UE

A.4.~~1.~~2.4.1 Test Purpose and Environment

This test is to verify the requirement for the ~~NTDD~~1.28Mcps TDD OPTION/FDD cell re-selection delay reported in section 4.1.2.4.
This scenario implies the presence of 1 low chip rate TDD and 1 FDD cell as given in Table A.4-7~~5~~ and A.4-8~~6~~.
The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.
For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the ~~NTDD~~1.28Mcps TDD OPTION cell 1 is better ranked as the FDD cell 2 during T1 and the FDD cell 2 is better ranked than the ~~NTDD~~1.28Mcps TDD OPTION cell 1 during T2.
Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4-7: General test parameters for the TDD/FDD cell re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	~~NTDD~~1.28Mcps TDD OPTION cell
	Neighbour cells		Cell2	FDD cell
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4-8: Test parameters for the ~~NTDD~~1.28Mcps TDD OPTION/FDD cell re-selection

Parameter	Unit	Cell 1				Cell 2	
Timeslot Number		0		DwPts		n.a.	
		T1	**T2**	**T 1**	**T 2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2	
PCCPCH_Ec/Ior	dB	-3	-3			-12	-12
DwPCH_Ec/Ior	dB			0	0	n.a.	
CPICH_Ec/Ior	dB	n.a.		n.a.		-10	-10
SCH_Ec/Ior	dB	n.a.		n.a.		-12	-12
PICH_Ec/Ior						-15	-15
OCNS	dB	n.a.		n.a.		-0,941	-0,941
$\hat{I}_{or}/I_{oc}$	dB	[]	[]			[]	[]
I_{oc}	DBm/1. 28 MHz	-70					
PCCPCH_RSCP	dBm	[]	[]			n.a.	n.a.
CPICH_Ec/Io		n.a.				[]	[]
Treselection	s	0				0	
Propagation Condition		AWGN					

A.4.~~1.~~2.4.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateFDD} + T_{SI}$, where:

$T_{evaluateFDD}$ See Table 4.5~~1~~ in section 4.5~~1.5~~.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A.4.3 UTRAN to GSM Cell Re-Selection

A.4.3.1 Scenario 1

A.4.3.1.1 Test Purpose and Environment

A.4.3.1.1.1 3.84Mcps TDD option

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.3.2.1. This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. Test parameters are given in Table, A.4-.98, A.4-.109, A.4-110.

Table A.4-96: General test parameters for UTRAN to GSM Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
T1		s		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4-107: Cell re-selection UTRAN to GSM cell case (cell 1)

Parameter	Unit	Cell 1 (UTRA)			
Timeslot Number		0		8	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0
PICH_Ec/Ior	dB			-3	-3
OCNS_Ec/Ior	dB	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7
I_{oc}	dBm/3,84 MHz	–70		–70	
PCCPCH RSCP	dBm	-64	-66		
Propagation Condition		AWGN		AWGN	
Cell_selection_and_reselection_quality_measure		P-CCPCH RSCP			
Qqualmin	dB	[ ]			
Qrxlevmin	dBm	[ ]			
UE_TXPWR_MAX_RACH	dBm	[ ]			
Qoffset1_{s, n}	dB	C1, C2: [ ]			
Qhyst1	dB	[ ]			
PENALTY_TIME	s	C2: [ ]			
TEMP_OFFSET1	dB	C2: [ ]			
Treselection	s	[ ]			
$Ssearch_{RAT}$	dB	[ ]			

Table A.4-11~~8~~: Cell re-selection UTRAN to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-70	-60
RXLEV_ACCESS_MIN	dBm	[ ]	
MS_TXPWR_MAX_CCH	dBm	[ ]	

A.4.3.1.1.2 1.28Mcps TDD option

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.1.3. This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. Test parameters are given in Table A.4.3.1.1.2-1~~-9~~, A.4.3.1.1.2-2~~-10~~, A.43.1.1.2-3~~-11~~.
The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.
For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the ~~NTDD~~1.28Mcps TDD OPTION cell 1 is better ranked as the GSM cell 2 during T1 and the GSM cell 2 is better ranked than the ~~NTDD~~1.28Mcps TDD OPTION cell 1 during T2.

Table A.4.3.1.1.2-1~~-9~~: General test parameters for UTRAN (~~NTDD~~1.28Mcps TDD OPTION) to GSM Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
DRX cycle length		s	1,28	
T1		s	15	
T2		s	15	

Table A.4 3.1.1.2-24-10: Cell re-selection UTRAN to GSM cell case (cell 1)

Parameter	Unit	Cell 1 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
$\hat{I}_{or}/I_{oc}$	dB	[9]	[7]	[9]	[7]
I_{oc}	dBm/1.28 MHz	–70		–70	
PCCPCH RSCP	dBm	[-64]	[-66]		
Propagation Condition		AWGN		AWGN	
Cell_selection_and_reselection_quality_measure		P-CCPCH RSCP			
Treselection	s	[ ]			
$Ssearch_{RAT}$	dB	[ ]			

Table A.4.3.1.1.2-3-11: Cell re-selection UTRAN to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-80	-70
RXLEV_ACCESS_MIN	dBm	-100	
MS_TXPWR_MAX_CCH	dBm	30	

A.4.3.1.2 Test Requirements

A.4.3.1.2.1 3.84Mcps option

The requirements reported in section 4.3.2.1 shall be verified in more than [X %] of the cases.

A.4.3.1.2.2 1.28Mcps option

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send LOCATION UPDATING REQUEST message to perform a Location update.

The cell re-selection delay shall be less than [8] s.

NOTE:

The UE shall keep a running average of 4 measurements, thus gives 4*1280ms ($T_{measureGSM}$ Table 4.5), means 5.12 seconds can elapse from the beginning of time period T2 before the UE has finished the measurements to evaluate that the GSM cell fulfils the re-selection criteria.

The cell selection parameters in the BCCH of the GSM cell in system info 3 and 4 are transmitted at least every second.

A.5 UTRAN Connected Mode Mobility

unchanged

A.5.4 Cell Re-selection in CELL_FACH

A.5.4.1 One frequency present in neighbour list

A.5.4.1.1 Test Purpose and Environment

A.5.4.1.1.1 3.84Mcps TDD option

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL_FACH state in the single carrier case reported in section 5.4.2.1.1.
The test parameters are given in Table A.5.1 and A.5.2

Table A.5.1 General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
final condition	Active cell		Cell2	
T1		S		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.5.2 Cell specific test parameters for Cell Re-selection in CELL_FACH

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t$_{offset}$		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t$_{offset}$		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP		-74	-74			-74	-74			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/3.84 MHz	-70											
Propagation Condition		AWGN											

Note: PCCPCH_RSCP is the quality measure for cell selection and re-selection.

A.5.4.1.1.2 1.28Mcps TDD option

Note: Cell reselection in Cell-FACH is still under discussion.
The purpose of this test is to verify the requirement for the cell re-selection delay in CELL_FACH state in the single carrier case reported in section 5.4.2.1.1.
The test parameters are given in Table A. 5.4.1.1.2-1 and A. 5.4.1.1.2-2

Table A. 5.4.1.1.2-1 General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
final condition	Active cell		Cell2	
T1		S		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A. 5.4.1.1.2-2 Cell specific test parameters for Cell Re-selection in CELL_FACH

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	-64	-66			-66	-64			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst	DBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	DB	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	-74	-74			-74	-74			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst	DBm	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Treselection		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qintrasearch	DB	[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
I_{oc}	dBm/1.28 MHz	-70											
Propagation Condition		AWGN											

A.5.4.1.2 Test Requirements

The UE shall select cell 2 within a cell re-selection delay specified in 5.4.2.1.1

A.5.4.2 Two frequencies present in the neighbour list

A.5.4.2.1 Test Purpose and Environment

A.5.4.2.1.1 3.84Mcps TDD option

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL_FACH state in section 5.4.2.1.2.The test parameters are given in Table A.5.3 3 and A.5.4 4.

Table A.5.3: General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
final condition	Active cell		Cell2	
T1		S		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.5.4: Cell specific test parameters for Cell re-selection in CELL_FACH state

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		0		8		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	3	0	3	0	0	3	0	3	-3	-3	-3	-3
PCCPCH RSCP	dBm	-70	-73			-73	-70			-76	-76		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				Cell 5				Cell 6			
Timeslot		0		8		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		20	20	20	20	15	15	15	15	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS	dB	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
PCCPCH RSCP		-76	-76			-76	-76			-76	-76		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	dBm dB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/3.84 MHz	-70											
Propagation Condition		AWGN											

Note: PCCPCH_RSCP is the quality measure for cell selection and re-selection.

A.5.4.2.1.2 1.28Mcps TDD option

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL_FACH state in section 5.4.2.1.2. The test parameters are given in Table A. 5.4.2.1.2-1 and A. 5.4.2.1.2-2.

Table A. 5.4.2.1.2-1: General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
final condition	Active cell		Cell2	
T1		s		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A. 5.4.2.1.2-2: Cell specific test parameters for Cell re-selection in CELL_FACH state

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		0		DWPTS		0		DWPTS		0		DWPTS	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	[-64]	[-66]			[-66]	[-64]			[-74]	[-74]		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	DBm DB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				Cell 5				Cell 6			
Timeslot		0		DWPTS		0		DWPTS		0		DWPTS	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel				Channel 2				Channel			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	[-74]	[-74]			[-74]	[-74]			[-74]	[-74]		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	DBm DB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/1.28 MHz	-70											
Propagation Condition		AWGN											

Note: PCCPCH_RSCP is the quality measure for cell selection and re-selection.

A.5.4.2.2 Test Requirements

The UE shall select cell 2 within a cell re-selection delay specified in 5.4.2.1.2

A.5.5 Cell Re-selection in CELL_PCH

For 1.28Mcps TDD, same requirements and test cases valid as for cell re-selection in idle mode.

For 3.84Mcps TDD, the requirements and test cases is described as following.

A.5.5.1 One frequency present in the neighbour list

unchanged

A.5.6 Cell Re-selection in URA_PCH

For 1.28Mcps TDD, same requirements and test cases valid as for cell re-selection in idle mode.

For 3.84Mcps TDD, the requirements and test cases is described as following.

A.5.6.1 One frequency present in the neighbour list

unchanged

A.6 Dynamic channel allocation

NOTE: This section is included for consistency with numbering with section 6; currently no test covering requirements in this section exists.

A.7 Timing characteristics

NOTE: This section is included for consistency with numbering with section 7; currently no test covering requirements in this section exists.

A.8 UE Measurements Procedures

A.8.1 TDD intra frequency measurements

A.8.1.1 Event triggered reporting in AWGN propagation conditions

A.8.1.1.1 Test Purpose and Environment

A.8.1.1.1.1 3.84Mcps TDD option

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure A.8-1. The test parameters are shown in Table A.8-1. Hysteresis, absolute Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 1G reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

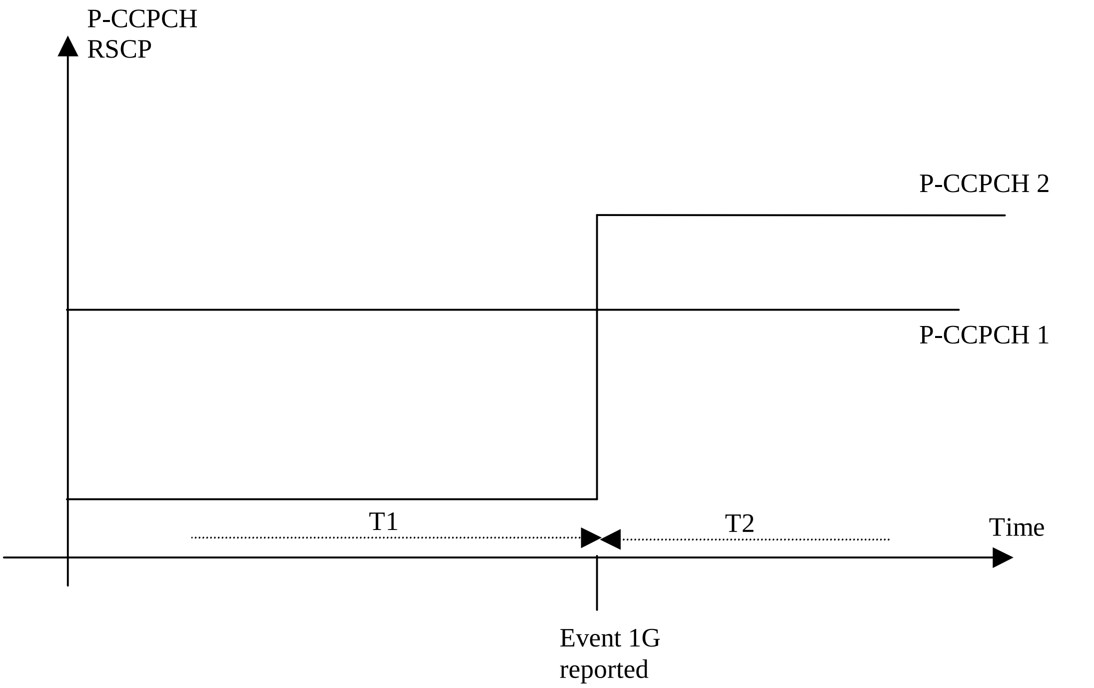

Figure A.8-1: Illustration of parameters for handover measurement reporting test case

Table A.8-1

Parameter	**Unit**	**Cell 1**				**Cell 2**			
Timeslot Number		0		8		0		8	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	15	15	15	15
PICH_Ec/Ior				-3	-3			-3	-3
OCNS		-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	3	3	3	3	-Infinity	5	-Infinity	5
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dB	-70	-70			-Infinity	-68		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

Note: The DPCH of all cells are located in an other timeslot than 0 or 8

A.8.1.1.1.2 1.28Mcps TDD option

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure A. 8.1.1.1.2. The test parameters are shown in Table A. 8.1.1.1.2. Hysteresis, absolute Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 1G reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

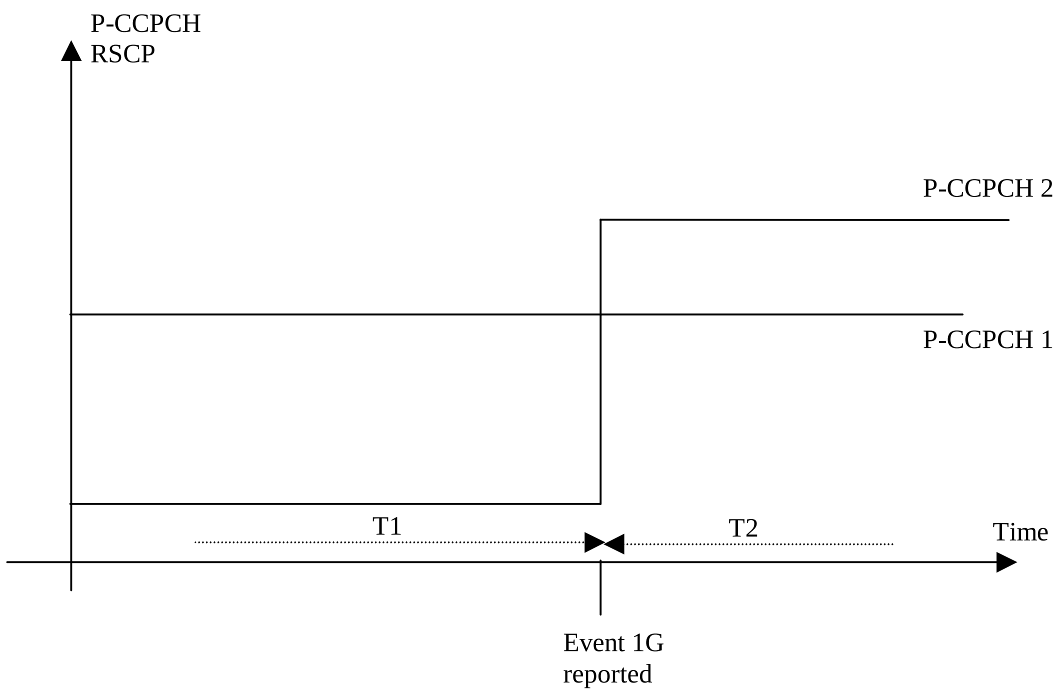

Figure A. 8.1.1.1.2: Illustration of parameters for handover measurement reporting test case

Table A. 8.1.1.1.2

Parameter	**Unit**	**Cell 1**				**Cell 2**			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
PCCPCH_RSCP	dBm	[-70]	[-70]			-Infinity	[-67]		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

NNote: The DPCH of all cells are located in a timeslot other than 0.

A.8.1.1.2 Test Requirements

The UE shall send one Event 1G triggered measurement report, with a measurement reporting delay less than [480] ms from the beginning of time period T2.
The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

A.8.2 TDD inter frequency measurements

A.8.2.1 Correct reporting of neighbours in AWGN propagation condition

A.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 8.1.2.2.

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure A.8-2. The test parameters are shown in Table A.8-2. Hysteresis, absolute Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 2C reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

The test parameters are shown in Table A.8-2.

Table A.8-2 Cell Specific Parameters for Correct Reporting of Neighbours in AWGN Propagation Condition

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		0		8	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 1		Channel 2		Channel 2	
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t$_{offset}$		0	0	0	0	15	15	15	15
PICH_Ec/Ior				-3	-3			-3	-3
OCNS		-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	3	3	3	3	-Infinity	6	-Infinity	6
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dB	-70	-70			-Infinity	-67		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

Note: The DPCH of all cells are located in an other timeslot than 0 or 8

A.8.2.1.2 Test Requirements

The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than [5] s from the beginning of time period T2.
The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

A.8.3 FDD measurements

A.8.3.1 Correct reporting of FDD neighbours in AWGN propagation condition

A.8.3.1.1 Test Purpose and Environment

A.8.3.1.1.1 3.84Mcps TDD option

This test will derive that the terminal makes correct reporting of an event. Cell 1 is current active cell, Cell 2 is a FDD cell. The power level of CPICH Ec/Io of cell 2 and the P-CCPCH RSCP of cell 1 is changed. Hysteresis, Absolute threshold and Time to Trigger values are given in the table below and they are signalled from test device. New measurement control information, which defines neighbour cells etc., is always sent before the handover starts. The number of neighbour cells in the measurement control information is FFS. The test parameters are shown in Table A.8-3.

Table A.8-3

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		n.a		n.a.	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
CPICH_Ec/Ior	dB	n.a.		n.a.		[ ]		[ ]	
PCCPCH_Ec/Ior	dB	-3	-3			[ ]		[ ]	
SCH_Ec/Ior	dB	-9	-9	-9	-9	[ ]		[ ]	
SCH_t_{offset}		0	0	0	0	n.a.		n.a.	
PICH_Ec/Ior				-3	-3	[ ]		[ ]	
DCH_Ec/Ior	dB	n.a.	n.a.	n.a.	n.a.	[ ]		[ ]	
OCNS	dB	-4,28	-4,28	-4,28	-4,28	[ ]		[ ]	
$\hat{I}_{or}/I_{oc}$	dB	[ ]	[ ]	[ ]	[ ]	[ ]		[ ]	
I_{oc}	dBm/3.84 MHz	-70				-70			
CPICH_Ec/Io		n.a.				[ ]			
PCCPCH_RSCP	dB	[ ]	[ ]	[ ]	[ ]	n.a.		n.a.	
Absolute Threshold (SIR)	dB	[ ]				[ ]			
Hysteresis	dB	[ ]				[ ]			
Time to Trigger	msec	[ ]				[ ]			
Propagation Condition		AWGN				AWGN			

Note: The DPCH of the TDD cell is located in an other timeslot than 0 or 8

A.8.3.1.1.2 1.28Mcps TDD option

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 8.1.2.2.

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure A. 8.1.1.1.2. The test parameters are shown in Table A. 8.3.1.1.2. Hysteresis, absolute Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 2C reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

The test parameters are shown in Table A. 8.3.1.1.2.

Table A. 8.3.1.1.2 Cell Specific Parameters for Correct Reporting of Neighbours in AWGN Propagation Condition

Parameter	**Unit**	**Cell 1**				**Cell 2**			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
PCCPCH_RSCP	dBm	[-70]	[-70]			-Infinity	[-67]		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

Note: The DPCH of all cells are located in a timeslot other than 0.

A.8.3.1.2 Test Requirements

A.8.3.1.2.1 3.84Mcps TDD option

The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than [5] seconds from the start of time period T2.
The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

A.8.3.1.2.2 1.28Mcps TDD option

The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than [5] s from the beginning of time period T2.
The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

A.9 Measurement Performance Requirements

Unless explicitly stated:

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12.2 kbps as defined in TS 25.102 annex A. This measurement channel is used both in active cell and cells to be measured.
- Cell 1 is the active cell.
- Single task reporting.

Power control is active.

A.9.1 Measurement Performance for UE

If not otherwise stated, the test parameters in table A.9.1 should be applied for 3.84Mcps TDD UE RX measurements requirements and the test parameters in table A.9.1.1-1 should be applied for 1.28Mcps TDD UE RX measurements requirements, in this clause.

A.9.1.1 TDD intra frequency measurements

A.9.1.1.1 3.84Mcps TDD option

In this case all cells are on the same frequency. The table A.9.1 and notes 1-5 define the limits of signal strengths and code powers, where the requirement is applicable.

Table A.9.1 Intra frequency test parameters for UE RX Measurements

Parameter	Unit	Cell 1		Cell 2	
UTRA RF Channel number		Channel 1		Channel 1	
Timeslot		0	8	0	8
P-CCPCH Ec/Ior	dB	-3	-	-3	-
SCH Ec/Ior	dB	-9	-9	-9	-9
PICH_Ec/Ior	dB	-	-3	-	-3
OCNS	dB	-4,28	-4,28	-4,28	-4,28
Îor/Ioc	dB	[ ]		[ ]	
Ioc	dBm/ 3,84 MHz	-70		-70	
Range 1:Io *Range 2: Io*	dBm	-94..-70 -94..-50		-94..-70 -94..-50	
Propagation condition	-	AWGN		AWGN	

Note 1: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* |≤ 20 dB.

Note 3: | *Io – P-CCPCH_Ec/Ior*| ≤ [20] dB.

Note 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

Note 5: The DPCH of all cells are located in an other timeslot than 0 or 8

A.9.1.1.2 1.28Mcps TDD option

If not otherwise stated, the test parameters in table A.9.1.1.2 should be applied for UE RX measurements requirements in this section.

Table A. 9.1.1.2 Intra frequency test parameters for UE RX Measurements

Parameter	**Unit**	**Cell 1**				**Cell 2**			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
Range 1:Io *Range 2:Io*	dBm	-94..-70 –94..-50				-94..-70 –94..-50			
Propagation condition	AWGN								

Note 1: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* |≤ 20 dB.

Note 3: | *Io – P-CCPCH_RSCP*| ≤ [20] dB.

Note 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

Note 5: The DPCH of all cells are located in a timeslot other than 0

A.9.1.2 TDD inter frequency measurements

A.9.1.2.1 3.84Mcps TDD option

In this case all cells are on the same frequency. The table A.9.2 and notes 1-5 define the limits of signal strengths and code powers, where the requirement is applicable.

Table A.9.2 Inter frequency test parameters for UE RX Measurements

Parameter	Unit	Cell 1		Cell 2	
UTRA RF Channel number		Channel 1		Channel 2	
Timeslot		0	8	0	8
P-CCPCH Ec/Ior	dB	-3	-	-3	-
SCH Ec/Ior	dB	-9	-9	-9	-9
PICH_Ec/Ior	dB	-	-3	-	-3
OCNS	dB	-4,28	-4,28	-4,28	-4,28
Îor/Ioc	dB	[ ]		[ ]	
Ioc	dBm/ 3,84 MHz	-70		-70	
Range 1:Io *Range 2: Io*	dBm	-94..-70 -94..-50		-94..-70 -94..-50	
Propagation condition	-	AWGN		AWGN	

Note 1: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* |≤ 20 dB.

Note 3: | *Io – P-CCPCH_Ec/Ior*| ≤ [20] dB.

Note 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

Note 5: The DPCH of all cells are located in an other timeslot than 0 or 8

A.9.1.2.2 1.28Mcps TDD option

If not otherwise stated, the test parameters in table A. 9.1.2.2 should be applied for UE RX measurements requirements in this section.

Table A. 9.1.2.2 Intra frequency test parameters for UE RX Measurements

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
Range 1:Io *Range 2:Io*	dBm	-94..-70 –94..-50				-94..-70 –94..-50			
Propagation condition	AWGN								

Note 1: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* |≤ 20 dB.

Note 3: | *Io –P-CCPCH_RSCP1,2*| ≤ [20] dB.

Note 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

Note 5: The DPCH of all cells are located in a timeslot other than 0

A.9.1.3 FDD inter frequency measurements

A.9.1.3.1 3.84Mcps TDD option

In this case both cells are in different frequency. Table A.9.3 and notes 1-6 define the limits of signal strengths and code powers, where the requirement is applicable.

Table A.9.3 CPICH Inter frequency test parameters

Parameter	Unit	Cell 1		Cell 2
Timeslot Number		0	8	n.a
UTRA RF Channel Number		Channel 1		Channel 2
CPICH_Ec/Ior	dB	n.a.	n.a.	-10
P-CCPCH_Ec/Ior	dB	-3		-12
SCH_Ec/Ior	dB	-9	-9	-12
SCH_t_{offset}		0	0	n.a.
PICH_Ec/Ior			-3	-15
DPCH_Ec/Ior	dB	n.a.	n.a.	-15
OCNS	dB	-4.28	-4.28	-1,11
$\hat{I}_{or}/I_{oc}$	dB	[]	[]	10,5
I_{oc}	dBm/3,84 MHz	-70		Note 5
Range 1:Io *Range 2: Io*	dBm	-94..-70 -94..-50		-94..-70 -94..-50
Propagation condition	-	AWGN		AWGN

Note 1: *CPICH_RSCP1,2* ≥ -114 dBm.

Note 2: | *CPICH_RSCP1 – CPICH_RSCP2* | ≤ 20 dB

Note 3: | *Channel 1_Io –Channel 2_Io*| ≤ 20 dB

Note 4: | *Io – CPICH_Ec/Ior*| ≤ 20 dB

Note 5: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*. *Io –10,6 dB = Ioc*

Note 6: The DPCH of the TDD cell is located in an other timeslot than 0 or 8

A.9.1.4 UTRA carrier RSSI inter frequency measurements

A.9.1.4.1 3.84Mcps TDD option

The table A.9.4 and notes 1,2 define the limits of signal strengths, where the requirement is applicable.

Table A.9.4UTRA carrier RSSI Inter frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channei number	-	Channel 1	Channel 2

Îor/Ioc	dB	-1	-1
Ioc	dBm/ 3.84 MHz	Note 2	Note 2
Range 1: Io *Range 2: Io*	dBm/ 3,84 MHz	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

Note 1: For relative accuracy requirement | *Channel 1_Io –Channel 2_Io* | *< 20 dB.*

Note 2: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

A.9.1.4.2 1.28Mcps TDD option

The table A.9.1.4.2 and notes 1,2 define the limits of signal strengths, where the requirement is applicable.

Table A.9.1.4.2 UTRA carrier RSSI Inter frequency test parameters

Parameter	**Unit**	**Cell 1**	**Cell 2**
UTRA RF Channei number	-	Channel 1	Channel 2
Îor/Ioc	DB	-1	-1
Ioc	dBm/1.28 MHz	Note 2	Note 2
Range 1: Io *Range 2: Io*	dBm/1.28 MHz	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

Note 1: For relative accuracy requirement | *Channel 1_Io –Channel 2_Io* | *< 20 dB.*

Note 2: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

A.9.2 Measurement Performance for UTRAN

A.9.2.1 UTRAN RX measurements

A.9.2.1.1 3.84Mcps TDD option

If not otherwise stated, the test parameters in table A.9.5 should be applied for UTRAN RX measurements requirements in this clause.

Table A.9.5 Intra frequency test parameters for UTRAN RX Measurements

Parameter	**Unit**	**Cell 1**
UTRA RF Channel number		Channel 1
Timeslot		[ ]
DPCH Ec/Ior	dB	[ ]
Îor/Ioc	dB	[ ]
Ioc	dBm/ 3,84 MHz	-89
Range: Io	dBm	-105..-74
Propagation condition	-	AWGN

A.9.2.1.2 1.28Mcps TDD option

If not otherwise stated, the test parameters in table A.9.2.1.2 should be applied for UTRAN RX measurements requirements in this section.

Table A.9.2.1.2 Intra frequency test parameters for UTRAN RX Measurements

Parameter	**Unit**	**Cell 1**
UTRA RF Channel number		Channel 1
Timeslot		[ ]

DPCH Ec/Ior	dB	[ ]
Îor/Ioc	dB	[ ]
Ioc	dBm/1.28 MHz	-89
Range: Io	dBm	-105..-74
Propagation condition	AWGN	

3GPP TSG RAN WG4 Meeting #16 **R4-01-029**

Vienna, Austria 19th - 23rd February 2001

CR-Form-v3

CHANGE REQUEST

⌘ **25.142**	**CR 56**	⌘ rev	**-**	⌘ Current version:	**3.4.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title:	⌘ BS Conformance test for 1.28Mcps TDD		
Source:	⌘ RAN WG4		
Work item code:	⌘ LCRTDD-RF	***Date:*** ⌘	19 February 2001
Category:	⌘ **B**	***Release:*** ⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change: ⌘	This CR collects the principally agreed wording of the changes necessary for introducing the feature '1.28Mcps TDD option' in the TS25.142. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.
Summary of change: ⌘	Based on the approved contents of TR25.945, the '1.28Mcps TDD option' related descriptions are add in the corresponding sections in existing TS25.142
Consequences if not approved: ⌘	

Clauses affected: ⌘	
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments: ⌘	

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Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3GPP TS 25.142 V3.4.0 (2000-12)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Radio Access Networks;
Base station conformance testing (TDD)
(Release 1999)

Keywords

UMTS, radio, base station, testing, TDM

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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:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

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

The present document specifies the Radio Frequency (RF) test methods and conformance requirements for UTRA Base Stations (BS) operating in the TDD mode. These have been derived from, and are consistent with, the UTRA base station (BS) specifications defined in 3GPP TS 25.105 [1]. The document covers both options of the TDD mode, which are the 3,84 Mcps and the 1,28 Mcps options respectively. The requirements are listed in different subsections only if the parameters deviate.

In this TS, the reference point for RF connections (except for the measurement of mean transmitted RF carrier power) is the antenna connector, as defined by the manufacturer. This TS does not apply to repeaters or RF devices which may be connected to an antenna connector of a BS.

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 3GPP TS 25.105: " UTRA (BS) TDD; Radio transmission and reception ".

[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 721: "Classification of environmental conditions".

[4] IEC 68-2: "Basic environmental testing procedures; Part 2: Tests".

[5] ETR 028: "Uncertainties in the measurement of mobile radio equipment characteristics".

[6] Recommendation ITU-R SM.329-7: "Spurious emissions".

[7] Recommendation ITU-R SM.328-9: "Spectra and bandwidth of emissions".

[8] ETSI EN 300 019-1: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1: Classification of environmental conditions Introduction".

3 Definitions, symbols, and abbreviations

For the purposes of the present document, the following definitions, symbols and abbreviations apply:

3GPP	3rd Generation Partnership Project
α	Roll-off factor
dB	decibel
dBm	decibel relative to 1 milliWatt

DPCHo	Mechanism used to simulate an individual intracell interferer in the cell with one code and a spreading factor of 16
$\frac{DPCH_o\_E_c}{I_{or}}$	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
EVM	Error Vector Magnitude
F	Frequency (of the assigned channel frequency of the wanted signal)
Fuw	Frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal
IMT-2000	International Mobile Telecommunications 2000
Ioc	Power spectral density of a band limited white noise source (simulating interference form other cells) as measured at the BS antenna connector.
Îor	Received power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
IPR	Intellectual Property Rights
P	Transmit power
Pout	Output power of the base station; defined as the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter during one slot
Pmax	Maximum output power of the base station; defined as the mean power level per carrier over an active timeslot measured at the antenna connector for a specified reference condition
RBER	Residual BER
REFSENS	Reference Sensitivity Level
RMS	Root-Mean Square
PRAT	Rated output power of the base station; defined as the mean power level per carrier over an active timeslot that the manufacturer has declared to be available at the antenna connector
RRC	Root-Raised Cosine
T_C	Chip duration
TS	Time Slot

4 Frequency bands and channel arrangement

4.1 General

The information presented in this section is based on a chip rate of 3,84 Mcps and 1,28Mcps respectively.

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

4.2 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.

4.3 TX–RX frequency separation

4.3.1 3,84Mcps 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.

4.3.2 1,28Mcps 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 UL and all main timeslots (at least the last one) after the single switching point are allocated DL.

4.4 Channel arrangement

4.4.1 Channel spacing

4.4.1.1 3,84Mcps TDD option

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

4.4.1.2 1,28Mcps TDD option

The nominal channel spacing is 1,6 MHz, but this can be adjusted to optimize performance in a particular deployment scenario.

4.4.2 Channel raster

The channel raster is 200 kHz, which means that the carrier frequency must be a multiple of 200 kHz.

4.4.3 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:

$N_t = 5 * F$ MHz $0{,}0 \leq F \leq 3276{,}6$ MHz   where F is the carrier frequency in MHz

5 General test conditions and declarations

The requirements of this clause apply to all tests in this TS, when applicable.

The general conditions during the tests should be according to the relevant parts of ETR 027 [2] (methods of measurement for mobile radio equipment) with the exceptions and additions defined in the individual tests.

Many of the tests in this TS measure a parameter relative to a value which is not fully specified in the UTRA specifications. For these tests, the conformance requirement is determined relative to a nominal value specified by the manufacturer.

Certain functions of a BS are optional in the UTRA specifications. Some requirements for the BS may be regional as listed in subclause 5.15.

When specified in a test, the manufacturer shall declare the nominal value of a parameter, or whether an option is supported.

5.1 Base station classes

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

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

5.2 Output power

The manufacturer shall declare the rated output power, PRAT, of the base station which is defined as the mean power level per carrier over an active timeslot available at the antenna connector; see subclause 6.2.

5.3 Specified frequency range

The manufacturer shall declare:

- which of the frequency bands defined in sub-clause 4.2 is supported by the BS.
- the frequency range within the above frequency band(s) supported by the BS. As TDD is employed, the same frequency range is used for transmit and receive operation.

Many tests in this TS are performed with appropriate frequencies in the bottom, middle and top of the operating frequency band of the BS. These are denoted as RF channels B (bottom), M (middle) and T (top).

When a test is performed by a test laboratory, the UARFCNs to be used for RF channels B, M and T shall be specified by the laboratory. The laboratory may consult with operators, the manufacturer or other bodies.

When a test is performed by a manufacturer, the UARFCNs to be used for RF channels B, M and T may be specified by an operator.

5.4 Relationship between RF generation and chip clock

The manufacturer shall declare compliance with the requirement that the BS shall use the same frequency source for both RF generation and the chip clock.

5.5 Spectrum emission mask

The manufacturer shall declare whether the BS under test is intended to operate in regions where conformance to the spectrum emission mask defined in subclause 6.6.2.1.2 is mandatory. If so, the conformance test for spectrum emission mask specified in subclause 6.6.2.1 shall be performed; otherwise, this test is not required.

5.6 Adjacent Channel Leakage power Ratio (ACLR)

The manufacturer shall declare:

- whether the BS under test is intended to operate in proximity to another TDD BS or FDD BS operating on the first or second adjacent frequency. If so, conformance with the ACLR requirement specified in subclause 6.6.2.2.2.2 is mandatory; otherwise, this requirement needs not to be tested.
- whether the BS under test is intended to operate co-sited to another TDD BD or FDD BS operating on the first or second adjacent frequency. If so, conformance with the ACLR requirement specified in subclause 6.6.2.2.2.3 is mandatory; otherwise, this requirement needs not to be tested.

5.7 Tx spurious emissions

5.7.1 Category of spurious emissions limit

The manufacturer shall declare one of the following:

a) the BS shall be tested against Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-7 [6].

or

b) the BS shall be tested against Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-7 [6].

If the manufacturer declares Category A limits to be applicable, conformance with the spurious emissions requirements specified in subclause 6.6.3.2.1.1 is mandatory, and the requirements specified in subclause 6.6.3.2.1.2 need not to be tested. If the manufacturer declares Category B limits to be applicable, conformance with the spurious emissions requirements specified in subclause 6.6.3.2.1.2 is mandatory, and the requirements specified in subclause 6.6.3.2.1.1 need not to be tested.

5.7.2 Co-existence with GSM

The manufacturer shall declare:

- whether the BS under test is intended to operate in geographic areas in which also GSM 900 is deployed. If so, compliance with the conformance requirement specified in subclause 6.6.3.2.2.1 is mandatory; otherwise, this requirement needs not to be tested.
- whether the BS under test is intended to operate co-located with a GSM 900 BTS. If so, compliance with the conformance requirement specified in subclause 6.6.3.2.2.2 is mandatory; otherwise, this requirement needs not to be tested.

5.7.3 Co-existence with DCS 1800

The manufacturer shall declare:

- whether the BS under test is intended to operate in geographic areas in which also DCS 1800 is deployed. If so, compliance with the conformance requirement specified in subclause 6.6.3.2.3.1 is mandatory; otherwise, this requirement needs not to be tested.
- whether the BS under test is intended to operate co-located with a DCS 1800 BTS. If so, compliance with the conformance requirement specified in subclause 6.6.3.2.3.2 is mandatory; otherwise, this requirement needs not to be tested.

5.7.4 Co-existence with UTRA FDD

The manufacturer shall declare:

- whether the BS under test is intended to operate in geographic areas in which also UTRA FDD is deployed. If so, compliance with the conformance requirement specified in subclause 6.6.3.2.4.1 is mandatory; otherwise, this requirement needs not to be tested.
- whether the BS under test is intended to operate co-located with a UTRA FDD BS. If so, compliance with the conformance requirement specified in subclause 6.6.3.2.4.2 is mandatory; otherwise, this requirement needs not to be tested.

5.8 Blocking characteristics

The conformance requirements with respect to the parameter blocking characteristics are dependent on the operating frequency bands of the BS under test; see subclause 7.5.2. However, no additional declaration is required; the need for a manufacturer's declaration of the frequency bands supported by the BS is already covered by subclause 5.3. The relationship between the frequency bands supported by the BS and the mandatory blocking requirements is given in table 5.8.1.

Table 5.8.1: Relationship between the frequency bands supported by the BS and the mandatory blocking requirements

Supported frequency band according to manufacturer's declaration	Mandatory blocking requirement
subclause 4.2a)	table 7.5.2.1
subclause 4.2b)	table 7.5.2.2
subclause 4.2c)	table 7.5.2.3

5.9 Test environments

For each test in this TS, the environmental conditions under which the BS is to be tested are defined.

5.9.1 Normal test environment

When a normal test environment is specified for a test, the test should be performed under any combination of conditions between the minimum and maximum limits stated in table 5.9.1.1.

Table 5.9.1.1: Limits of conditions for Normal Test Environment

Condition	Minimum	Maximum
Barometric pressure	86 kPa	106 kPa
Temperature	15°C	30°C
Relative Humidity	20 %	85 %
Power supply	Nominal, as declared by the manufacturer	
Vibration	Negligible	

The ranges of barometric pressure, temperature and humidity represent the maximum variation expected in the uncontrolled environment of a test laboratory. If it is not possible to maintain these parameters within the specified limits, the actual values shall be recorded in the test report.

NOTE: This may, for instance, be the case for measurements of radiated emissions performed on an open field test site.

5.9.2 Extreme test environment

The manufacturer shall declare one of the following:

a) The equipment class for the equipment under test, as defined in EN 300 019-1-3, (Equipment Engineering (EE); Environmental conditions and environmental test for telecommunications equipment, Part 1-3: Classification of environmental conditions, Stationary use at weather protected locations).

b) The equipment class for the equipment under test, as defined in EN 300 019-1-4, (Equipment Engineering (EE); Environmental conditions and environmental test for telecommunications equipment, Part 1-4: Classification of environmental conditions, Stationary use at non-weather protected locations).

c) For equipment that does not comply to an EN 300 019-1 [8] class, the relevant classes from IEC 721 [3] documentation for Temperature, Humidity and Vibration shall be declared.

NOTE: Reduced functionality for conditions that fall out side of the standard operational conditions are not tested in this TS. These may be stated and tested separately.

5.9.2.1 Extreme temperature

When an extreme temperature test environment is specified for a test, the test shall be performed at the standard minimum and maximum operating temperatures defined by the manufacturer's declaration for the equipment under test.

Minimum temperature:

> The test shall be performed with the environmental test equipment and methods of inducing the required environmental phenomena into the equipment, conforming to the test procedure of IEC 68-2-1 [4], Environmental Testing, Part 2: Tests - Tests A: Cold. The equipment shall be maintained at the stabilized condition for the duration of the test sequence.

Maximum temperature:

> The test shall be performed with the environmental test equipment and methods of inducing the required environmental phenomena in to the equipment, conforming to the test procedure of IEC 68-2-2 [4] (Environmental Testing, Part 2: Tests - Tests Bd Dry heat). The equipment shall be maintained at the stabilized condition for the duration of the test sequence.

NOTE: It is recommended that the equipment is made fully operational prior to the equipment being taken to its lower operating temperature.

5.9.3 Vibration

When vibration conditions are specified for a test, the test shall be performed while the equipment is subjected to a vibration sequence as defined by the manufacturers declaration for the equipment under test. This shall use the environmental test equipment and methods of inducing the required environmental phenomena in to the equipment, conforming to the test procedure of IEC 68-2-6 [4], Environmental Testing, Part 2: Tests - Test Fc and guidance: Vibration (Sinusoidal). Other environmental conditions shall be within the ranges specified in subclause 5.9.1, Normal test environment.

NOTE: The higher levels of vibration may induce undue physical stress in to equipment after a prolonged series of tests. The testing body should only vibrate the equipment during the RF measurement process.

5.9.4 Power supply

When extreme power supply conditions are specified for a test, the test shall be performed at the standard upper and lower limits of operating voltage defined by the manufacturer's declaration for the equipment under test.

Upper voltage limit

The equipment shall be supplied with a voltage equal to the upper limit declared by the manufacturer (as measured at the input terminals to the equipment). The tests shall be carried out at a steady state minimum and maximum limit declared by the manufacturer for the equipment, to the methods described in IEC 68-2-1 [4] Test Ab/Ad: Cold and IEC 68-2-2 Test Bb/Bd: Dry Heat.

Lower voltage limit

The equipment shall be supplied with a voltage equal to the lower limit declared by the manufacturer (as measured at the input terminals to the equipment). The tests shall be carried out at a steady state minimum and maximum limit declared by the manufacturer for the equipment, to the methods described in IEC 68-2-1 [4] Test Ab/Ad: Cold and IEC 68-2-2 [4] Test Bb/Bd: Dry Heat.

5.9.5 Acceptable uncertainty of measurement equipment

The maximum acceptable uncertainty of measurement equipment is specified separately for each test, where appropriate. The measurement equipment shall enable the stimulus signals in the test case to be adjusted to within the specified tolerance, and the conformance requirement to be measured with an uncertainty not exceeding the specified values. All tolerances and uncertainties are absolute values and are valid for a confidence level of 95 %, unless otherwise stated.

It should be noted that the stated uncertainties in subclause 4.1 apply to the test equipment only and do not include system effects due to mismatch between the DUT and the test equipment.

Subclause 5.9, Test environments:

Pressure	± 5 kPa
Temperature	± 2 degrees
Relative Humidity	± 5 %
DC Voltage	± 1,0 %
AC Voltage	± 1,5 %
Vibration	10 %
Vibration frequency	0,1 Hz

The above values shall apply unless the test environment is controlled and the specification for the control of the test environment specifies the uncertainty for the parameter.

Transmitter

Subclause 6.2, Base station maximum output power:

Conformance requirement:

RF power, for static power step 0 ± 1,0 dB

Subclause 6.3, Frequency stability:

Conformance requirement:

Frequency ± 10 Hz

Subclause 6.4, Output power dynamics

Conformance requirement:

RF power, for static power steps (minimum and maximum Tx power)	± 1,0 dB
Relative RF Power	± 0,7 dB

Subclause 6.5, Transmit OFF power:

Conformance requirement:

RF power difference

Power difference < 50 dB	± 0,7 dB
Power difference ≥ 50 dB	± 1,5 dB

Subclause 6.6, Output RF spectrum emissions

Conformance requirement:

RF power difference

Power difference < 50 dB	± 0,7 dB
Power difference ≥ 50 dB	± 1,5 dB

Relative RF power:

Table 5.9.5.1: Acceptable uncertainty of relative RF power measurements

Offset from carrier, MHz	Power difference, dB	Uncertainty of relative power, dB

Spurious emissions

RF power

- inside the BS transmit band ± 1.5 dB

- outside the BS transmit band:

f ≤ 2 GHz ± 1.5 dB

2 GHz < f ≤ 4 GHz ± 2.0 dB

f > 4 GHz ± 4.0 dB

Subclause 6.7, Transmit intermodulation:

Test case:

Relative RF power (of injected signal) ± 1.5 dB

Conformance requirement (outside RX band):

RF power; absolute limit values ± 1.5 dB

RF power, relative measurements ± 2.0 dB

Conformance requirement (inside RX band):

RF power; absolute limit values +4 dB -3 dB

NOTE: The positive limit for uncertainty is greater than the negative limit because the measurement result can be increased (but not decreased) due to intermodulation products within the measurement apparatus.

Receiver

Where a measurement uncertainty of +5 dB -0 dB is specified for an input signal, the measured value of the input signal should be increased by an amount equal to the uncertainty with which it can be measured. This will ensure that the true value of the input signal is not below the specified nominal.

Subclause 7.2, Reference sensitivity level

Test case:

RF power ± 1.0 dB

Subclause 7.3, Dynamic range:

Test case:

RF power ± 1.5 dB

Relative RF power ± 3.0 dB

Subclause 7.4, Adjacent Channel Selectivity (ACS):

Test case:

RF power ± 1.5 dB

Relative RF power ± 3.0 dB

Subclause 7.5, Blocking characteristics:

Test case:

RF power, wanted signal ± 1.0 dB

RF power, interfering signal;

f ≤ 2 GHz ± 0.7 dB

2 GHz < f ≤ 4 GHz ± 1.5 dB

f > 4 GHz ± 3.0 dB

Subclause 7.6, Intermodulation characteristics:

Test case:

RF power, wanted signal ± 1.0 dB

RF power, interfering signals ± 0.7 dB

Subclause 7.7, Spurious emissions:

Conformance requirement:

RF power;

f ≤ 2 GHz ± 1.5 dB

2 GHz < f ≤ 4 GHz ± 2.0 dB

f > 4 GHz ± 4.0 dB

5.9.6 Test tolerances

The following values may be increased only on a test by test basis. The test tolerances should not be increased to take account of commonly known test system errors (such as mismatch, cable loss, etc.)

Transmitter

Subclause 6.2, Base station maximum output power:

Conformance requirement:

RF power, for static power step 0 [± 1,0] dB

Subclause 6.3, Frequency stability:

Conformance requirement:

Frequency ± [10] Hz

Subclause 6.4, Output power dynamics

Conformance requirement:

RF power, for static power steps (minimum and maximum Tx power) ± [1,0] dB

Relative RF Power ± [0,7] dB

Subclause 6.5, Transmit OFF power:

Conformance requirement:

RF power difference

Power difference < 50 dB ± [0,7] dB

Power difference ≥ 50 dB ± [1,5] dB

Subclause 6.6, Output RF spectrum emissions

Conformance requirement:

RF power difference

Power difference < 50 dB ± [0,7] dB

Power difference ≥ 50 dB ± [1,5] dB

Relative RF power:

Table 5.9.6.1: Acceptable uncertainty of relative RF power measurements

Offset from carrier, MHz	Power difference, dB	Uncertainty of relative power, dB

Spurious emissions

RF power

- inside the BS transmit band ± [1.5] dB

- outside the BS transmit band:

f ≤ 2 GHz ± [1.5] dB

2 GHz < f ≤ 4 GHz ± [2.0] dB

f > 4 GHz ± [4.0] dB

Subclause 6.7, Transmit intermodulation:

Test case:

Relative RF power (of injected signal) ± [1.5] dB

Conformance requirement (outside RX band):

RF power; absolute limit values ± [1.5] dB

RF power, relative measurements ± [2.0] dB

Conformance requirement (inside RX band):

RF power; absolute limit values +[4] dB –[3] dB

NOTE: The positive limit for uncertainty is greater than the negative limit because the measurement result can be increased (but not decreased) due to intermodulation products within the measurement apparatus.

Receiver

Where a measurement uncertainty of +5 dB -0 dB is specified for an input signal, the measured value of the input signal should be increased by an amount equal to the uncertainty with which it can be measured. This will ensure that the true value of the input signal is not below the specified nominal.

Subclause 7.2, Reference sensitivity level

Test case:

RF power ± [1.0] dB

Subclause 7.3, Dynamic range:

Test case:

RF power ± [1.5] dB

Relative RF power ± [3.0] dB

Subclause 7.4, Adjacent Channel Selectivity (ACS):

Test case:

RF power ± [1.5] dB

Relative RF power ± [3.0] dB

Subclause 7.5, Blocking characteristics:

Test case:

RF power, wanted signal ± [1.0] dB

RF power, interfering signal;

$f \leq 2$ GHz ± [0.7] dB

2 GHz < $f \leq 4$ GHz ± [1.5] dB

$f > 4$ GHz ± [3.0] dB

Subclause 7.6, Intermodulation characteristics:

Test case:

RF power, wanted signal ± [1.0] dB

RF power, interfering signals ± [0.7] dB

Subclause 7.7, Spurious emissions:

Conformance requirement:

RF power;

$f \leq 2$ GHz ± [1.5] dB

2 GHz < $f \leq 4$ GHz ± [2.0] dB

$f > 4$ GHz ± [4.0] dB

5.10 Interpretation of measurement results

Compliance with the requirement is determined by comparing the measured value (or derived value from the measured one) with the test limit. The test limit shall be calculated by adding the specified limit in the core requirement using the test tolerance as specified in subclause 5.9.6.

The actual measurement uncertainty of the test equipment for the measurement of each parameter shall be included in the test report.

The recorded value for the test equipment uncertainty shall be, for each measurement, equal to or lower than the appropriate figure in subclause 5.9.5 of this TS.

If the test equipment for a test is known to have a measurement uncertainty greater than that specified in subclause 5.9.5, it is still permitted to use this equipment provided that an adjustment is made to the measured value as follows:

The initial test limit is derived as above. Any additional uncertainty in the test equipment over and above that specified in subclause 5.9.5 shall be used to tighten the test limit. This procedure will ensure that test equipment not compliant with subclause 5.9.5 does not increase the chance of passing a device under test where that device would otherwise have failed the test if test equipment compliant with subclause 5.9.5 had been used.

5.11 Selection of configurations for testing

Most tests in this TS are only performed for a subset of the possible combinations of test conditions. For instance:

- Not all TRXs in the configuration may be specified to be tested.
- Only one RF channel may be specified to be tested.
- Only one timeslot may be specified to be tested.

When a test is performed by a test laboratory, the choice of which combinations are to be tested shall be specified by the laboratory. The laboratory may consult with operators, the manufacturer or other bodies.

When a test is performed by a manufacturer, the choice of which combinations are to be tested may be specified by an operator.

5.12 BS Configurations

This TS has been written to specify tests for the standard configurations of BS which have been assumed in UTRA requirements specifications, in particular TS 25.105 " UTRA (BS) TDD; Radio transmission and Reception " [1]. However, there are other configurations of BS which comply with these specifications, but for which the application of these specifications is not fully defined. For some such configurations there may be alternate ways to apply the requirements of this specification to testing of the configuration, or some variation in the test method may be necessary. It may therefore be necessary for the parties to the testing to reach agreement over the method of testing in advance.

If the BS is supplied in a number of different environmental enclosures or configurations, it may not be necessary to test RF parameters for each environmental configuration, provided that it can be demonstrated that the equipment has been tested at the worst internal environmental conditions.

Where alternative interpretations of this specification are possible for a BS configuration under test, the interpretation which has been adopted in performing the test shall be recorded with the test results.

Where variation in the test method within this TS has been necessary to enable a BS configuration to be tested, the variation in the test method which has been made in performing the test shall be recorded with the test results. Where possible, agreement should be reached in advance about the nature of such a variation with any party who will later receive the test results.

Possible interpretations of this TS for some common configurations are given in the following subclauses.

5.12.1 Receiver diversity

For the tests in clause 7 of this TS, the specified test signals shall be applied to one receiver antenna connector, with the remaining receiver antenna connectors being terminated with 50 ohms.

5.12.2 Duplexers

Due to TDD operation, there is no need to use a duplexer in the BS.

5.12.3 Power supply options

If the BS is supplied with a number of different power supply configurations, it may not be necessary to test RF parameters for each of the power supply options, provided that it can be demonstrated that the range of conditions over which the equipment is tested is at least as great as the range of conditions due to any of the power supply configurations.

This applies particularly if a BS contains a DC rail which can be supplied either externally or from an internal mains power supply. In this case, the conditions of extreme power supply for the mains power supply options can be tested by testing only the external DC supply option. The range of DC input voltages for the test should be sufficient to verify the performance with any of the power supplies, over its range of operating conditions within the BS, including variation of mains input voltage, temperature and output current.

5.12.4 Ancillary RF amplifiers

Ancillary RF amplifier: a piece of equipment, which when connected by RF coaxial cables to the BS, has the primary function to provide amplification between the transmit and/or receive antenna connector of a BS and an antenna without requiring any control signal to fulfil its amplifying function.

The requirements of this TS shall be met with the ancillary RF amplifier fitted. At tests according to clause 6 and 7 for TX and RX respectively, the ancillary amplifier is connected to the BS by a connecting network (including any cable(s), attenuator(s), etc.) with applicable loss to make sure the appropriate operating conditions of the ancillary amplifier and the BS. The applicable connecting network loss range is declared by the manufacturer. Other characteristics and the temperature dependence of the attenuation of the connecting network are neglected. The actual attenuation value of the connecting network is chosen for each test as one of the applicable extreme values. The lowest value is used unless otherwise stated.

Sufficient tests should be repeated with the ancillary amplifier fitted and, if it is optional, without the ancillary RF amplifier to verify that the BS meets the requirements of this TS in both cases.

5.12.5 BS using antenna arrays

A BS may be configured with a multiple antenna port connection for some or all of its TRXs or with an antenna array related to one cell (not one array per TRX). This subclause applies to a BS which meets at least one of the following conditions:

- The transmitter output signals from one or more TRX appear at more than one antenna port, or
- there is more than one receiver antenna port for a TRX or per cell and an input signal is required at more than one port for the correct operation of the receiver (NOTE: diversity reception does not meet this requirement) thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as "aircombining"), or
- transmitters and receivers are connected via duplexers to more than one antenna

If a BS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the UTRA requirements, the tests of conformance may be performed on a system comprising the BS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BS is used with the antenna system.

For testing of conformance of such a BS, the following procedure may be used:

Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure 5.12.5.1.

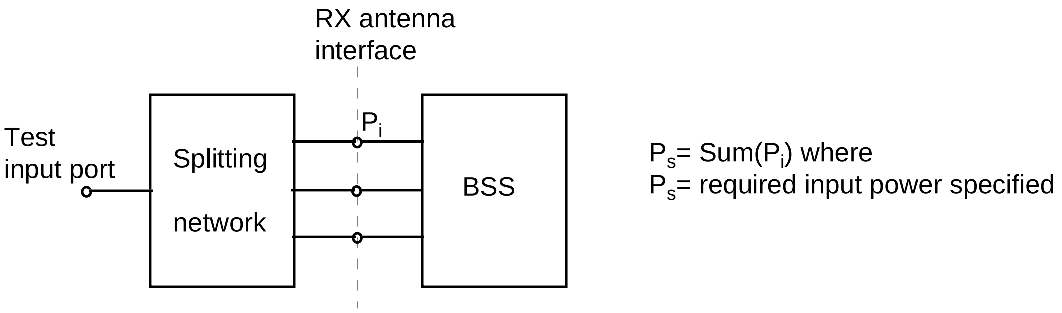

Figure 5.12.5.1: Receiver test setup

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

Transmitter tests

For each test, the conformance requirement shall be met by the sum of the signals emitted by each transmitter antenna connector. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximised.

An example of a suitable test configuration is shown in figure 5.12.5.2.

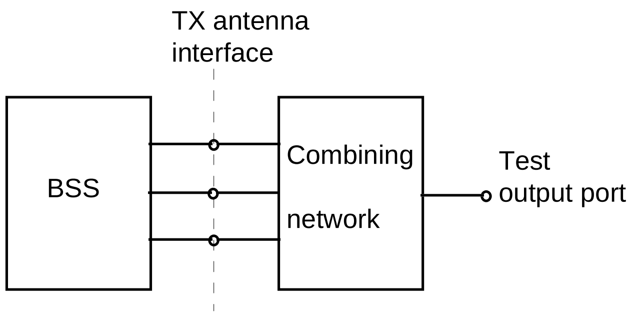

Figure 5.12.5.2: Transmitter test setup

For Intermodulation attenuation, the test may be performed separately for each transmitter antenna connector.

5.13 Overview of the conformance test requirements

Tables 5.13.1, 5.13.2 and 5.13.3 give an overview of the conformance test requirements for the transmitter, the receiver and system performance, respectively.

Table 5.13.1: Overview of the conformance tests requirements for the transmitter

Parameter	Subclause	Note
Maximum output power	6.2	manufacturer's declaration required
Frequency stability	6.3	manufacturer's declaration required
Output power dynamics	6.4	
Inner loop power control	6.4.1	
Power control steps	6.4.2	
Power control dynamic range	6.4.3	
Minimum transmit power	6.4.4	
Primary CCPCH power	6.4.5.	
Transmit OFF power	6.5	
Output RF spectrum emissions	6.6	
Occupied bandwidth	6.6.1	
Out-of-band emission	6.6.2	
Spectrum emission mask	6.6.2.1	manufacturer's declaration required
Adjacent Channel Leakage power Ratio (ACLR)	6.6.2.2	manufacturer's declaration required
Spurious emissions	6.6.3	
Mandatory requirements	6.6.3.2.1	manufacturer's declaration required
Co-existence with GSM 900	6.6.3.2.2	manufacturer's declaration required
Co-existence with DCS 1800	6.6.3.2.3	manufacturer's declaration required
Co-existence with UTRA FDD	6.6.3.2.4	manufacturer's declaration required
Transmit intermodulation	6.7	
Transmit modulation	6.8	
Modulation accuracy	6.8.1	
Peak code domain error	6.8.2	

Table 5.13.2: Overview of the conformance tests requirements for the receiver

Parameter	Subclause	Note
Reference sensitivity level	7.2	
Dynamic range	7.3	
Adjacent Channel Selectivity (ACS)	7.4	
Blocking characteristics	7.5	manufacturer's declaration required
Intermodulation characteristics	7.6	
Spurious emissions	7.7	

Table 5.13.3: Overview of the conformance test requirements for system performance

Parameter	Subclause	Note
Demodulation in static propagation conditions	8.2	
Demodulation of DCH	8.2.1	
Demodulation of DCH in multipath fading conditions	8.3	
Multipath fading Case 1	8.3.1	
Multipath fading Case 2	8.3.2	
Multipath fading Case 3	8.3.3	

5.14 Format and interpretation of tests

Each test in the following clauses has a standard format:

X Title

The title gives the name of the parameter to be tested.

X.1 Definition and applicability

This subclause gives the general definition of the parameter under consideration and specifies whether the test is applicable to all equipment or to a certain subset only.

X.2 Conformance requirements

This subclause describes the requirements the equipment under test has to fulfil to ensure compliance with the relevant specification.

In addition, this subclause contains the reference to the subclause to the 3GPP reference (or core) specification from which the conformance requirements are derived.

X.3 Test purpose

This subclause defines the purpose of the test.

X.4 Method of test

X.4.1 Initial conditions

This subclause defines the initial conditions for each test, including the basic measurement setup.

X.4.2 Procedure

This subclause describes the steps necessary to perform the test and provides further details of the test definition like point of access (e.g. antenna port), domain (e.g. frequency-span), range, weighting (e.g. bandwidth), and algorithms (e.g. averaging).

X.5 Test requirements

This subclause defines the pass/fail criteria for the equipment under test.

5.15 Regional requirements

Some requirements in TS 25.142 may only apply in certain regions. Table 5.15.1 lists all requirements that may be applied differently in different regions.

Table 5.15.1: List of regional requirements

Subclause number	Requirement	Comments
4.2	Frequency bands	Some bands may be applied regionally.
6.2.2	Maximum output power	In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the ranges defined for the Normal test environment in subclause 5.8.1
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.
6.6.3.2.1.1	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.329-7 [1], are applied.
6.6.3.2.1.2	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.329-7 [1], are applied.
6.6.3.2.2.1	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.
6.6.3.2.2.2	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.
6.6.3.2.3.1	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.
6.6.3.2.3.2	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.
6.6.3.2.4.1	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.
6.6.3.2.4.2	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 subclause 4.2 that are supported by the BS.

6 Transmitter characteristics

6.1 General

Unless otherwise stated, all measurements shall be made at the BS antenna connector.

6.2 Maximum output power

6.2.1 Definition and applicability

Output power, Pout, of the base station is the power of one carrier delivered to a load with resistance equal to the nominal load impedance, when averaged (in the sense of thermal power) over the useful part of the burst (time slot).

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

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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.2.2 Conformance requirements

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 ranges defined for the Normal test environment in subclause 5.8.1.

The reference for this requirement is TS 25.105 subclause 6.2.1.1.

6.2.3 Test purpose

The test purpose is to verify the accuracy of the maximum output power across the frequency range and under normal and extreme conditions for all transmitters in the BS.

6.2.4 Method of test

6.2.4.1 Initial conditions

6.2.4.1.1 3,84Mcps TDD option

(1) The transmitter under test and all other transmitters of the base station (if any) are switched on.

(2) The power of the transmitters not under test (if any) are controlled down.

(3) Connect the power measuring equipment to the BS antenna connector.

(4) Set the parameters of the transmitted signal according to table 6.2.4.1.1.

Table 6.2.4.1.1: Parameters of the transmitted signal for maximum output power test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.2.4.1.2 1,28Mcps TDD option

(1) The transmitter under test and all other transmitters of the base station (if any) are switched on.

(2) The power of the transmitters not under test (if any) are controlled down.

(3) Connect the power measuring equipment to the BS antenna connector.

(4) Set the parameters of the transmitted signal according to table 6.2.4.1.2.

Table 6.2.4.1.2: Parameters of the transmitted signal for maximum output power test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.2.4.2 Procedure

6.2.4.2.1 3,84Mcps TDD option

(1) Measure thermal power over the 2464 active chips of an even time slot (this excludes the guard periods), and with a measurement bandwidth of at least 5 MHz.

(2) Run step (1) for RF channels Low / Mid / High.

6.2.4.2.2 1,28Mcps TDD option

(1) Measure thermal power over the 848 active chips of a transmit time slot (this excludes the guard periods), and with a measurement bandwidth of at least 1,6 MHz.

(2) Run steps (1) and (2) for RF channels Low / Mid / High.

6.2.5 Test requirements

The value of the measured output power, derived according to subclause 6.2.4.2, shall be within the tolerance defined in subclause 6.2.2.

6.3 Frequency stability

6.3.1 Definition and applicability

Frequency stability is the ability of the BS to transmit at the assigned carrier frequency.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.3.2 Conformance requirements

The BS frequency stability shall be within $\pm$0,05 ppm observed over a period of one timeslot.

The reference for this requirement is TS 25.105 subclause 6.3.1.

TS 25.105 subclause 6.3 specifies the additional requirement that the BS shall use the same frequency source for both RF generation and the chip clock. Compliance with this requirement is demonstrated by manufacturer's declaration; see subclause 5.4; a dedicated conformance test for this requirement is not defined.

6.3.3 Test purpose

The test purpose is to verify the accuracy of the carrier frequency across the frequency range and under normal and extreme conditions.

6.3.4 Method of test

6.3.4.1 Initial conditions

6.3.4.1.1 3,84Mcps TDD option

(1) The transmitter under test and all other transmitters of the base station (if any) are switched on.

(2) The power of the transmitters not under test (if any) are controlled down.

(3) Connect the tester to the BS antenna connector.

(4) Set the parameters of the transmitted signal according to table 6.3.4.1.1.

Table 6.3.4.1.1: Parameters of the transmitted signal for frequency stability test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Number of DPCH in each active TS	1
BS output power setting	PRAT
Data content of DPCH	real life (sufficient irregular)

6.3.4.1.2 1,28Mcps TDD option

(1) The transmitter under test and all other transmitters of the base station (if any) are switched on.

(2) The power of the transmitters not under test (if any) are controlled down.

(3) Connect the tester to the BS antenna connector.

(4) Set the parameters of the transmitted signal according to table 6.3.4.1.1.

Table 6.3.4.1.2: Parameters of the transmitted signal for Frequency stability test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0, 4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
BS output power setting	PRAT
Data content of DPCH	real life (sufficient irregular)

6.3.4.2 Procedure

(1) Measure the frequency error delta f across one burst (time slot), by applying the global in-channel Tx test method described in Annex C.

(2) Repeat step (1) for 200 bursts (time slots).

(3) Run steps (1) and (2) for RF channels Low / Mid / High.

6.3.5 Test requirements

For all measured bursts (time slots), the frequency error, derived according to subclause 6.3.4.2, shall not exceed 0,5 x 10E-7.

6.4 Output power dynamics

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

6.4.2.1 Definition and applicability

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

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.4.2.2 Conformance requirements

The power control step sizes in the DL shall be 1 dB, 2 dB and 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 6.4.2.2.1.

Table 6.4.2.2.1: Power control step size tolerance

Step size	tolerance	Range of average rate of change in mean power per 10 steps	
		Minimum	maximum
1dB	± 0,5 dB	± 8 dB	± 12 dB
2dB	± 0,75 dB	± 16 dB	± 24 dB
3dB	± 1 dB	± 24 dB	± 36 dB

The reference for this requirement is TS 25.105 subclause 6.4.2.1.

6.4.2.3 Test purpose

The DL power control is applied to adjust the BS output power to a value that is sufficiently high to generate a SIR at the UE receiver equal to the target SIR, while limiting the intercell interference.

The test purpose is to verify the ability of the BS to interpret received TPC commands in a correct way and to adjust its output power according to these commands with the specified accuracy.

6.4.2.4 Method of test

6.4.2.4.1 Initial conditions

6.4.2.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Disable closed loop power control in the BS under test.

(3) Set the initial parameters of the BS transmitted signal according to table 6.4.2.4.1.1.

(4) Operate the BS in such a mode that it is able to interpret received TPC commands.

(5) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4.2.4.1.1: Initial parameters of the BS transmitted signal for power control steps test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Number of DPCH in each active TS	1
DPCH power	Minimum
Data content of DPCH	real life (sufficient irregular)

6.4.2.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Disable closed loop power control in the BS under test.

(3) Set the initial parameters of the BS transmitted signal according to table 6.4.2.4.1.2.

(4) Operate the BS in such a mode that it is able to interpret received TPC commands.

(5) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4.2.4.1.2: Initial parameters of the BS transmitted signal for power control steps test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0, 4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
DPCH power	Minimun
Data content of DPCH	real life (sufficient irregular)

6.4.2.4.2 Procedure

6.4.2.4.2.1 3,84Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH. This sequence shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS) and shall consist of a series of TPC commands with content "Increase Tx power", followed by a series of TPC commands with content "Decrease Tx power". Each of these series should be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum and its minimum, respectively.

(3) Measure the power of the active DPCH over the 2464 active chips of each even time slot TS i (this excludes the guard period) , and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Based on the measurement made in step (3), calculate the power control step sizes and the average rate of change per 10 steps.

(5) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (4).

6.4.2.4.2.2 1,28Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH. This sequence shall be transmitted to the BS within the receive time slots TS i of the BS and shall consist of a series of TPC commands with content "Increase Tx power", followed by a series of TPC commands with content "Decrease Tx power". Each of these series should be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum and its minimum, respectively.

(3) Measure the power of the active DPCH over the 848 active chips of each receive time slot TS i (this excludes the guard period) , and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Based on the measurement made in step (3), calculate the power control step sizes and the average rate of change per 10 steps.

(5) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (4).

6.4.2.5 Test requirements

6.4.2.5.1 3,84Mcps TDD option

For all measurements, the tolerance of the power control step sizes and the average rate of change per 10 steps shall be within the limits given in Table 6.4.2.2.1.

In case, the power control step size is set to 3 dB, the number of power control steps feasible within the power control dynamic range of the BS under test may be less than 10. In this case, the evaluation of the average rate of change in mean power shall be based on the number of power control steps actually feasible, and the permitted range of average rate of change shall be reduced compared to the values given in table 6.4.2.4.1.1 in proportion to the ratio (number of power control steps actually feasible /10).

EXAMPLE: If the number of power control steps actually feasible is 9, the minimum and maximum value of the range of average rate of change in mean power are given by 21,6 dB and 32,4 dB, respectively.

6.4.2.5.2 1,28Mcps TDD option

For all measurements, the tolerance of the power control step sizes and the average rate of change per 10 steps shall be within the limits given in Table 6.4.2.2.1.

In case, the power control step size is set to 3 dB, the number of power control steps feasible within the power control dynamic range of the BS under test may be less than 10. In this case, the evaluation of the average rate of change in mean power shall be based on the number of power control steps actually feasible, and the permitted range of average rate of change shall be reduced compared to the values given in table 6.4.2.4.1.2 in proportion to the ratio (number of power control steps actually feasible /10).

EXAMPLE: If the number of power control steps actually feasible is 9, the minimum and maximum value of the range of average rate of change in mean power are given by 21,6 dB and 32,4 dB, respectively.

6.4.3 Power control dynamic range

6.4.3.1 Definition and applicability

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

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.4.3.2 Conformance requirements

The DL power control dynamic range shall be greater than or equal to 30 dB.

The reference for this requirement is TS 25.105 subclause 6.4.3.1.

6.4.3.3 Test purpose

The test purpose is to verify the ability of the BS to control the power of a single code signal over the specified dynamic range.

6.4.3.4 Method of test

6.4.3.4.1 Initial conditions

6.4.3.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.4.3.4.1.1.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4.3.4.1.1: Parameters of the BS transmitted signal for power control dynamic range test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Number of DPCH in each active TS	1
Data content of DPCH	real life (sufficient irregular)

6.4.3.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.4.3.4.1.2.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4.3.4.1.2: Parameters of the BS transmitted signal for power control dynamic range test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0, 4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
Data content of DPCH	real life (sufficient irregular)

6.4.3.4.2 Procedure

6.4.3.4.2.1 3,84Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Increase Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).

(3) Measure the power of the active DPCH over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).

(5) Measure the power of the active DPCH over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(6) Determine the power control dynamic range by calculating the difference between the maximum transmit output power measured in step (3) and the minimum transmit output power measured in step (5).

(7) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (6).

6.4.3.4.2.2 1,28Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Increase Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum, and shall be transmitted to the BS within the receive time slots TS i of the BS.

(3) Measure the power of the active DPCH over the 848 active chips of an receive time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the receive time slots TS i of the BS.

(5) Measure the power of the active DPCH over the 848 active chips of a receive time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(6) Determine the power control dynamic range by calculating the difference between the maximum transmit output power measured in step (3) and the minimum transmit output power measured in step (5).

(7) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (6).

6.4.3.5 Test requirements

The power control dynamic range derived according to 6.4.3.4.2 shall be in compliance with the requirements in 6.4.3.2.

6.4.4 Minimum transmit power

6.4.4.1 Definition and applicability

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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.4.4.2 Conformance requirements

The DL minimum transmit power shall be lower than or equal to

Maximum output power - 30 dB.

The reference for this requirement is TS 25.105 subclause 6.4.4.1.

6.4.4.3 Test purpose

The test purpose is to verify the ability of the BS to reduce its output power to a specified value.

6.4.4.4 Method of test

6.4.4.4.1 Initial conditions

6.4.4.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.4.4.4.1.1.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to thermal power;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4.4.4.1.1: Parameters of the BS transmitted signal for minimum transmit power test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.4.4.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.4.4.4.1.2.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to thermal power;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4.4.4.1.2: Parameters of the BS transmitted signal for minimum transmit power test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.4.4.4.2 Procedure

6.4.4.4.2.1 3,84Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to all active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of all active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).

(3) Measure the power of the BS output signal over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) and (3).

6.4.4.4.2.2 1,28Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to all active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of all active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the receive time slots TS i of the BS.

(3) Measure the power of the BS output signal over the 848 active chips of a receive time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) and (3).

6.4.4.5 Test requirements

For all measurements, the minimum transmit power derived in step (4) of 6.4.4.4.2 shall be at least 30 dB below the maximum output power as declared by the manufacturer; see 6.2.

6.4.5 Primary CCPCH power

6.4.5.1 Definition and applicability

Primary CCPCH power is the transmission power of the Primary Common Control Physical Channel averaged over the transmit timeslot. Primary CCPCH power is signaled on the BCH.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.4.5.2 Conformance requirements

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 6.4.5.2.1. The error is a function of the total power averaged over the timeslot, Pout, and the manufacturer's rated output power, PRAT.

Table 6.4.5.2.1: 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 < P ≤ PRAT - 3	+/- 3,5 dB
PRAT - 13 < P ≤ PRAT - 6	+/- 5 dB

The reference for this requirement is TS 25.105 subclause 6.4.5.

6.4.5.3 Test purpose

The power of the Primary CCPCH received by the UE, together with the information on the Primary CCPCH nominal transmit power signaled on the BCH, are used by the UE for path loss estimation and adjustment of its own transmit power. Therefore, deviations of the Primary CCPCH power from its nominal value are transposed by the UE into deviations from the wanted transmit power of the UE.

The test purpose is to verify that the Primary CCPCH power remains within its specified tolerances under normal and extreme conditions.

6.4.5.4 Method of test

6.4.5.4.1 Initial conditions

6.4.5.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test. The BS tester must have the ability to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C.

(2) Set the parameters of the BS transmitted signal according to table 6.4.5.4.1.1.

Table 6.4.5.4.1.1: Parameters of the BS transmitted signal for Primary CCPCH power testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Time slots carrying PCCPCH	TS 0 and TS 8
Number of additional DPCH in TS 0 and TS 8	3
BS output power setting	PRAT
Relative power of PCCPCH	¼ of BS output power
Relative power of each DPCH in TS 0 and TS 8	¼ of BS output power
Data content of DPCH	real life (sufficient irregular)

6.4.5.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test. The BS tester must have the ability to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C.

(2) Set the parameters of the BS transmitted signal according to table 6.4.5.4.1.2.

Table 6.4.5.4.1.2: Parameters of the BS transmitted signal for Primary CCPCH power testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Time slots carrying PCCPCH	TS 0
BS output power setting	PRAT
Relative power of PCCPCH	1/2 of BS output power
Data content of DPCH	real life (sufficient irregular)

6.4.5.4.2 Procedure

6.4.5.4.2.1 3,84Mcps TDD option

(1) Measure the PCCPCH power in TS 0 and TS 8 by applying the global in-channel Tx test method described in Annex C.

(2) Reduce the base station output power by 2 dB, 5 dB and 13 dB, without changing the relative powers of the PCCPCH and the DPCHs, and repeat step (1) for each output power setting.

6.4.5.4.2.2 1,28Mcps TDD option

(1) Measure the PCCPCH power in TS 0 by applying the global in-channel Tx test method described in Annex C.

(2) Reduce the base station output power by 2 dB, 5 dB and 13 dB, without changing the relative powers of the PCCPCH and the DPCHs, and repeat step (1) for each output power setting.

6.4.5.5 Test requirements

The Primary CCPCH power, measured according to subclause 6.4.5.4.2, shall be within the limits defined in subclause 6.4.5.2.

6.5 Transmit ON/OFF power

6.5.1 Transmit OFF power

6.5.1.1 Definition and applicability

The transmit OFF power is the maximum residual output power within the channel bandwidth when the BS does not transmit.

The requirements in this subclause shall apply to base stations intended for general purpose applications.

6.5.1.2 Conformance requirements

6.5.1.2.1 3,84Mcps TDD option

The 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.

6.5.1.2.2 1,28Mcps TDD option

The 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.

The reference for this requirement is TS 25.105 subclause 6.5.1.

6.5.1.3 Test purpose

This test verifies the ability of the BS to reduce its transmit OFF power to a value below the specified limit. This ability is needed to minimize the interference for other users receiving on the same frequency.

6.5.1.4 Method of test

6.5.1.4.1 Initial conditions

The conformance testing of transmit OFF power is included in the conformance testing of transmit ON/OFF time mask; therefore, see subclause 6.5.2.4.1 for initial conditions.

6.5.1.4.2 Procedure

The conformance testing of transmit OFF power is included in the conformance testing of transmit ON/OFF time mask; therefore, see subclause 6.5.2.4.2 for procedure.

6.5.1.5 Test requirements

The conformance testing of transmit OFF power is included in the conformance testing of transmit ON/OFF time mask; therefore, see subclause 6.5.2.5 for test requirements.

6.5.2 Transmit ON/OFF time mask

6.5.2.1 Definition and applicability

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

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.5.2.2 Conformance requirements

6.5.2.2.1 3,84Mcps TDD option

The transmit power level versus time should meet the mask specified in figure 6.5.2.2.1.

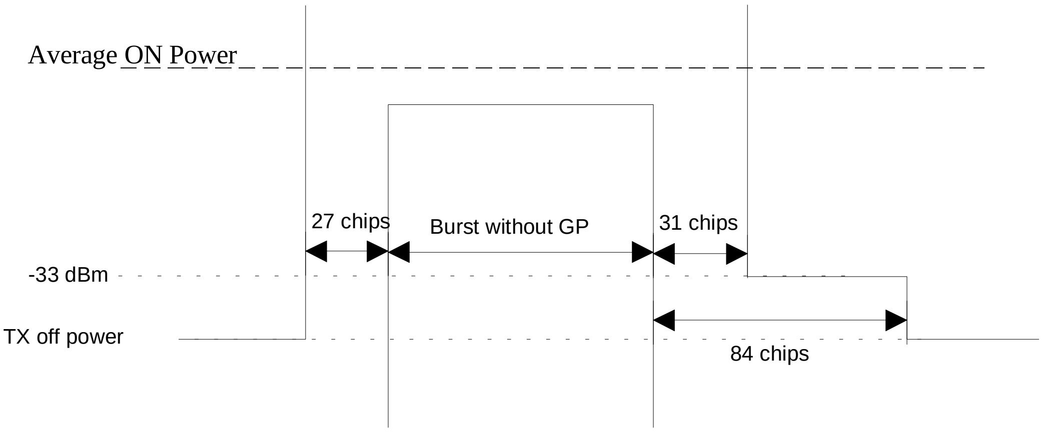

Figure 6.5.2.2.1: Transmit ON/OFF template

6.5.2.2.2 1,28Mcps TDD option

The transmit power level versus time should meet the mask specified in figure 6.5.2.2.2.

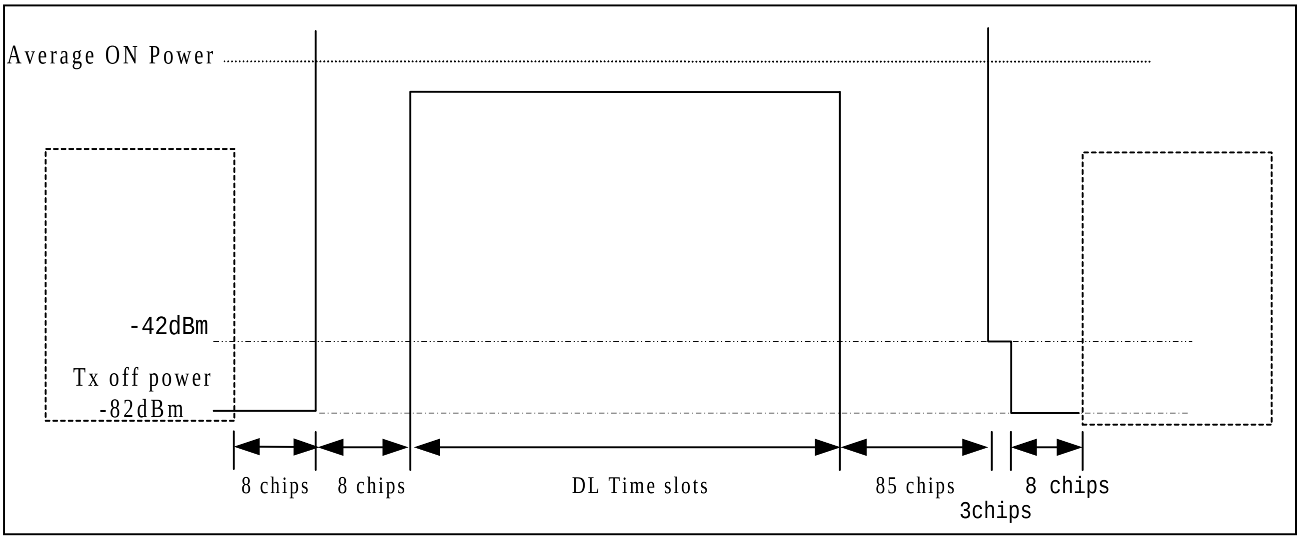

Figure 6.5.2.2.2: Transmit ON/OFF template for 1,28Mcps TDD option

The reference for this requirement is TS 25.105 subclause 6.5.2.

6.5.2.3 Test purpose

This test verifies the ability of the BS to reduce its transmit power outside of the active part of the Tx time slot (burst without guard period) to values below specified limits. This ability is needed to minimize the interference for other users receiving on the same frequency.

6.5.2.4 Method of test

6.5.2.4.1 Initial conditions

6.5.2.4.1.1 3,84Mcps TDD option

(1) Connect the power measuring equipment to the BS antenna connector.

(2) Set the parameters of the transmitted signal according to table 6.5.2.4.1.1.

Table 6.5.2.4.1.1: Parameters of the transmitted signal for transmit ON/OFF time mask test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	Real life (sufficient irregular)

6.5.2.4.1.2 1,28Mcps TDD option

(1) Connect the power measuring equipment to the BS antenna connector.

(2) Set the parameters of the transmitted signal according to table 6.5.2.4.1.2.

Table 6.5.2.4.1.2: Parameters of the transmitted signal for transmit ON/OFF time mask test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is UpPCH,1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.5.2.4.2 Procedure

6.5.2.4.2.1 3,84Mcps TDD option

(1) Measure the power of the BS output signal chipwise (i.e. averaged over time intervals of one chip duration) over the period starting 65 chips before the start of the odd time slots TS i (receive time slots of the BS), and ending 27 chips before the next even time slot (transmit time slot of the BS) starts, and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate. If the power measuring equipment is based on signal sampling, the sampling theorem shall be met. In this case, the power is determined by calculating the RMS value of the signal samples taken at the measurement filter output over one chip duration.

6.5.2.4.2.2 1,28Mcps TDD option

(1) Measure the power of the BS output signal chipwise (i.e. averaged over time intervals of one chip duration) over the transmit off power period starting 11 chips before the start of the receive time slot TS i = UpPCH, and ending 8 chips before the next transmit time slot TS i=4 starts, and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. If the power measuring equipment is based on signal sampling, the sampling theorem shall be met. In this case, the power is determined by calculating the RMS value of the signal samples taken at the measurement filter output over one chip duration.

6.5.2.5 Test requirements

6.5.2.5.1 3,84Mcps TDD option

Each value of the power measured according to subclause 6.5.4.2 shall be below the limits defined in figure 6.5.2.2.1 of subclause 6.5.2.2.

6.5.2.5.2 1,28Mcps TDD option

Each value of the power measured according to subclause 6.5.4.2 shall be below the limits defined in figure 6.5.2.2.2 of subclause 6.5.2.2.

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

6.6.1.1 Definition and applicability

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 requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.6.1.2 Conformance requirements

6.6.1.2.1 3,84Mcps TDD option

The occupied bandwidth shall be less than 5 MHz based on a chip rate of 3,84 Mcps.

The reference for this requirement is TS 25.105 subclause 6.6.1.

6.6.1.2.2 1,28Mcps TDD option

The occupied bandwidth shall be less than 1.6 MHz based on a chip rate of 1,28 Mcps.

The reference for this requirement is TS 25.105 subclause 6.6.1.

6.6.1.3 Test purpose

The occupied bandwidth, defined in the Radio Regulations of the International Telecommunication Union ITU, is a useful concept for specifying the spectral properties of a given emission in the simplest possible manner; see also Recommendation ITU-R SM.328-9 [7]. The test purpose is to verify that the emission of the BS does not occupy an excessive bandwidth for the service to be provided and is, therefore, not likely to create interference to other users of the spectrum beyond undue limits.

6.6.1.4 Method of test

6.6.1.4.1 Initial conditions

6.6.1.4.1.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.1.4.1.1.

Table 6.6.1.4.1.1: Parameters of the BS transmitted signal for occupied bandwidth testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	Real life (sufficient irregular)

6.6.1.4.1.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.1.4.1.2.

Table 6.6.1.4.1.2: Parameters of the BS transmitted signal for occupied bandwidth testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.6.1.4.2 Procedure

6.6.1.4.2.1 3,84Mcps TDD option

(1) Measure the power of the transmitted signal with a measurement filter of bandwidth 30 kHz. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The centre frequency of the filter shall be stepped in contiguous 30 kHz steps from a minimum frequency, which shall be (7,5 – 0,015) MHz below the assigned channel frequency of the transmitted signal, up to a maximum frequency, which shall be (7,5 – 0,015) MHz above the assigned channel frequency of the transmitted signal. The time duration of each step shall be sufficiently long to capture one active time slot. The measured power shall be recorded for each step.

(2) Determine the total transmitted power by accumulating the recorded power measurement results of all steps.

(3) Sum up the recorded power measurement results, starting from the step at the minimum frequency defined in (1) up to the step at a lower limit frequency by which this sum is equal to or greater than 0.5 % of the total power determined in (2). This limit frequency is recorded as "Lower Frequency".

(4) Sum up the recorded power measurement results, starting from the step at the maximum frequency defined in (1) down to the step at an upper limit frequency by which this sum is equal to or greater than 0.5 % of the total power determined in (2). This limit frequency is recorded as "Upper Frequency".

(5) Calculate the occupied bandwidth as the difference between the "Upper Frequency" obtained in (3) and the "Lower Frequency" obtained in (4).

6.6.1.4.2.2 1,28Mcps TDD option

(1) Measure the power of the transmitted signal with a measurement filter of bandwidth 30 kHz. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The centre frequency of the filter shall be stepped in contiguous 30 kHz steps from a minimum frequency, which shall be (2,4 – 0,015) MHz below the assigned channel frequency of the transmitted signal, up to a maximum frequency, which shall be (2,4 – 0,015) MHz above the assigned channel frequency of the transmitted signal. The time duration of each step shall be sufficiently long to capture one active time slot. The measured power shall be recorded for each step.

(2) Determine the total transmitted power by accumulating the recorded power measurement results of all steps.

(3) Sum up the recorded power measurement results, starting from the step at the minimum frequency defined in (1) up to the step at a lower limit frequency by which this sum is equal to or greater than 0,5 % of the total power determined in (2). This limit frequency is recorded as "Lower Frequency".

(4) Sum up the recorded power measurement results, starting from the step at the maximum frequency defined in (1) down to the step at an upper limit frequency by which this sum is equal to or greater than 0,5 % of the total power determined in (2). This limit frequency is recorded as "Upper Frequency".

(5) Calculate the occupied bandwidth as the difference between the "Upper Frequency" obtained in (3) and the "Lower Frequency" obtained in (4).

6.6.1.5 Test requirements

6.6.1.5.1 3,84Mcps TDD option

The occupied bandwidth calculated in step (5) of subclause 6.6.1.4.2 shall be less than 5 MHz.

6.6.1.5.2 1,28Mcps TDD option

The occupied bandwidth calculated in step (5) of subclause 6.6.1.4.2 shall be less than 1,6 MHz.

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 Definition and applicability

6.6.2.1.1.1 3,84Mcps TDD option

The spectrum emission mask specifies the limit of the transmitter out of band emissions at frequency offsets from the assigned channel frequency of the wanted signal between 2,5 MHz and 12,5 MHz.

The mask defined in subclause 6.6.2.1.2 below may be mandatory in certain regions. In other regions this mask may not be applied.

6.6.2.1.1.2 1,28Mcps TDD option

The spectrum emission mask specifies the limit of the transmitter out of band emissions at frequency offsets from the assigned channel frequency of the wanted signal between 0,8 MHz and 4 MHz.

The mask defined in subclause 6.6.2.1.2 below may be mandatory in certain regions. In other regions this mask may not be applied.

6.6.2.1.2 Conformance requirements

6.6.2.1.2.1 3,84Mcps TDD option

For regions where this subclause 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 6.6.2.1.2.1 to 6.6.2.1.2.4 in the frequency range of f_offset from 2,515 MHz to f_offset_{max} from the carrier frequency, where:

- f_offset is the separation between the carrier frequency and the centre of the measurement filter
- f_offset_{max} is either 12,5 MHz or the offset to the UMTS Tx band edge as defined in subclause 4.2, whichever is the greater.

Table 6.6.2.1.2.1: Spectrum emission mask values, BS rated output power PRAT ≥ 43 dBm

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	2,515 MHz ≤ f_offset < 2,715 MHz	-14 dBm	30 kHz
	2,715 MHz ≤ f_offset < 3,515 MHz	- 14 - 15·(f_offset – 2,715) dBm	30 kHz
	3,515 MHz ≤ f_offset < 4,0 MHz	-26 dBm	30 kHz
	4,0 MHz ≤ f_offset < 8,0 MHz	-13 dBm	1 MHz
	8,0 MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.6.2.1.2.2: Spectrum emission mask values, BS rated output power 39 ≤ PRAT < 43 dBm

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	2,515 MHz ≤ f_offset < 2,715 MHz	-14 dBm	30 kHz
	2,715 MHz ≤ f_offset < 3,515 MHz	-14 - 15·(f_offset – 2,715) dBm	30 kHz
	3,515 MHz ≤ f_offset < 4,0 MHz	-26 dBm	30 kHz
	4,0 MHz ≤ f_offset < 8,0 MHz	-13 dBm	1 MHz
	8,0 MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.6.2.1.2.3: Spectrum emission mask values, BS rated output power 31 ≤ PRAT < 39 dBm

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	2,515 MHz ≤ f_offset < 2,715 MHz	P - 53 dBm	30 kHz
	2,715 MHz ≤ f_offset < 3,515 MHz	P – 53 - 15·(f_offset – 2,715) dBm	30 kHz
	3,515 MHz ≤ f_offset < 4,0 MHz	P - 65 dBm	30 kHz
	4,0 MHz ≤ f_offset < 8,0 MHz	P - 52 dBm	1 MHz
	8,0 MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.6.2.1.2.4: Spectrum emission mask values, BS rated output power PRAT < 31 dBm

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	2,515 MHz ≤ f_offset < 2,715 MHz	-22 dBm	30 kHz
	2,715 MHz ≤ f_offset < 3,515 MHz	-22 – 15·(f_offset – 2,715) dBm	30 kHz
	3,515 MHz ≤ f_offset < 4,0 MHz	-34 dBm	30 kHz
	4,0 MHz ≤ f_offset < 8,0 MHz	-21 dBm	1 MHz
	8,0 MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

6.6.2.1.2.2 1,28Mcps TDD option

For regions where this subclause 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 6.6.2.1.2.5 to 6.6.2.1.2.8 in the frequency range of f_offset from 0.815 MHz to f_offset_{max} from the carrier frequency, where:

- f_offset is the separation between the carrier frequency and the centre of the measurement filter
- f_offset_{max} is either 4 MHz or the offset to the UMTS Tx band edge as defined in subclause 4.2, whichever is the greater.

Table 6.6.2.1.2.5: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	-14 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	- 14 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.3MHz	-28 dBm	30 kHz
	2.3MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.6.2.1.2.6: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	-14 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	-14 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.415MHz	-28 dBm	30 kHz
	2.415MHz ≤ f_offset < 2.9MHz	P-71 dBm	30 kHz
	2.9MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.6.2.1.2.7: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	P - 53 dBm	30 kHz

	1.015MHz ≤ f_offset < 1.815MHz	P - 53 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.415MHz	P - 67 dBm	30 kHz
	2.415MHz ≤ f_offset < 2.9MHz	P - 71 dBm	30 kHz
	2.9MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.6.2.1.2.8: Spectrum emission mask values, BS maximum output power P < 31 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	-22 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	-22 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.415MHz	-36 dBm	30 kHz
	2.415MHz ≤ f_offset < 2.9MHz	-40 dBm	30 kHz
	2.9MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

6.6.2.1.3 Test purpose

The test purpose is to verify that the BS out of band emissions do not result in undue interference to any other system (wideband, narrowband) operating at frequencies close to the assigned channel bandwidth of the wanted signal.

This test is independent of the characteristics of possible victim systems and, therefore, complements the tests on occupied bandwidth in 6.6.1 (verifying the spectral concentration of the BS Tx emissions) and on ACLR in 6.6.2.2 (simulating the perception of other UTRA receivers).

6.6.2.1.4 Method of test

6.6.2.1.4.1 Initial conditions

6.6.2.1.4.1.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.2.1.4.1.1.

Table 6.6.2.1.4.1.1: Parameters of the BS transmitted signal for spectrum emission mask testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.6.2.1.4.1.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.2.1.4.1.2.

Table 6.6.2.1.4.1.2: Parameters of the BS transmitted signal for spectrum emission mask testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.6.2.1.4.2 Procedure

6.6.2.1.4.2.1 3,84Mcps TDD option

Measure the power of the BS spectrum emissions by applying measurement filters with bandwidths as specified in the relevant table in subclause 6.6.2.1.2. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The centre frequency of the filter shall be stepped in contiguous steps over the ranges of frequency offsets f_offset as given in the tables. The step width shall be equal to the respective measurement bandwidth. The time duration of each step shall be sufficiently long to capture one active time slot.

For frequency offsets of the measurement filter centre frequency in the range 4,0 MHz ≤ f_offset < f_offset_{max}, the measurement shall be performed by applying filters with measurement bandwidth of 50 kHz or less and integrating the measured results over the nominal measurement bandwidth 1 MHz specified in the tables in subclause 6.6.2.1.2.1.

6.6.2.1.4.2.2 1,28Mcps TDD option

Measure the power of the BS spectrum emissions by applying measurement filters with bandwidths as specified in the relevant table in subclause 6.6.2.1.2. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The centre frequency of the filter shall be stepped in contiguous steps over the ranges of frequency offsets f_offset as given in the tables. The step width shall be equal to the respective measurement bandwidth. The time duration of each step shall be sufficiently long to capture one active time slot.

The measurement shall be performed by applying filters with measurement bandwidth of 50 kHz or less and integrating the measured results over the nominal measurement bandwidth 1 MHz specified in the tables in subclause 6.6.2.1.2.1 when the measurement bandwidth is 1MHz.

6.6.2.1.5 Test requirements

6.6.2.1.5.1 3,84Mcps TDD option

The spectrum emissions measured according to subclause 6.6.2.1.4.2 shall be within the mask defined in the relevant table of subclause 6.6.2.1.2.

6.6.2.1.5.2 1,28Mcps TDD option

The spectrum emissions measured according to subclause 6.6.2.1.4.2 shall be within the mask defined in the table 6.6.2.1.5.5 to 6.6.2.1.5.8.

Table 6.6.2.1.5.5: Test requirements for spectrum emission mask values, BS maximum output power P ≥ 43 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth

	0.815MHz ≤ f_offset < 1.015MHz	-12.5 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	- 12.5 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.3MHz	-26.5 dBm	30 kHz
	2.3MHz ≤ f_offset < f_offset_{max}	-11.5 dBm	1 MHz

Table 6.6.2.1.5.6: Test requirements for spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	-12.5 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	-12.5 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.415MHz	-26.5 dBm	30 kHz
	2.415MHz ≤ f_offset < 2.9MHz	P-69.5 dBm	30 kHz
	2.9MHz ≤ f_offset < f_offset_{max}	P – 54.5 dBm	1 MHz

Table 6.6.2.1.5.7: Test requirements for spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	P – 51.5 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	P – 51.5 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.415MHz	P – 65.5 dBm	30 kHz
	2.415MHz ≤ f_offset < 2.9MHz	P – 69.5 dBm	30 kHz
	2.9MHz ≤ f_offset < f_offset_{max}	P – 54.5 dBm	1 MHz

Table 6.6.2.1.5.8: Test requirements for spectrum emission mask values, BS maximum output power P < 31 dBm for 1,28Mcps TDD

	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
	0.815MHz ≤ f_offset < 1.015MHz	-20.5 dBm	30 kHz
	1.015MHz ≤ f_offset < 1.815MHz	-20.5 - 15·(f_offset – 1.015) dBm	30 kHz
	1.815MHz ≤ f_offset < 2.415MHz	-34.5 dBm	30 kHz
	2.415MHz ≤ f_offset < 2.9MHz	-38.5 dBm	30 kHz
	2.9MHz ≤ f_offset < f_offset_{max}	-23.5 dBm	1 MHz

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.6.2.2.1 Definition and applicability

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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.6.2.2.2 Conformance requirements

6.6.2.2.2.1 Minimum requirement

6.6.2.2.2.1.1 3,84Mcps TDD option

The ACLR shall be equal to or greater than the limits given in Table 6.6.2.2.2.1.1.

Table 6.6.2.2.2.1.1: BS ACLR limits

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

6.6.2.2.2.1.2 1,28Mcps TDD option

The ACLR shall be equal to or greater than the limits given in Table 6.6.2.2.2.1.2.

Table 6.6.2.2.2.1.2: BS ACLR limits for 1,28Mcps TDD

BS adjacent channel offset	ACLR limit
± 1.6 MHz	40 dB
± 3.2 MHz	50 dB

The reference for this requirement is TS 25.105 subclause 6.6.2.2.1.

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

6.6.2.2.2.2.1 3,84Mcps TDD option

In case the equipment is operated in proximity to another TDD BS or FDD BS on an adjacent frequency, the ACLR shall be equal to or greater than the value specified in Table 6.6.2.2.2.2.1.

Table 6.6.2.2.2.2.1: BS ACLR limits in case of operation in proximity

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

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

The reference for this requirement is TS 25.105 subclause 6.6.2.2.2.

NOTE: The necessary dynamic range to very the conformance requirements specified in table 6.6.2.2.2.2.1 is at the limits of the capability of state-of-art measuring equipment.

6.6.2.2.2.2.2 1,28Mcps 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 6.14.

Table 6.6.2.2.2.2.2: BS ACLR in case of operation in proximity for 1,28Mcps TDD

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

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

6.6.2.2.2.3.1 3,84Mcps TDD option

In case the equipment is co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the ACLR is specified in terms of the absolute transmit power level of the BS measured in the adjacent channel. The maximum power level shall not exceed the limit in Table 6.6.2.2.2.3.1.

Table 6.6.2.2.2.3.1: BS ACLR limits 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

The reference for this requirement is TS 25.105 subclause 6.6.2.2.3.

NOTE: The necessary dynamic range of the measuring equipment to verify the conformance requirements specified in table 6.6.2.2.2.3.1 is dependent on the BS output power. If the BS output power is larger than –10 dBm, the necessary dynamic range is beyond the capability of state-of-the-art measuring equipment; direct verification of the conformance requirements is not feasible. Alternatively, indirect measurement methods need to be defined.

6.6.2.2.2.3.2 1,28Mcps 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 6.16.

Table 6.6.2.2.2.3.2 : BS ACLR in case of co-siting for 1,28Mcps TDD

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_{actual} is higher than 30dB, this requirement may be relaxed by the amount MCL_{actual} – 30dB.

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

6.6.2.2.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference produced by the transmitted signal to other UTRA receivers operating at the first or second adjacent RF channel.

6.6.2.2.4 Method of test

6.6.2.2.4.1 Initial conditions

6.6.2.2.4.1.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.2.2.4.1.1.

Table 6.6.2.2.4.1.1: Parameters of the BS transmitted signal for ACLR testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	Real life (sufficient irregular)

6.6.2.2.4.1.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.2.2.4.1.2.

Table 6.6.2.2.4.1.2: Parameters of the BS transmitted signal for ACLR testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.6.2.2.4.2 Procedure

6.6.2.2.4.2.1 3,84Mcps TDD option

(1) Measure transmitted power over the 2464 active chips of the even time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points. (The global in-channel Tx test described in Annex C may be applied.)

(2) Average over TBD time slots.

(3) Measure interference power at the first lower adjacent RF channel (center frequency 5 MHz below the assigned channel frequency of the transmitted signal) over the useful part of the burst within the even time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken with adherence to the sampling theorem.

(4) Average over TBD time slots.

(5) Calculate the ACLR by the ratio

ACLR = transmitted power acc. to (2) / interference power acc. to (4).

(6) Repeat steps (3), (4) and (5) for the second lower adjacent RF channel (center frequency 10 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 5 MHz and 10 MHz above the assigned channel frequency of the transmitted signal, respectively).

6.6.2.2.4.2.2 1,28Mcps TDD option

(1) Measure transmitted power over the 848 active chips of the transmit time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points. (The global in-channel Tx test described in Annex C may be applied.)

(2) Average over TBD time slots.

(3) Measure interference power at the first lower adjacent RF channel (center frequency 1,6 MHz below the assigned channel frequency of the transmitted signal) over the useful part of the burst within the transmit time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken with adherence to the sampling theorem.

(4) Average over TBD time slots.

(5) Calculate the ACLR by the ratio

ACLR = transmitted power acc. to (2) / interference power acc. to (4).

(6) Repeat steps (3), (4) and (5) for the second lower adjacent RF channel (center frequency 3,2 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 1,6 MHz and 3,2 MHz above the assigned channel frequency of the transmitted signal, respectively).

6.6.2.2.5 Test requirements

6.6.2.2.5.1 3,84Mcps TDD option

The ACLR calculated in step (5) of subclause 6.6.2.2.4.2 shall be equal or greater than the limits given in table 6.6.2.2.2.1.1 or table 6.6.2.2.2.2.1, respectively. In case the equipment is co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the interference power at the first and second adjacent channel measured according to steps (3) and (4) of subclause 6.6.2.2.4.2 shall not exceed the maximum level specified in table 6.6.2.2.2.3.1.

6.6.2.2.5.2 1,28Mcps TDD option

The ACLR calculated in step (5) of subclause 6.6.2.2.4.2 shall be equal or greater than the limits given in table 6.6.2.2.5.4. In case the equipment is in proximity or co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the interference power at the adjacent channel measured according to steps (3) and (4) of subclause 6.6.2.2.4.2 shall not exceed the maximum level specified in table 6.6.2.2.5.5 or 6.6.2.2.5.6 respectively.

Table 6.6.2.2.5.4: BS ACLR Test Requirements (1,28Mcps option)

BS adjacent channel offset	ACLR limit
± 1.6 MHz	39.2 dB
± 3.2 MHz	49 dB

Table 6.6.2.2.5.5: BS ACLR Test Requirements in case of operation in proximity (1,28Mcps option)

Center Frequency for Measurement	Maximum Level (sum of emitted interference power of all node B antennas at the antenna connector)	Measurement Bandwidth
Closest used frequency of victim receiver	[-36 dBm-TT]	chip rate of victim receiver

Table 6.6.2.2.5.6: BS ACLR Test Requirements in case of co-siting (1,28Mcps option)

Center Frequency for Measurement	Maximum Level (sum of emitted interference power of all node B antennas at the antenna connector)	Measurement Bandwidth
Closest used frequency of	[-76 dBm-TT]	Chip rate of victim receiver

victim receiver		

6.6.3 Spurious emissions

6.6.3.1 Definition and applicability

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 in this subclause shall apply to base stations intended for general-purpose applications.

6.6.3.2 Conformance requirements

6.6.3.2.1 Mandatory requirements

The requirements of either subclause 6.6.3.2.1.1 or subclause 6.6.3.2.1.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer.

~~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.~~

6.6.3.2.1.1 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.329-7 [6], are applied.

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.1.1.1.

Table 6.6.3.2.1.1.1: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement bandwidth	Note
9 kHz – 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150 kHz – 30 MHz		10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30 MHz – 1 GHz		100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1 GHz – 12,75 GHz		1 MHz	Upper frequency as in ITU SM.329-7, s2.6

The reference for this requirement is TS 25.105 subclause 6.6.3.1.1.1.

6.6.3.2.1.2 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.329-7 [6], are applied.

6.6.3.2.1.2.1 3,84Mcps TDD option

The power of any spurious emission shall not exceed the maximum levels given in Table 6.6.3.2.1.2.1.

Table 6.6.3.2.1.2.1: BS Mandatory spurious emissions limits, Category B

Band	Maximum level	Measurement bandwidth	Note
9 kHz – 150 kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150 kHz – 30 MHz	-36 dBm	10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30 MHz – 1 GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1 GHz – Fc1 - 60 MHz or Fl - 10 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-7, s4.1
Fc1 - 60 MHz or Fl - 10 MHz *whichever is the higher* – Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher* – Fc2 + 50 MHz or Fu +10 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 50 MHz or Fu + 10 MHz *whichever is the lower* – Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower* – 12,5 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-7, s4.1. Upper frequency as in ITU-R SM.329-7, s2.6

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

The reference for this requirement is TS 25.105 subclause 6.6.3.1.2.1.

6.6.3.2.1.2.2 1,28Mcps TDD option

The power of any spurious emission shall not exceed the maximum levels given in Table 6.6.3.2.1.2.2.

Table 6.6.3.2.1.2.2: BS Mandatory spurious emissions limits, Category B for 1,28Mcps TDD

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz ↔ Fc1-19.2 MHz or Fl –3.2 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-7, s4.1

Fc1 – 19.2 MHz or Fl -3.2MHz *whichever is the higher* ⇔ Fc1 - 16 MHz or Fl –3.2 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc1 - 16 MHz or Fl –3.2 MHz *whichever is the higher* ⇔ Fc2 + 16 MHz or Fu +3.2 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 16 MHz or Fu + 3.2MHz *whichever is the lower* ⇔ Fc2 +19.2 MHz or Fu + 3.2MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 19.2 MHz or Fu +3.2 MHz *whichever is the lower* ⇔ 12,5 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-7, s4.1. Upper frequency as in ITU-R SM.329-7, s2.6

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

The reference for this requirement is TS 25.105 subclause 6.6.3.1.2.1.

6.6.3.2.2 Co-existence with GSM

6.6.3.2.2.1 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.

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.2.1.1.

Table 6.6.3.2.2.1.1: BS Spurious emissions limits for BS in geographic coverage area of GSM 900 MS receiver

Band	Maximum level	Measurement bandwidth	Note
921 MHz – 960 MHz	-57 dBm	100 kHz	

The reference for this requirement is TS 25.105 subclause 6.6.3.2.1.1.

6.6.3.2.2.2 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.

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.2.2.1.

Table 6.6.3.2.2.2.1: BS Spurious emissions limits for protection of the GSM 900 BTS receiver

Band	Maximum level	Measurement bandwidth	Note
876 MHz – 915 MHz	–98 dBm	100 kHz	

The reference for this requirement is TS 25.105 subclause 6.6.3.2.2.1.

6.6.3.2.3 Co-existence with DCS 1800

6.6.3.2.3.1 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.

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.3.1.1.

Table 6.6.3.2.3.1.1: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800 MS receiver

Band	Maximum level	Measurement bandwidth	Note
1805 MHz – 1880 MHz	-47 dBm	100 kHz	

The reference for this requirement is TS 25.105 subclause 6.6.3.3.1.1.

6.6.3.2.3.2 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.

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.3.2.1.

Table 6.6.3.2.3.2.1: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Band	Maximum level	Measurement bandwidth	Note
1710 MHz – 1785 MHz	-98 dBm	100 kHz	

The reference for this requirement is TS 25.105 subclause 6.6.3.3.3.1.

6.6.3.2.4 Co-existence with UTRA FDD

6.6.3.2.4.1 Operation in the same geographic area

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

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.4.1.1.

Table 6.6.3.2.4.1.1: 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	

The reference for this requirement is TS 25.105 subclause 6.6.3.4.1.1.

6.6.3.2.4.2 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.

The power of any spurious emission shall not exceed the maximum level given in Table 6.6.3.2.4.2.1.

Table 6.6.3.2.4.2.1: 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	

The reference for this requirement is TS 25.105 subclause 6.6.3.4.2.1.

6.6.3.3 Test purpose

6.6.3.3.1 3,84Mcps TDD option

The test purpose is to verify the ability of the BS to limit the interference caused by unwanted transmitter effects to other systems operating at frequencies which are more than 12,5 MHz away from of the UTRA band used.

6.6.3.3.2 1,28Mcps TDD option

The test purpose is to verify the ability of the BS to limit the interference caused by unwanted transmitter effects to other systems operating at frequencies which are more than 4 MHz away from of the UTRA band used.

6.6.3.4 Method of test

6.6.3.4.1 Initial conditions

6.6.3.4.1.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.3.4.1.1.

Table 6.6.3.4.1.1: Parameters of the BS transmitted signal for spurious emissions testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.6.3.4.1.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.3.4.1.2.

Table 6.6.3.4.1.2: Parameters of the BS transmitted signal for spurious emissions testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

6.6.3.4.2 Procedure

Measure the power of the spurious emissions by applying measurement filters with bandwidths as specified in the relevant tables of 6.6.3.2. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The center frequency of the filter shall be stepped in contiguous steps over the frequency bands as given in the tables. The step width shall be equal to the respective measurement bandwidth. The time duration of each step shall be sufficiently long to capture one active time slot.

6.6.3.5 Test requirements

The spurious emissions measured according to subclause 6.6.3.4.2 shall not exceed the limits specified in the relevant tables of 6.6.3.2.

6.7 Transmit intermodulation

6.7.1 Definition and applicability

6.7.1.1 3,84Mcps TDD option

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.

6.7.1.2 1,28Mcps TDD option

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 ±1,6 MHz, ±3,2 MHz and ±4,8 MHz offset from the subject signal.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.7.2 Conformance requirements

The transmit intermodulation level shall not exceed the out of band or the spurious emission requirements of subclause 6.6.2 and 6.6.3, respectively.

The reference for this requirement is TS 25.105 subclause 6.7.1.

6.7.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to restrict the generation of intermodulation products in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna to below specified levels.

6.7.4 Method of test

6.7.4.1 Initial conditions

6.7.4.1.1 3,84Mcps TDD option

(1) Connect the measuring equipment, the BS under test and the CDMA signal generator as shown in figure 6.7.4.1.1.

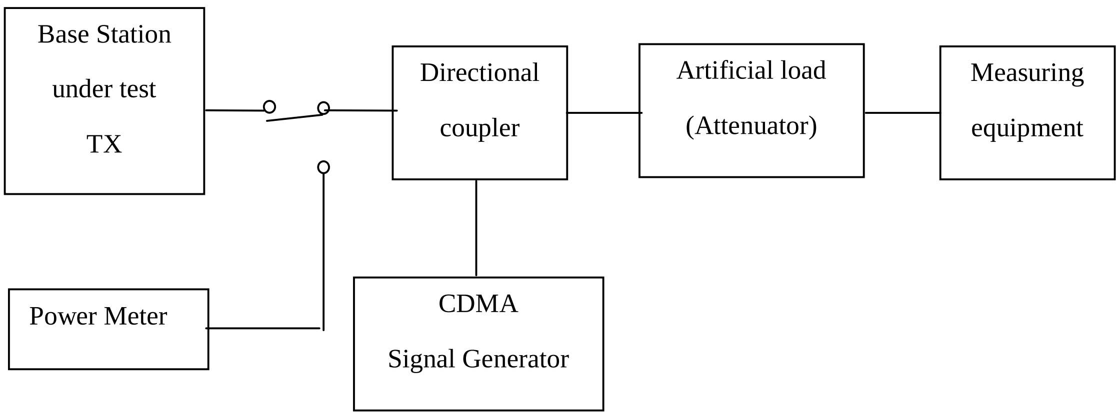

Figure 6.7.4.1.1: Measuring setup for Base Station transmit intermodulation testing

(2) Set the parameters of the BS transmitted signal according to table 6.7.4.1.1.

Table 6.7.4.1.1: Parameters of the BS transmitted signal for transmit intermodulation testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is odd; receive, if i is even.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

(3) Configure the CDMA signal generator to produce an interference signal with a level of 30 dB lower than that of the BS transmitted signal. The interference signal shall be like-modulated as the BS transmitted signal, and the active time slots of both signals shall be synchronized. The frequency of the interference signal shall be ±5 MHz, ±10 MHz and ±15 MHz offset from the BS transmitted signal.

6.7.4.1.2 1,28Mcps TDD option

(1) Connect the measuring equipment, the BS under test and the CDMA signal generator as shown in figure 6.7.4.1.2.

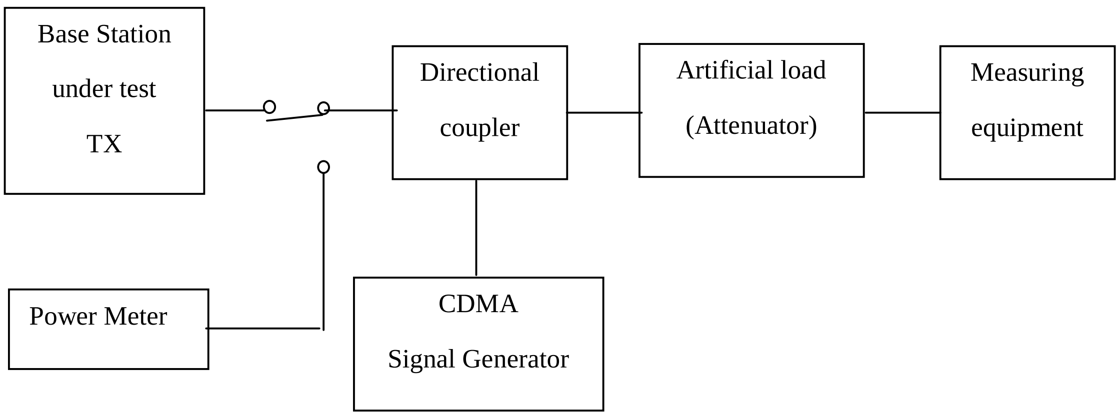

Figure 6.7.4.1.2: Measuring setup for Base Station transmit intermodulation testing

(2) Set the parameters of the BS transmitted signal according to table 6.7.4.1.2.

Table 6.7.4.1.2: Parameters of the BS transmitted signal for transmit intermodulation testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

(3) Configure the CDMA signal generator to produce an interference signal with a level of 30 dB lower than that of the BS transmitted signal. The interference signal shall be like-modulated as the BS transmitted signal, and the active time slots of both signals shall be synchronized. The frequency of the interference signal shall be ±1,6 MHz, ±3,2 MHz and ±4,8 MHz offset from the BS transmitted signal.

6.7.4.2 Procedure

Apply the test procedures for out of band and spurious emissions as described in 6.6.2 and 6.6.3, respectively. The frequency band occupied by the interference signal are excluded from the measurements.

6.7.5 Test requirements

The conformance requirements for out of band and spurious emissions as specified in 6.6.2 and 6.6.3 shall be met.

6.8 Transmit Modulation

6.8.1 Modulation accuracy

6.8.1.1 Definition and applicability

The modulation accuracy is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). A quantitative measure of the modulation accuracy is the error vector magnitude (EVM) which is defined as the square root of the ratio of the mean error vector power to the mean reference signal power expressed as %. The measurement interval is one timeslot.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

NOTE: The theoretical modulated waveform shall be calculated on the basis that the transmit pulse shaping filter is a root-raised cosine (RRC) with roll-off α =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 α = 0,22 and T_C is the chip duration ~~$T_C = \frac{1}{chiprate} \approx 0.26042\mu s$~~.

6.8.1.2 Conformance requirements

The error vector magnitude (EVM) shall not exceed 12,5 %. The requirement is valid over the total power dynamic range as specified in subclause 6.4.3 of TS 25.105.

The reference for this requirement is TS 25.105 subclause 6.8.2.1.

6.8.1.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to generate a sufficient precise waveform and thus to enable the UE receiver to achieve the specified error performance.

6.8.1.4 Method of test

6.8.1.4.1 Initial conditions

6.8.1.4.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.8.1.4.1.1.

Table 6.8.1.4.1.1: Parameters of the BS transmitted signal for modulation accuracy testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
Number of DPCH in each active TS	1
BS power setting	PRAT
Data content of DPCH	real life (sufficient irregular)

6.8.1.4.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.8.1.4.1.2.

Table 6.8.1.4.1.2: Parameters of the BS transmitted signal for modulation accuracy testing for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: Transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
Base station power	maximum, according to manufacturer's declaration
Data content of DPCH	real life (sufficient irregular)

6.8.1.4.2 Procedure

(1) Measure the error vector magnitude (EVM) by applying the global in-channel Tx test method described in Annex C.

(2) Set the BS output power to PRAT – 30 dB and repeat step (1) above.

6.8.1.5 Test requirements

The error vector magnitude (EVM) measured according to subclause 6.8.1.4.2 shall not exceed 12,5 %.

6.8.2 Peak code domain error

6.8.2.1 Definition and applicability

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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

6.8.2.2 Conformance requirements

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

The reference for this requirement is TS 25.105 subclause 6.8.3.1.

6.8.2.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to limit crosstalk among codes and thus to enable the UE receiver to achieve the specified error performance.

6.8.2.4 Method of test

6.8.2.4.1 Initial conditions

6.8.2.4.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.8.2.4.1.1.

Table 6.8.2.4.1.1: Parameters of the BS transmitted signal

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)
Spreading factor	16

6.8.2.4.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.8.2.4.1.2.

Table 6.8.2.4.1.2: Parameters of the BS transmitted signal for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)
Spreading factor	16

6.8.2.4.2 Procedure

Measure the peak code domain error by applying the global in-channel Tx test method described in Annex C.

6.8.2.5 Test requirements

The peak code domain error measured according to subclause 6.8.2.4.2 shall not exceed –28 dB.

7 Receiver characteristics

7.1 General

All tests unless otherwise stated in this subclause shall be conducted on Base Station Systems fitted with a full complement of Transceivers for the configuration. The manufacturer shall provide appropriate logical or physical test access to perform all tests in this subclause. Measurements shall include any RX multicoupler.

The tests in clause 7 assume that the receiver is not equipped with diversity. For receivers with diversity, the tests may be performed by applying the specified signals to one of the receiver inputs, and terminating or disabling the other(s). The tests and requirements are otherwise unchanged.

For receivers with diversity, testing of conformance shall be performed by applying the specified signals to one of the receiver inputs, and terminating or disabling the other(s).

In all the relevant subclauses in this clause all Bit Error Ratio (BER), Residual BER (RBER) and Frame Erasure Ratio (FER) measurements shall be carried out according to the general rules for statistical testing.

Unless detailed the receiver characteristic are specified at each antenna connector of the BS.

7.2 Reference sensitivity level

7.2.1 Definition and applicability

The reference sensitivity is the minimum receiver input power measured at the antenna connector at which the BER does not exceed the specific value.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

7.2.2 Conformance requirements

7.2.2.1 3,84Mcps TDD option

For the measurement channel specified in Annex A.2.1, the reference sensitivity level and performance of the BS shall be as specified in table 7.2.2.1 below.

Table 7.2.2.1: BS reference sensitivity levels

Data rate	BS reference sensitivity level (dBm)	BER
12,2 kbps	-109 dBm	BER shall not exceed 0,001

7.2.2.2 1,28Mcps option

For the measurement channel specified in Annex A.2.1.2, the reference sensitivity level and performance of the BS shall be as specified in table 7.2.2.2 below.

Table 7.2.2.2: BS reference sensitivity levels (1,28Mcps option)

Data rate	BS reference sensitivity level (dBm)	BER
12,2 kbps	-110 dBm	BER shall not exceed 0,001

The reference for this requirement is TS 25.105 subclause 7.2.1.

7.2.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed single-code test signal of minimum input power under defined conditions (no interference, no multipath propagation) with a BER not exceeding a specified limit. This test is also used as a reference case for other tests to allow the assessment of degradations due to various sources of interference.

7.2.4 Method of test

7.2.4.1 Initial conditions

7.2.4.1.1 3,84Mcps TDD option

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(1) Connect the BS tester (UE simulator) to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1.

(4) The level of BS tester output signal measured at the BS antenna connector shall be adjusted to –109 dBm.

7.2.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester (UE simulator) to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1.

(4) The level of BS tester output signal measured at the BS antenna connector shall be adjusted to –110 dBm.

7.2.4.2 Procedure

(1) Measure the BER by comparing the bit sequence of the information data transmitted by the BS tester with the bit sequence obtained from the BS receiver.

(2) Interchange the connections of the BS Rx ports and repeat the measurement according to (1).

7.2.5 Test requirements

7.2.5.1 3,84Mcps TDD option

For any BS Rx port tested, the measured BER shall not exceed 0,001.

7.2.5.2 1,28Mcps TDD option

For any BS Rx port tested, the measured BER at the Test Requirement of the BS reference sensitivity level specified in table 7.2.5.2 shall not exceed 0,001.

Table 7.2.5.2: Test Requirement for BS reference sensitivity level for 1,28Mcps option

Data rate	BS reference sensitivity level (dBm)	BER
12,2 kbps	-109,3 dBm	BER shall not exceed 0,001

7.3 Dynamic range

7.3.1 Definition and applicability

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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

7.3.2 Conformance requirements

7.3.2.1 3,84Mcps TDD option

The BER shall not exceed 0,001 for the parameters specified in table 7.3.2.1.

Table 7.3.2.1: Dynamic Range

Parameter	Level	Unit
Data rate	12,2	kbit/s
Wanted signal	<REFSENS> + 30 dB	dBm
Interfering AWGN signal	-73	dBm/3,84 MHz

7.3.2.2 1,28Mcps TDD option

The BER shall not exceed 0,001 for the parameters specified in table 7.3.2.1.

Table 7.3.2.2: Dynamic Range for 1,28Mcps TDD

Parameter	Level	Unit
Data rate	12,2	kbit/s
Wanted signal	<REFSENS> + 30 dB	dBm
Interfering AWGN signal	-76	dBm/1,28 MHz

The reference for this requirement is TS 25.105 subclause 7.3.

7.3.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed single-code test signal of maximum input power under defined conditions (specified interference, no multipath) with a BER not exceeding a specified limit.

7.3.4 Method of test

7.3.4.1 Initial conditions

7.3.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester (UE simulator), generating the wanted signal, and a band-limited white noise source, generating the interfering AWGN signal, to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1.

(4) The level of the BS tester output signal measured at the BS antenna connector shall be adjusted as specified in table 7.3.2.1.

(5) The power spectral density of the band-limited white noise source measured at the BS antenna connector shall be adjusted as specified in table 7.3.2.1. The minimum bandwidth of the white noise source shall be 1,5 times the chip rate (5,76 MHz for a chip rate of 3,84 MHz).

7.3.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester (UE simulator), generating the wanted signal, and a band-limited white noise source, generating the interfering AWGN signal, to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3)Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1.

(4) The level of the BS tester output signal measured at the BS antenna connector shall be adjusted as specified in table 7.3.2.2.

(5) The power spectral density of the band-limited white noise source measured at the BS antenna connector shall be adjusted as specified in table 7.3.2.2. The minimum bandwidth of the white noise source shall be 1,5 times the chip rate (2,4 MHz for a chip rate of 1,28 MHz).

7.3.4.2 Procedure

(1) Measure the BER by comparing the bit sequence of the information data transmitted by the BS tester with the bit sequence obtained from the BS receiver.

(2) Interchange the connections of the BS Rx ports and repeat the measurement according to (1)

7.3.5 Test requirements

For any BS Rx port tested, the measured BER shall not exceed 0,001.

7.4 Adjacent Channel Selectivity (ACS)

7.4.1 Definition and applicability

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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

7.4.2 Conformance requirements

7.4.2.1 3,84Mcps TDD option

The BER, measured on the wanted signal in the presence of an interfering signal, shall not exceed 0,001 for the parameters specified in table 7.4.2.2.1.

Table 7.4.2.2.1: Parameters of the wanted signal and the interfering signal for ACS testing

Parameter	Level	Unit
Data rate	12,2	kbit/s
Wanted signal	Reference sensitivity level + 6 dB	dBm
Interfering signal	-52	dBm
Fuw (modulated)	5	MHz
NOTE: Fuw is the frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal.		

7.4.2.2 1,28Mcps TDD option

The BER, measured on the wanted signal in the presence of an interfering signal, shall not exceed 0,001 for the parameters specified in table 7.4.2.2.2.

Table 7.4.2.2.2: Parameters of the wanted signal and the interfering signal for ACS testing for 1,28Mcps TDD

Parameter	Level	Unit
Data rate	12,2	kbit/s
Wanted signal	Reference sensitivity level + 6 dB	dBm
Interfering signal	-55	dBm
Fuw (modulated)	1,6	MHz
NOTE: Fuw is the frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal.		

The reference for this requirement is TS 25.105 subclause 7.4.1.

7.4.3 Test purpose

The test purpose is to verify the ability of the BS receiver filter to sufficiently suppress interfering signals in the channels adjacent to the wanted channel.

7.4.4 Method of test

7.4.4.1 Initial conditions

7.4.4.1.1 3,84Mcps TDD option

(1) Connect an UE simulator operating at the assigned channel frequency of the wanted signal and a signal generator used to produce the interfering signal in the adjacent channel to the antenna connector of one Rx port.

(2) Terminate or disable any other Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1. The level of the UE simulator signal measured at the BS antenna connector shall be adjusted to the value specified in table 7.4.2.2.1.

(4) Set the signal generator to produce an interfering signal that is equivalent to a continuous wideband CDMA signal with one code of chip frequency 3,84 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0,22$. The level of the interfering signal measured at the BS antenna connector shall be adjusted to the value specified in table 7.4.2.2.1.

7.4.4.1.2 1,28Mcps TDD option

(1) Connect an UE simulator operating at the assigned channel frequency of the wanted signal and a signal generator used to produce the interfering signal in the adjacent channel to the antenna connector of one Rx port.

(2) Terminate or disable any other Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1. The level of the UE simulator signal measured at the BS antenna connector shall be adjusted to the value specified in table 7.4.2.2.2.

(4) Set the signal generator to produce an interfering signal that is equivalent to a continuous wideband CDMA signal with one code of chip frequency 1,28 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off α = 0,22. The level of the interfering signal measured at the BS antenna connector shall be adjusted to the value specified in table 7.4.2.2.2.

7.4.4.2 Procedure

7.4.4.2.1 3,84Mcps TDD option

(1) Set the center frequency of the interfering signal to 5 MHz above the assigned channel frequency of the wanted signal.

(2) Measure the BER of the wanted signal at the BS receiver.

(3) Set the center frequency of the interfering signal to 5 MHz below the assigned channel frequency of the wanted signal.

(4) Measure the BER of the wanted signal at the BS receiver.

(5) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (4).

7.4.4.2.2 1,28Mcps TDD option

(1) Set the center frequency of the interfering signal to 1,6 MHz above the assigned channel frequency of the wanted signal.

(2) Measure the BER of the wanted signal at the BS receiver.

(3) Set the center frequency of the interfering signal to 1,6 MHz below the assigned channel frequency of the wanted signal.

(4) Measure the BER of the wanted signal at the BS receiver.

(5) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (4).

7.4.5 Test requirements

The BER measured according subclause 7.4.4.2 to shall not exceed 0,001.

7.5 Blocking characteristics

7.5.1 Definition and applicability

7.5.1.1 3,84Mcps TDD option

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 shall apply at all frequencies as specified in tables 7.5.2.1, 7.5.2.2 or 7.5.2.3 respectively, using a 1 MHz step size.

7.5.1.2 1,28Mcps TDD option

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 shall apply at all frequencies as specified in tables 7.5.2.4, 7.5.2.5 or 7.5.2.6 respectively, using a 1 MHz step size.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

7.5.2 Conformance requirements

7.5.2.1 3,84Mcps TDD option

The static reference performance as specified in clause 7.2 should be met with a wanted and an interfering signal coupled to the BS antenna input using the parameters specified in tables 7.5.2.1,7.5.2.2 or 7.5.2.3, respectively.

Table 7.5.2.1: Blocking requirements for operating bands defined in subclause 4.2 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	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 7.5.2.2: Blocking requirements for operating bands defined in subclause 4.2 b)

Center frequency of interfering signal	Interfering signal level	Wanted signal level	Minimum offset of interfering signal	Type of interfering signal
1850 – 1990 MHz	-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 7.5.2.3: Blocking requirements for operating bands defined in subclause 4.2 c)

Center frequency of interfering signal	Interfering signal level	Wanted signal level	Minimum offset of interfering signal	Type of interfering signal
1910 – 1930 MHz	-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

7.5.2.2 1,28Mcps TDD option

The static reference performance as specified in clause 7.2 should be met with a wanted and an interfering signal coupled to the BS antenna input using the parameters specified in tables 7.5.2.4,7.5.2.5 or 7.5.2.6, respectively.

Table 7.5.2.4: Blocking requirements for operating bands defined in subclause 4.2 a)

for 1,28Mcps TDD

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	3.2 MHz	1,28Mcps TDD signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 2025 – 2045 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28Mcps TDD signal with one code
1920 – 1980 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28Mcps TDD signal with one code
1 - 1880 MHz, 1980 – 1990 MHz, 2045 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.5.2.5: Blocking requirements for operating bands defined in subclause 4.2 b)

for 1,28Mcps TDD

Center 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	3.2 MHz	1,28Mcps TDD signal with one code
1830 – 1850 MHz, 1990 – 2010 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28Mcps TDD signal with one code
1 – 1830 MHz, 2010 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.5.2.6: Blocking requirements for operating bands defined in subclause 4.2 c)

for 1,28Mcps TDD

Center 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	3.2 MHz	1,28Mcps TDD signal with one code
1890 – 1910 MHz, 1930 – 1950 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28Mcps TDD signal with one code
1 – 1890 MHz, 1950 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

The reference for this requirement is TS 25.105 subclause 7.5.

7.5.3 Test purpose

7.5.3.1 3,84Mcps TDD option

The test stresses the ability of the BS receiver to withstand high-level interference from unwanted signals at frequency offsets of 10 MHz or more, without undue degradation of its sensitivity.

7.5.3.2 1,28Mcps TDD option

The test stresses the ability of the BS receiver to withstand high-level interference from unwanted signals at frequency offsets of 3,2 MHz or more, without undue degradation of its sensitivity.

7.5.4 Method of test

7.5.4.1 Initial conditions

(1) Connect an UE simulator operating at the assigned channel frequency of the wanted signal and a signal generator to the antenna connector of one Rx port.

(2) Terminate or disable any other Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1.The level of the UE simulator signal measured at the BS antenna connector shall be set to 6 dB above the reference sensitivity level specified in subclause 7.2.2.

7.5.4.2 Procedure

7.5.4.2.1 3,84Mcps TDD option

(1) Set the signal generator to produce an interfering signal at a frequency offset Fuw from the assigned channel frequency of the wanted signal which is given by

$$Fuw = \pm (n \times 1 \text{ MHz}),$$

where n shall be increased in integer steps from n = 10 up to such a value that the center frequency of the interfering signal covers the range from 1 MHz to 12,75 GHz. The interfering signal level measured at the antenna connector shall be set in dependency of its center frequency, as specified in tables 7.5.2.1, 7.5.2.2, or 7.5.2.3 respectively. The type of the interfering signal is either equivalent to a continuous wideband CDMA signal with one code of chip frequency 3,84 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0,22$, or a CW signal; see tables 7.5.2.1, 7.5.2.2 or 7.5.2.3 respectively.

(2) Measure the BER of the wanted signal at the BS receiver.

(3) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) and (2).

NOTE: The test procedure as defined in steps (1) and (2) requests to carry out more than 10000 BER measurements. To reduce the time needed for these measurements, it may be appropriate to conduct the test in two phases: During phase 1, BER measurements are made on all center frequencies of the interfering signal as requested but with a reduced confidence level, with the aim to identify those frequencies which require more detailed investigation. In phase 2, detailed measurements are made only at those critical frequencies identified before, applying the required confidence level.

7.5.4.2.2 1,28Mcps TDD option

(1) Set the signal generator to produce an interfering signal at a frequency offset Fuw from the assigned channel frequency of the wanted signal which is given by

$$Fuw = \pm (n \times 1 \text{ MHz}),$$

where n shall be increased in integer steps from n = 10 up to such a value that the center frequency of the interfering signal covers the range from 1 MHz to 12,75 GHz. The interfering signal level measured at the antenna connector shall be set in dependency of its center frequency, as specified in tables 7.5.2.1, 7.5.2.2, or 7.5.2.3 respectively. The type of the interfering signal is either equivalent to a continuous wideband CDMA signal with one code of chip frequency 1,28 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0,22$, or a CW signal; see tables 7.5.2.4, 7.5.2.5 or 7.5.2.6 respectively.

(2) Measure the BER of the wanted signal at the BS receiver.

(3) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) and (2).

NOTE: The test procedure as defined in steps (1) and (2) requests to carry out more than 10000 BER measurements. To reduce the time needed for these measurements, it may be appropriate to conduct the test in two phases: During phase 1, BER measurements are made on all center frequencies of the interfering signal as requested but with a reduced confidence level, with the aim to identify those frequencies which require more detailed investigation. In phase 2, detailed measurements are made only at those critical frequencies identified before, applying the required confidence level.

7.5.5 Test requirements

In all measurements made according to subclause 7.5.4.2, the BER shall not exceed 0,001.

7.6 Intermodulation characteristics

7.6.1 Definition and applicability

Third and higher order mixing of 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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

7.6.2 Conformance requirements

7.6.2.1 3,84Mcps TDD option

The static reference performance as specified in clause 7.2 should be met when the following signals are coupled to the BS antenna input.

- A wanted signal at the assigned channel frequency, 6 dB above the static reference level.
- Two interfering signals with the parameters specified in table 7.6.2.1.

Table 7.6.2.1: Parameters of the interfering signals for intermodulation characteristics testing

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

7.6.2.2 1,28Mcps TDD option

The static reference performance as specified in clause 7.2 should be met when the following signals are coupled to the BS antenna input.

- A wanted signal at the assigned channel frequency, 6 dB above the static reference level.
- Two interfering signals with the parameters specified in table 7.6.2.2.

Table 7.6.2.2: Parameters of the interfering signals for intermodulation characteristics testing for 1,28Mcps TDD

Interfering Signal Level	Offset	Type of Interfering Signal
- 48 dBm	3,2 MHz	CW signal
- 48 dBm	6,4 MHz	1,28Mcps TDD signal with one code

The reference for this requirement is TS 25.105 subclause 7.6.

7.6.3 Test purpose

The test purpose is to verify the ability of the BS receiver to inhibit the generation of intermodulation products in its non-linear elements caused by the presence of two high-level interfering signals at frequencies with a specific relationship to the frequency of the wanted signal.

7.6.4 Method of test

7.6.4.1 Initial conditions

(1) Connect an UE simulator operating at the assigned channel frequency of the wanted signal and two signal generators to the antenna connector of one Rx port.

(2) Terminate or disable any other Rx port not under test.

(3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1. The level of the UE simulator signal measured at the BS antenna connector shall be set to 6 dB above the reference sensitivity level specified in subclause 7.2.2.

(4) Set the first signal generator to produce a CW signal with a level measured at the BS antenna connector of -48 dBm.

(5) Set the second signal generator to produce an interfering signal equivalent to a wideband CDMA signal with one code of chip frequency ~~3,84 Mchip/s~~, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0{,}22$. The level of the signal measured at the BS antenna connector shall be set to - 48 dBm.

7.6.4.2 Procedure

7.6.4.2.1 3,84Mcps TDD option

(1) The frequency of the first and the second signal generator shall be set to 10 MHz and 20 MHz, respectively, above the assigned channel frequency of the wanted signal.

(2) Measure the BER of the wanted signal at the BS receiver.

(3) The frequency of the first and the second signal generator shall be set to 10 MHz and 20 MHz, respectively, below the assigned channel frequency of the wanted signal.

(4) Measure the BER of the wanted signal at the BS receiver.

(5) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (4).

7.6.4.2.2 1,28Mcps TDD option

(1) The frequency of the first and the second signal generator shall be set to 3,2 MHz and 6,4 MHz, respectively, above the assigned channel frequency of the wanted signal.

(2) Measure the BER of the wanted signal at the BS receiver.

(3) The frequency of the first and the second signal generator shall be set to 3,2 MHz and 6,4 MHz, respectively, below the assigned channel frequency of the wanted signal.

(4) Measure the BER of the wanted signal at the BS receiver.

(5) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (4).

7.6.5 Test requirements

The BER measured according subclause 7.6.4.2 to shall not exceed 0,001.

7.7 Spurious emissions

7.7.1 Definition and applicability

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 connectors. For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of subclause 6.6.3 shall apply to this port, and this test need not be performed.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

7.7.2 Conformance requirements

7.7.2.1 3,84Mcps TDD option

The power of any spurious emission shall not exceed the values given in table 7.7.2.1.

Table 7.7.2.1: Receiver spurious emission requirements

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,900 – 1,980 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,980 – 2,010 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,010 – 2,025 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz 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 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS

7.7.2.2 1,28Mcps TDD option

The power of any spurious emission shall not exceed the values given in table 7.7.2.2.

Table 7.7.2.2: Receiver spurious emission requirements for 1,28Mcps TDD

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 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.

The reference for this requirement is TS 25.105 subclause 7.7.1.

7.7.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference caused by receiver spurious emissions to other systems.

7.7.4 Method of test

7.7.4.1 Initial conditions

7.7.4.1.1 3,84Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3) Set the BS receiver to operational mode.

(4) Set the BS to transmit a signal with parameters according to table 7.7.4.1.1.

(5) Terminate the Tx port(s).

Table 7.7.4.1.1: Parameters of the transmitted signal for Rx spurious emissions test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 14: transmit, if i is even; receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

7.7.4.1.2 1,28Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3) Set the BS receiver to operational mode.

(4) Set the BS to transmit a signal with parameters according to table 7.7.4.1.2.

(5) Terminate the Tx port(s).

Table 7.7.4.1.2: Parameters of the transmitted signal for Rx spurious emissions test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

7.7.4.2 Procedure

7.7.4.2.1 3,84Mcps TDD option

(1) Measure the power of the spurious emissions by applying the measuring equipment with the settings as specified in table 7.7.4.2.1. The characteristics of the measurement filter with the bandwidth 3,84 MHz shall be RRC with roll-off $\alpha = 0,22$. The characteristics of the measurement filters with bandwidths 100 kHz and 1 MHz shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filters shall be stepped in contiguous steps over the frequency bands as specified in table 7.7.4.2.1. The time duration of each step shall be sufficiently long to capture one even (transmit) time slot.

(2) If the BS is equipped with more than one Rx port, interchange the connections of the BS Rx ports and repeat the measurement according to (1).

Table 7.7.4.2.1: Measurement equipment settings

Stepped frequency range	Measurement bandwidth	Step width	Note	Detection mode
9 kHz – 1 GHz	100 kHz	100 kHz		true RMS
1 GHz – 1,900 GHz	1 MHz	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS	
1,900 GHz – 1,980 GHz	3,84 MHz	200 kHz		
1,980 GHz – 2,010 GHz	1 MHz	1 MHz		
2,010 GHz – 2,025 GHz	3,84 MHz	200 kHz		
2,025 GHz – 12,75 GHz	1 MHz	1 MHz		

7.7.4.2.2 1,28Mcps TDD option

(1) Measure the power of the spurious emissions by applying the measuring equipment with the settings as specified in table 7.7.4.2.1. The characteristics of the measurement filter with the bandwidth 1,28 MHz shall be RRC with roll-off $\alpha = 0,22$. The characteristics of the measurement filters with bandwidths 100 kHz and 1 MHz shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filters shall be stepped in contiguous steps over the frequency bands as specified in table 7.7.4.2.2. The time duration of each step shall be sufficiently long to capture one even (transmit) time slot.

(2) If the BS is equipped with more than one Rx port, interchange the connections of the BS Rx ports and repeat the measurement according to (1).

Table 7.7.4.2.2: Measurement equipment settings

Stepped frequency range	Measurement bandwidth	Step width	Note	Detection mode
9 kHz – 1 GHz	100 kHz	100 kHz		true RMS
1 GHz – 1,900 GHz	1 MHz	1 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the BS	
1,900 GHz – 1,980 GHz	1,28 MHz	200 kHz		
1,980 GHz – 2,010 GHz	1 MHz	1 MHz		
2,010 GHz – 2,025 GHz	1,28 MHz	200 kHz		
2,025 GHz – 12,75 GHz	1 MHz	1 MHz		

7.7.5 Test requirements

The spurious emissions measured according to subclause 7.7.4.2 shall not exceed the limits specified in subclause 7.7.2.

8 Performance requirements

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 minimum bandwidth of the white noise source, simulating interference from other cells (I_{oc}) shall be 1,5 times the chip rate ~~(5,76 MHz for a chip rate of 3,84 MHz)~~.

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 8.1.1: 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

8.2.1.1 Definition and applicability

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Ratio (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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.2.1.2 Conformance requirements

8.2.1.2.1 3,84Mcps TDD option

For the parameters specified in table 8.2.1.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.2.1.2.2. These requirements are applicable for TFCS size 16.

Table 8.2.1.2.1: 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	–	–
I_{oc}	dBm/3,84 MHz	-89			
Information Data Rate	kbps	12,2	64	144	384

Table 8.2.1.2.2: Performance requirements in AWGN channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	-1,9	10^{-2}
2	-0,3	10^{-1}
	0,0	10^{-2}
3	0,0	10^{-1}
	0,2	10^{-2}
4	-0,5	10^{-1}
	-0,3	10^{-2}

8.2.1.2.2 1,28Mcps TDD option

For the parameters specified in table 8.2.1.2.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.2.1.2.2.2. These requirements are applicable for TFCS size 16.

Table 8.2.1.2.2.1: Parameters in static propagation conditions for 1,28Mcps TDD

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.2.1.2.2.2: Performance requirements in AWGN channel for 1,28Mcps TDD

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	0.6	10^{-2}
2	-0.9	10^{-1}
	-0.4	10^{-2}
3	-0.3	10^{-1}
	-0.1	10^{-2}
4	0.5	10^{-1}
	0.6	10^{-2}

The reference for this requirement is TS 25.105 subclause 8.2.1.

8.2.1.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed test signal under static propagation conditions with a BLER not exceeding a specified limit. Within the wanted channel, intracell interference sources as well as an additional intercell interference source are taken into account. Therefore, this test – as all other tests in clause 8 - mainly checks the ability of the signal processing part of the receiver to extract the wanted signal from the interfered-with input signal, whereas the tests in clause 7 concentrate on the receiver RF part.

8.2.1.4 Method of test

8.2.1.4.1 Initial conditions

8.2.1.4.1 3,84Mcps TDD option

Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 16, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.2.1.2.1.1.

8.2.1.4.2 1,28Mcps TDD option

Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.2.1.2.2.1.

8.2.1.4.2 Procedure

8.2.1.4.2.1 3,84Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.2.1.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.2.1.4.2.1.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.2.1.4.2.1.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.2.1.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	6	-99,9	$DPCH_1$	8	-96,9
2	10^{-1}	4	-98,8	$DPCH_1$	16	-98,8
				$DPCH_2$	4	-92,8
	10^{-2}	4	-98,5	$DPCH_1$	16	-98,5
				$DPCH_2$	4	-92,5
3	10^{-1}	0	–	$DPCH_1$	16	-98,5
				$DPCH_2$	2	-89,5
	10^{-2}	0	–	$DPCH_1$	16	-98,3
				$DPCH_2$	2	-89,3
4	10^{-1}	0	–	$DPCH_1$	2	-89,5
	10^{-2}	0	–	$DPCH_1$	2	-89,3

8.2.1.4.2.2 1,28Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.2.1.2.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.2.1.4.2.2.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.2.1.4.2.2.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.2.1.4.2.2: Parameters of $DPCH_0$ and the wanted signal for 1,28Mcps TDD

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-97.4	$DPCH_1$	8	-97.4
2	10^{-1}	1	-98.9	$DPCH_1$	2	-92.9
	10^{-2}	1	-98.4	$DPCH_1$	2	-92.5
3	10^{-1}	1	-98.3	$DPCH_1$	2	-92.3
	10^{-2}	1	-98.1	$DPCH_1$	2	-92.1
4	10^{-1}	0	–	$DPCH_1$	8	-97.5
				$DPCH_2$	2	-91.5
	10^{-2}	0	–	$DPCH_1$	8	-97.4
				$DPCH_2$	2	-91.4

8.2.1.5 Test requirements

8.2.1.5.1 3,84Mcps TDD option

The BLER measured according to subclause 8.2.1.4.2 shall not exceed the limits specified in table 8.2.1.2.2.

8.2.1.5.2 1,28Mcps TDD option

The BLER measured according to subclause 8.2.1.4.2. shall not exceed the limits specified in table 8.2.1.2.2.2.

8.3 Demodulation of DCH in multipath fading conditions

8.3.1 Multipath fading Case 1

8.3.1.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 1 is determined by the maximum Block Error Ratio (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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.3.1.2 Conformance requirements

8.3.1.2.1 3,84Mcps TDD option

For the parameters specified in table 8.3.1.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.3.1.2.2. These requirements are applicable for TFCS size 16.

Table 8.3.1.2.1: 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	–	–
I_{oc}	dBm/3,84 MHz	-89			
Information Data Rate	kbps	12,2	64	144	384

Table 8.3.1.2.2: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6,3	10^{-2}
2	5,5	10^{-1}
	9,4	10^{-2}
3	5,6	10^{-1}
	9,4	10^{-2}
4	5,5	10^{-1}
	8,7	10^{-2}

8.3.1.2.2 1,28Mcps TDD option

For the parameters specified in table 8.3.1.2.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.3.1.2.2.2. These requirements are applicable for TFCS size 16.

Table 8.3.1.2.2.1: Parameters in multipath Case 1 channel for 1,28Mcps TDD

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.3.1.2.2.2: Performance requirements multipath Case 1 channel for 1,28Mcps TDD

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.4	10^{-2}
2	5.3	10^{-1}
	9.4	10^{-2}
3	5.7	10^{-1}
	10.1	10^{-2}
4	6.0	10^{-1}
	10.0	10^{-2}

The reference for this requirement is TS 25.105 subclause 8.3.1.

8.3.1.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed test signal under defined propagation conditions (multipath fading Case 1) with a BLER not exceeding a specified limit. Within the wanted channel, independent intracell interference sources as well as an additional intercell interference source are taken into account. Therefore, this test – as all other tests in clause 8 - mainly checks the ability of the signal processing part of the receiver to extract the wanted signal from the distorted and interfered-with input signal, whereas the tests in clause 7 concentrate on the receiver RF part.

8.3.1.4 Method of test

8.3.1.4.1 Initial conditions

8.3.1.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 16, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.3.1.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 1.

8.3.1.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.3.1.2.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 1.

8.3.1.4.2 Procedure

8.3.1.4.2.1 3,84Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.3.1.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.3.1.4.2.1.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.3.1.4.2.1.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.3.1.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	6	-91,7	$DPCH_1$	8	-88,7
2	10^{-1}	4	-93	$DPCH_1$	16	-93
				$DPCH_2$	4	-87
	10^{-2}	4	-89,1	$DPCH_1$	16	-89,1
				$DPCH_2$	4	-83,1
3	10^{-1}	0	–	$DPCH_1$	16	-92,9
				$DPCH_2$	2	-83,9
	10^{-2}	0	–	$DPCH_1$	16	-89,1
				$DPCH_2$	2	-80,1
4	10^{-1}	0	–	$DPCH_1$	2	-83,5
	10^{-2}	0	–	$DPCH_1$	2	-80,3

8.3.1.4.2.2 1,28Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.3.1.2.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.3.1.4.2.2.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.3.1.4.2.2.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.3.1.4.2.2: Parameters of $DPCH_0$ and the wanted signal for 1,28Mcps TDD

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-87.6	$DPCH_1$	8	-87.6
2	10^{-1}	1	-92.7	$DPCH_1$	2	-86.7
	10^{-2}	1	-88.6	$DPCH_1$	2	-82.6
3	10^{-1}	1	-92.3	$DPCH_1$	2	-86.3
	10^{-2}	1	-87.9	$DPCH_1$	2	-81.9
4	10^{-1}	0	–	$DPCH_1$	8	-92.0
				$DPCH_2$	2	-86.0
	10^{-2}	0	–	$DPCH_1$	8	-88.0
				$DPCH_2$	2	-82.0

8.3.1.5 Test requirements

8.3.1.5.1 3,84Mcps TDD option

The BLER measured according to subclause 8.3.1.4.2 shall not exceed the limits specified in table 8.3.1.2.2.

8.3.1.5.2 1,28Mcps TDD option

The BLER measured according to subclause 8.3.1.4.2 shall not exceed the limits specified in table 8.3.1.2.2.2.

8.3.2 Multipath fading Case 2

8.3.2.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 2 is determined by the maximum Block Error Ratio (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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.3.2.2 Conformance requirements

8.3.2.2.1 3,84Mcps TDD option

For the parameters specified in table 8.3.2.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.3.2.2.2. These requirements are applicable for TFCS size 16.

Table 8.3.2.2.1: 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	–	–	–
I_{oc}	dBm/3,84 MHz	-89			
Information Data Rate	kbps	12,2	64	144	384

Table 8.3.2.2.2: Performance requirements in multipath Case 2 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	0,1	10^{-2}
2	0,4	10^{-1}
	2,8	10^{-2}
3	3,6	10^{-1}
	6,0	10^{-2}
4	3,0	10^{-1}
	5,4	10^{-2}

8.3.2.2.2 1,28Mcps option

For the parameters specified in table 8.3.2.2.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.3.2.2.2.2. These requirements are applicable for TFCS size 16.

Table 8.3.2.2.2.1: Parameters in multipath Case 2 channel for 1,28Mcps TDD

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.3.2.2.2.2: Performance requirements multipath Case 2 channel for 1,28Mcps TDD.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.7	10^{-2}
2	3.6	10^{-1}
	5.9	10^{-2}
3	4.2	10^{-1}
	6.3	10^{-2}
4	4.6	10^{-1}
	6.0	10^{-2}

The reference for this requirement is TS 25.105 subclause 8.3.2.

8.3.2.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed test signal under defined propagation conditions (multipath fading Case 2) with a BLER not exceeding a specified limit. Within the wanted channel, independent intracell interference sources as well as an additional intercell interference source are taken into account. Therefore, this test – as all other tests in clause 8 - mainly checks the ability of the signal processing part of the receiver to extract the wanted signal from the distorted and interfered-with input signal, whereas the tests in clause 7 concentrate on the receiver RF part.

8.3.2.4 Method of test

8.3.2.4.1 Initial conditions

8.3.2.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 16, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.3.2.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 2.

8.3.2.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.3.2.2.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 2.

8.3.2.4.2 Procedure

8.3.2.4.2.1 3,84Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.3.2.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.3.2.4.2.1.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.3.2.4.2.1.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.3.2.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	2	-94,9	$DPCH_1$	8	-91,9
2	10^{-1}	0	–	$DPCH_1$	16	-95,6
				$DPCH_2$	4	-89,6
	10^{-2}	0	–	$DPCH_1$	16	-93,2
				$DPCH_2$	4	-87,2
3	10^{-1}	0	–	$DPCH_1$	16	-94,9
				$DPCH_2$	2	-85,9
	10^{-2}	0	–	$DPCH_1$	16	-92,5
				$DPCH_2$	2	-83,5
4	10^{-1}	0	–	$DPCH_1$	2	-86
	10^{-2}	0	–	$DPCH_1$	2	-83,6

8.3.2.4.2.2 1,28Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.3.2.2.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.3.2.4.2.2.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.3.2.4.2.2.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.3.2.4.2.2: Parameters of $DPCH_0$ and the wanted signal for 1,28Mcps TDD

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-91.3	$DPCH_1$	8	-91.3
2	10^{-1}	1	-94.4	$DPCH_1$	2	-88.4
	10^{-2}	1	-92.1	$DPCH_1$	2	-86.1
3	10^{-1}	1	-93.8	$DPCH_1$	2	-87.8
	10^{-2}	1	-91.7	$DPCH_1$	2	-85.7
4	10^{-1}	0	–	$DPCH_1$	8	-93.4
				$DPCH_2$	2	-87.4
	10^{-2}	0	–	$DPCH_1$	8	-92.0
				$DPCH_2$	2	-86.0

8.3.2.5 Test requirements

8.3.2.5.1 3,84Mcps TDD option

The BLER measured according to subclause 8.3.2.4.2 shall not exceed the limits specified in table 8.3.2.2.2.

8.3.2.5.2 1,28Mcps TDD option

The BLER measured according to subclause 8.3.2.4.2 shall not exceed the limits specified in table 8.3.2.2.2.2.

8.3.3 Multipath fading Case 3

8.3.3.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 3 is determined by the maximum Block Error Ratio (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.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.3.3.2 Conformance requirements

8.3.3.2.1 3,84Mcps TDD option

For the parameters specified in table 8.3.3.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.3.3.2.2. These requirements are applicable for TFCS size 16.

Table 8.3.3.2.1: 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	–	–	–
I_{oc}	dBm/3,84 MHz	-89			
Information Data Rate	kbps	12,2	64	144	384

Table 8.8: Performance requirements in multipath Case 3 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	-0,6	10^{-2}
2	0,7	10^{-1}
	2,4	10^{-2}
	3,8	10^{-3}
3	3,9	10^{-1}
	5,9	10^{-2}
	7,3	10^{-3}
4	2,8	10^{-1}
	4,2	10^{-2}
	4,8	10^{-3}

8.3.3.2.2 1,28Mcps TDD option

For the parameters specified in table 8.3.3.2.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in Table 8.3.3.2.2.2. These requirements are applicable for TFCS size 16.

Table 8.3.3.2.2.1: Parameters in multipath Case 3 channel (1,28Mcps option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.3.3.2.2.2: Performance requirements multipath Case 3 channel (1,28Mcps option).

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	5.6	10^{-2}
2	3.2	10^{-1}
	4.6	10^{-2}
	5.9	10^{-3}
3	3.7	10^{-1}
	4.8	10^{-2}
	5.9	10^{-3}
4	4.2	10^{-1}
	5.1	10^{-2}
	5.9	10^{-3}

The reference for this requirement is TS 25.105 subclause 8.3.3.

8.3.3.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed test signal under defined propagation conditions (multipath fading Case 3) with a BLER not exceeding a specified limit. Within the wanted channel, independent intracell interference sources as well as an additional intercell interference source are taken into account. Therefore, this test – as all other tests in clause 8 - mainly checks the ability of the signal processing part of the receiver to extract the wanted signal from the distorted and interfered-with input signal, whereas the tests in clause 7 concentrate on the receiver RF part.

8.3.3.4 Method of test

8.3.3.4.1 Initial conditions

8.3.3.4.1.1 3,84Mcps TDD option

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 16, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.3.3.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 3.

8.3.3.4.1.2 1,28Mcps TDD option

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators), and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid UTRA TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.3.3.2.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 3.

8.3.3.4.2 Procedure

8.3.3.4.2.1 3,84Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.3.3.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.3.3.4.2.1.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.3.3.4.2.1.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.3.3.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	2	-95,6	$DPCH_1$	8	-92,6
2	10^{-1}	0	–	$DPCH_1$	16	-95,3
				$DPCH_2$	4	-89,3
	10^{-2}	0	–	$DPCH_1$	16	-93,6
				$DPCH_2$	4	-87,6
	10^{-3}	0	–	$DPCH_1$	16	-92,2
				$DPCH_2$	4	-86,2
3	10^{-1}	0	–	$DPCH_1$	16	-94,6
				$DPCH_2$	2	-85,6
	10^{-2}	0	–	$DPCH_1$	16	-92,6
				$DPCH_2$	2	-83,6
	10^{-3}	0	–	$DPCH_1$	16	-91,2
				$DPCH_2$	2	-82,2
4	10^{-1}	0	–	$DPCH_1$	2	-86,2
	10^{-2}	0	–	$DPCH_1$	2	-84,8
	10^{-3}	0	–	$DPCH_1$	2	-84,2

8.3.3.4.2.2 1,28Mcps TDD option

(1) Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.3.3.2.2.1.

(2) For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.3.3.4.2.2.

(3) Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.3.3.4.2.2.

(4) Measure the BLER of the wanted signal at the BS receiver.

Table 8.3.3.4.2.2: Parameters of $DPCH_0$ and the wanted signal for 1,28Mcps TDD

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-92.4	$DPCH_1$	8	-92.4
2	10^{-1}	1	-94.8	$DPCH_1$	2	-88.8
	10^{-2}	1	-93.4	$DPCH_1$	2	-87.4
	10^{-3}	1	-92.1	$DPCH_1$	2	-86.1
3	10^{-1}	1	-94.3	$DPCH_1$	2	-88.3
	10^{-2}	1	-93.2	$DPCH_1$	2	-87.2
	10^{-3}	1	-92.1	$DPCH_1$	2	-86.1
4	10^{-1}	0	–	$DPCH_1$	8	-93.8
				$DPCH_2$	2	-87.8
	10^{-2}	0	–	$DPCH_1$	8	-92.9
				$DPCH_2$	2	-86.9
	10^{-3}	0	–	$DPCH_1$	8	-92.1
				$DPCH_2$	2	-86.1

8.3.3.5 Test requirements

8.3.3.5.1 3,84Mcps TDD option

The BLER measured according to subclause 8.3.3.4.2 shall not exceed the limits specified in table 8.3.3.2.2.

8.3.3.5.2 1,28Mcps TDD option

The BLER measured according to subclause 8.3.3.4.2 shall not exceed the limits specified in table 8.3.3.2.2.2.

Annex A (normative): Measurement Channels

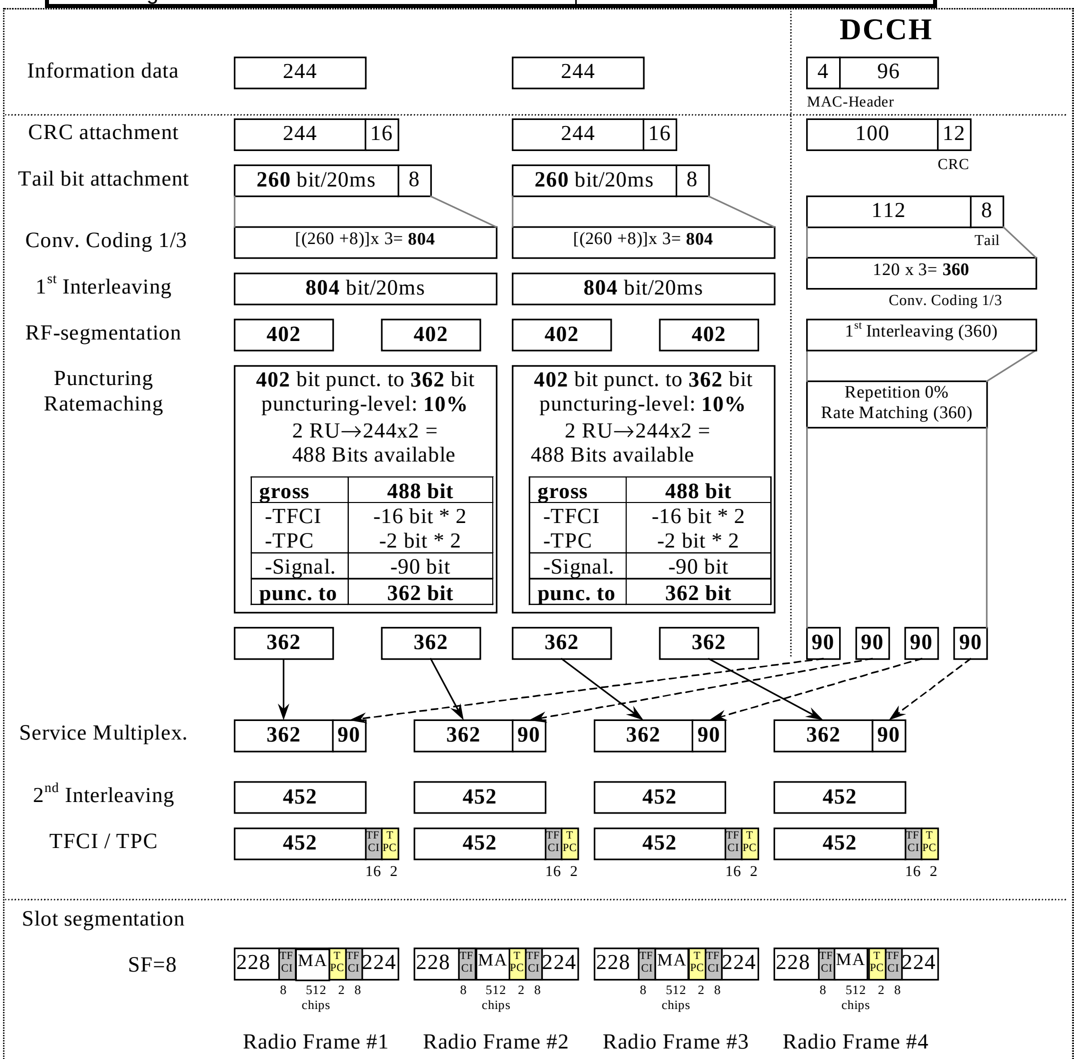
A.1 General

A.2 Reference measurement channel

A.2.1 UL reference measurement channel (12.2 kbps)

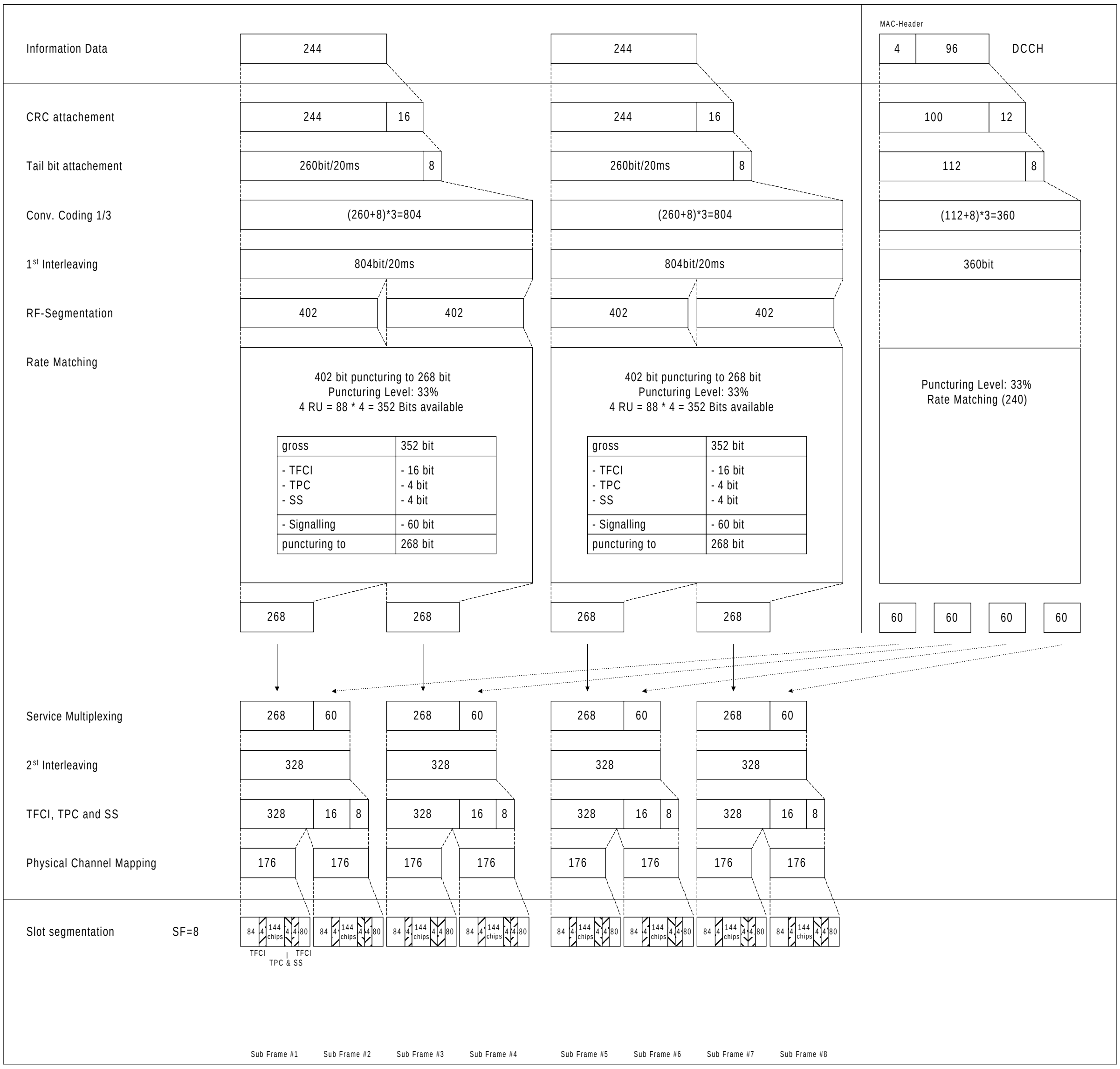
A.2.1.1 3,84Mcps TDD option

Parameter	
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%



A.2.1.2 1,28Mcps option

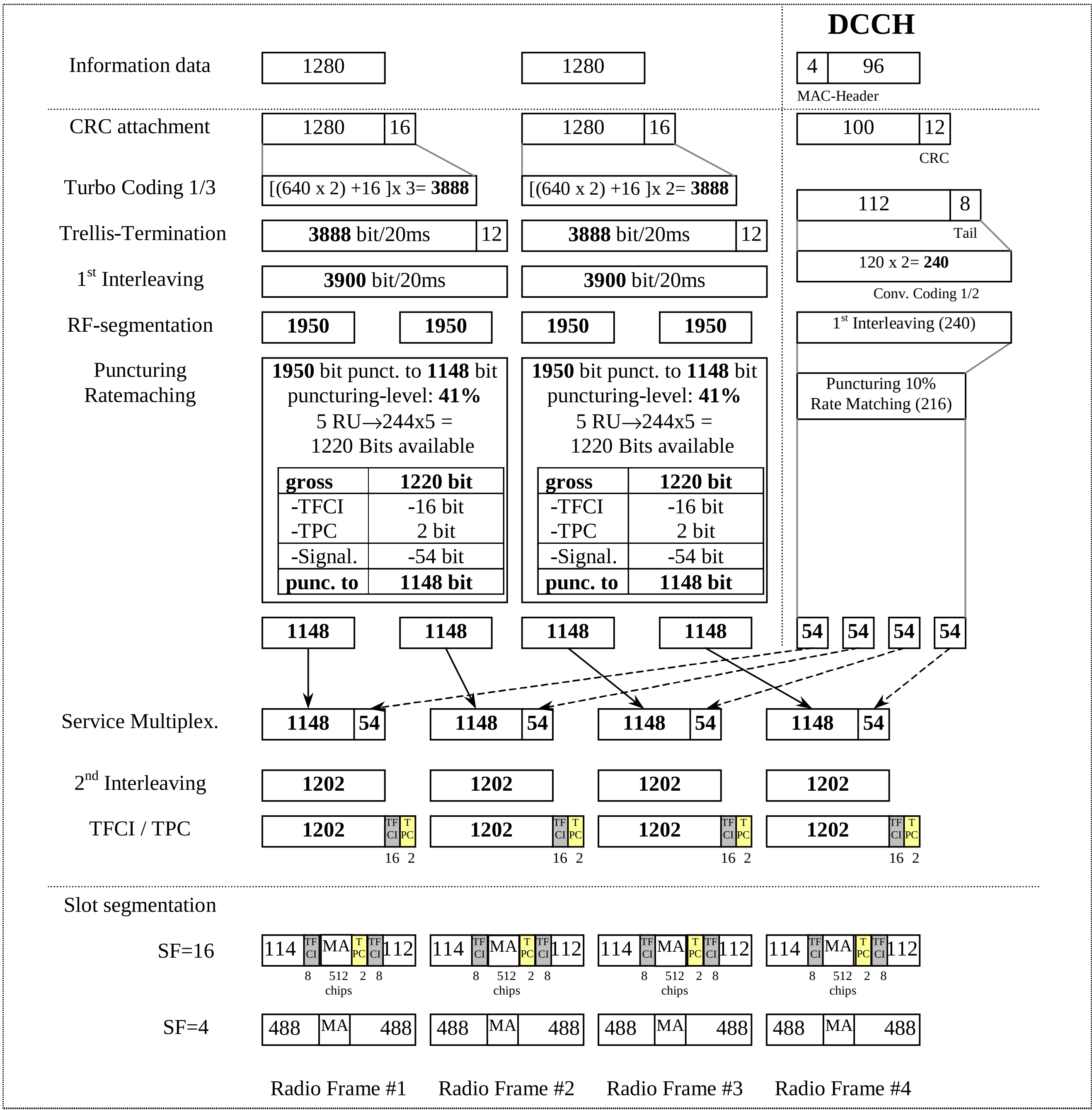
Parameter	
Information data rate	12.2 kbps
RU's allocated	1TS (1*SF8) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH / DCCH	33% / 33%



A.2.2 UL reference measurement channel (64 kbps)

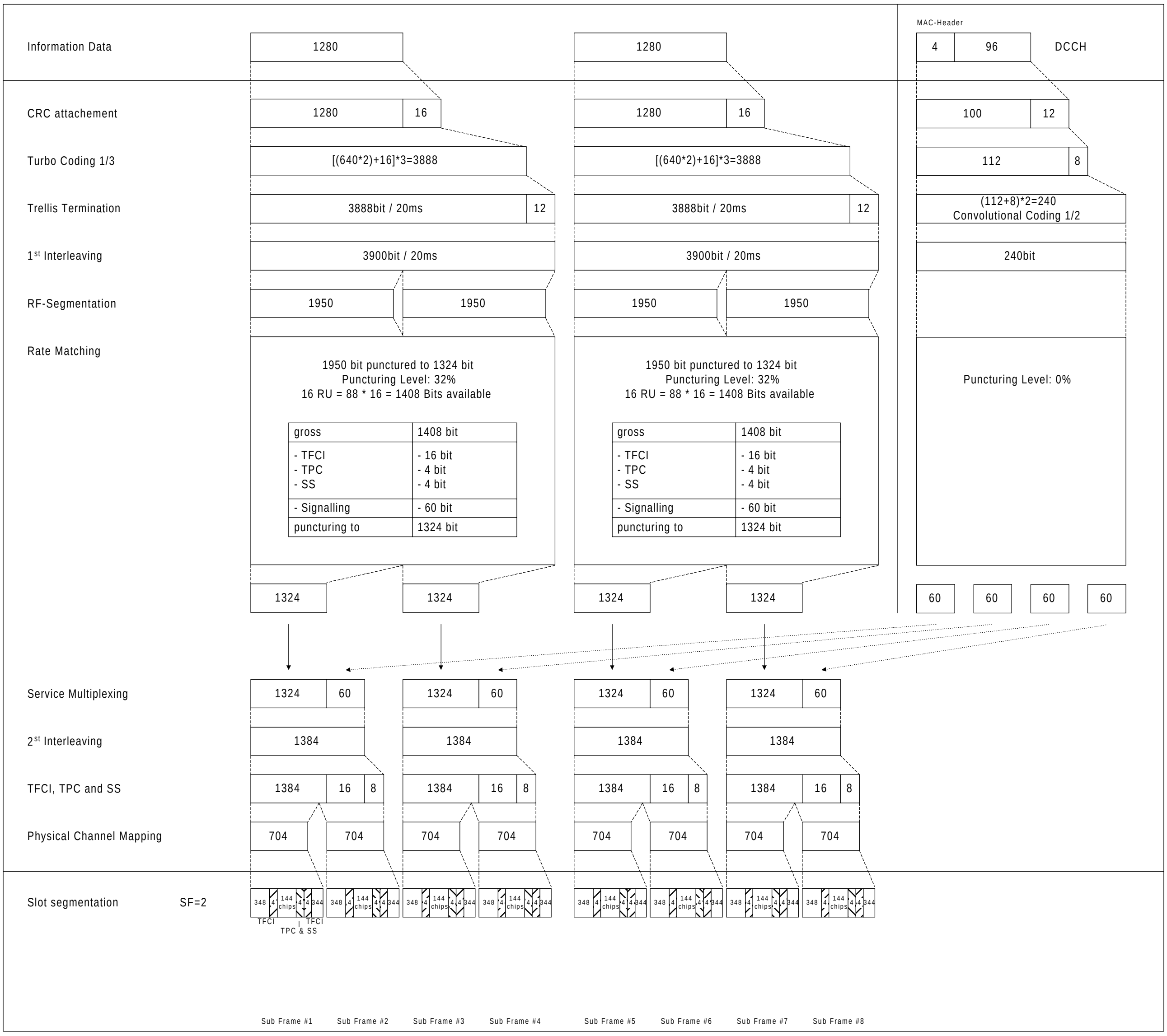
A.2.2.1 3,84Mcps TDD option

Parameter	
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%



A.2.2.2 1,28Mcps TDD option

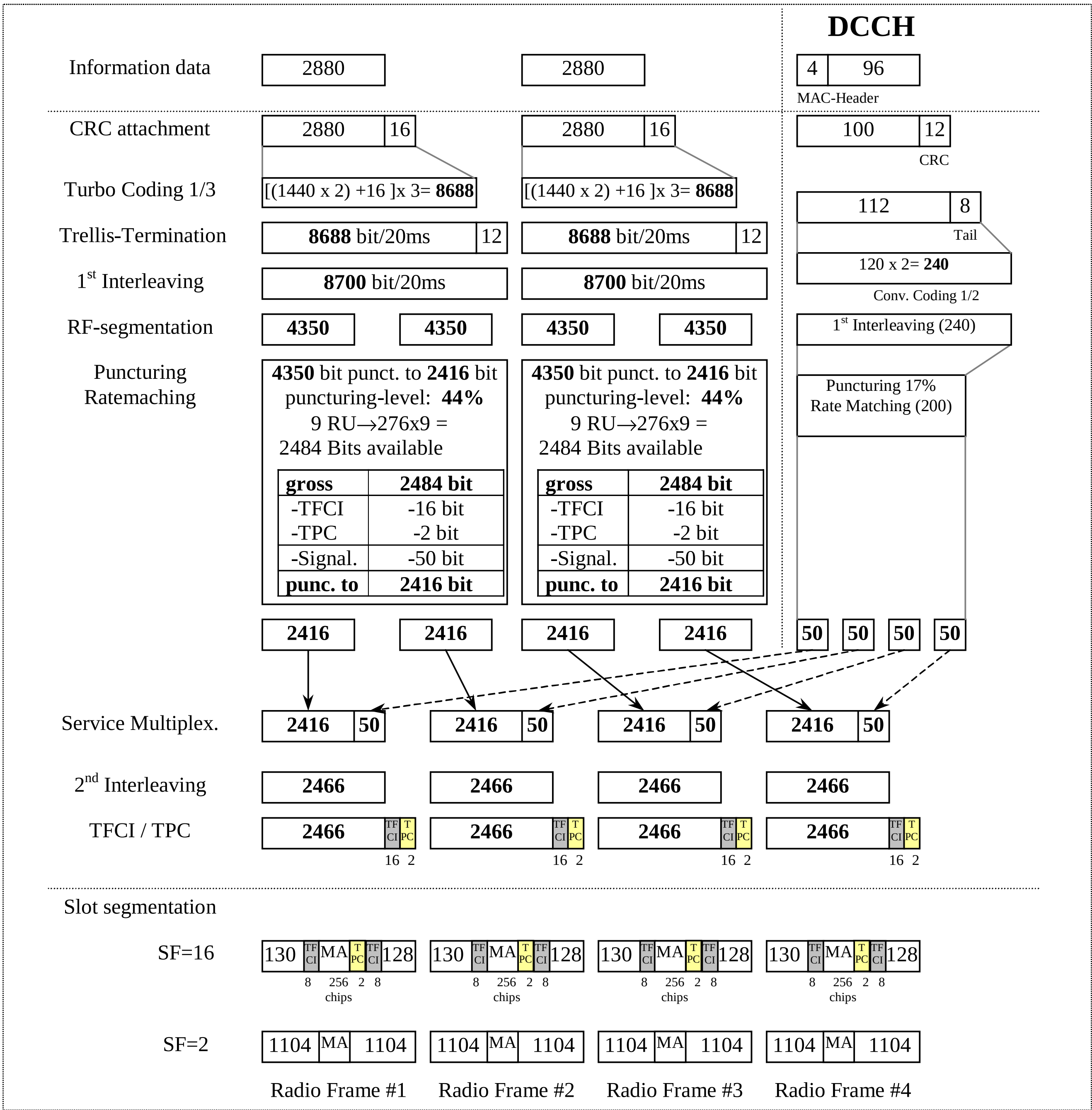
Parameter	
Information data rate	64 kbps
RU's allocated	1TS (1*SF2) = 8RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	32% / 0



A.2.3 UL reference measurement channel (144 kbps)

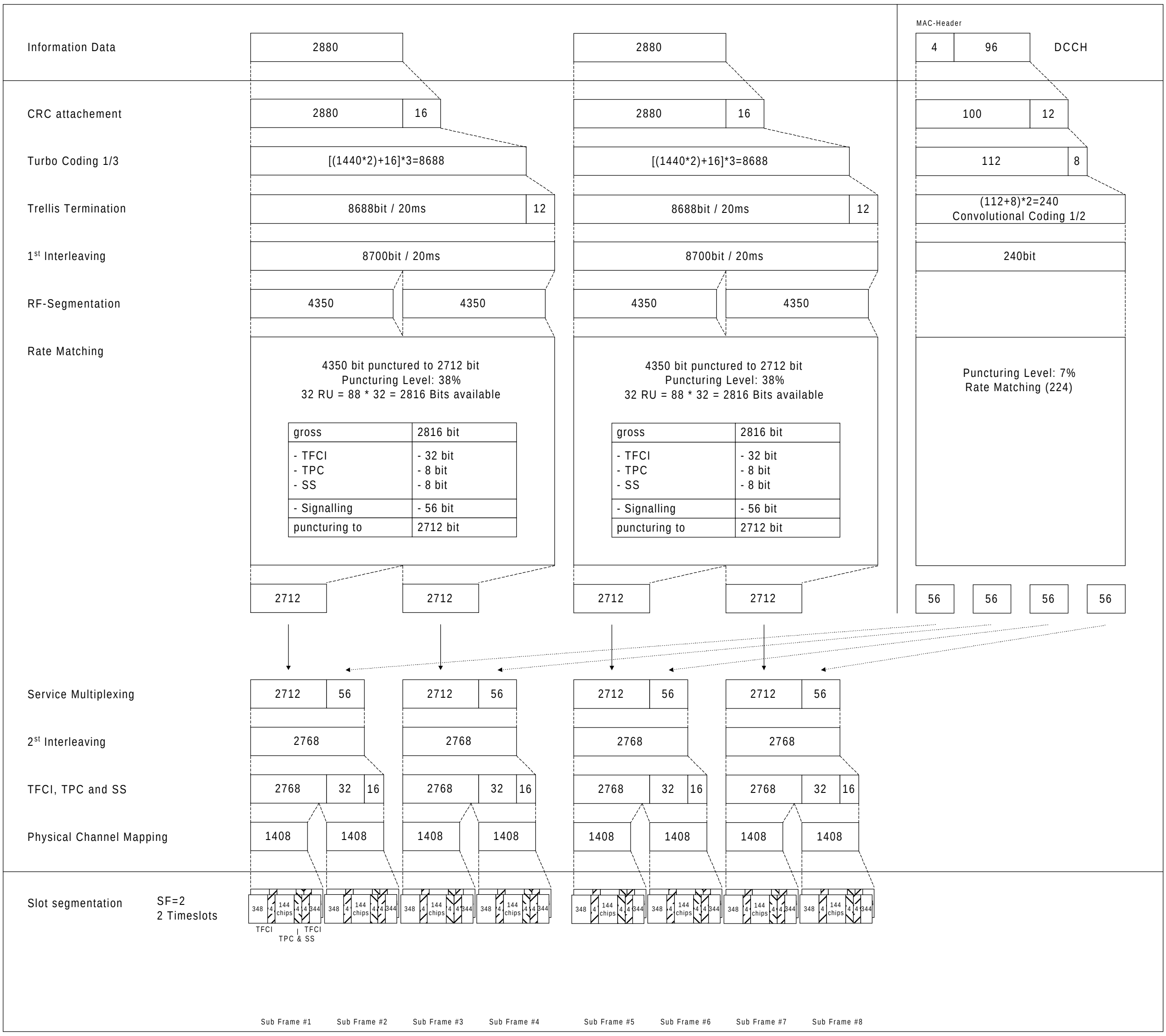
A.2.3.1 3,84Mcps TDD option

Parameter	
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%



A.2.3.2 1,28Mcps TDD option

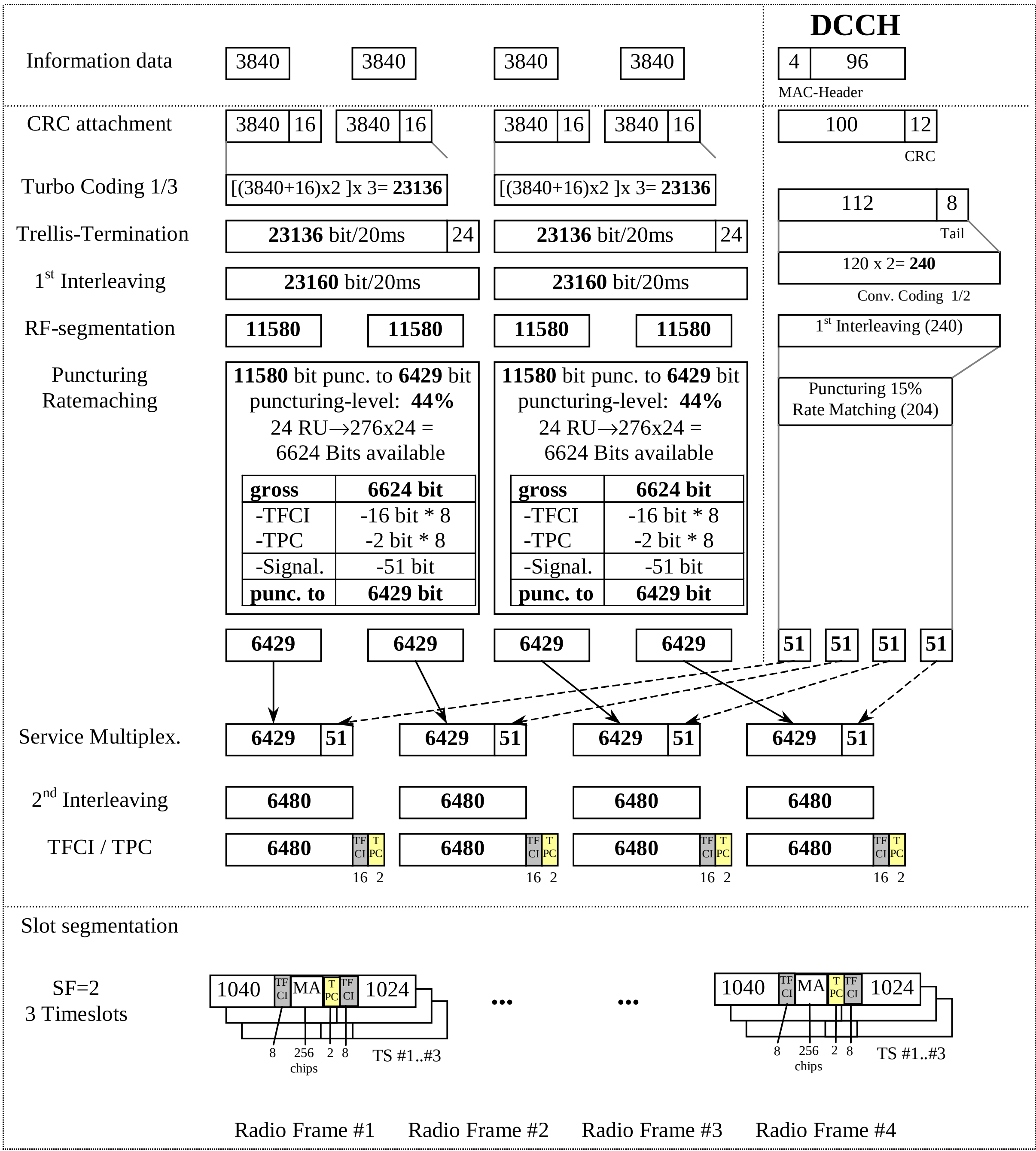
Parameter	
Information data rate	144 kbps
RU's allocated	2TS (1*SF2) = 16RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	8 Bit/user/10ms
TFCI	32 Bit/user/10ms
Synchronisation Shift (SS)	8 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	38% / 7%



A.2.4 UL reference measurement channel (384 kbps)

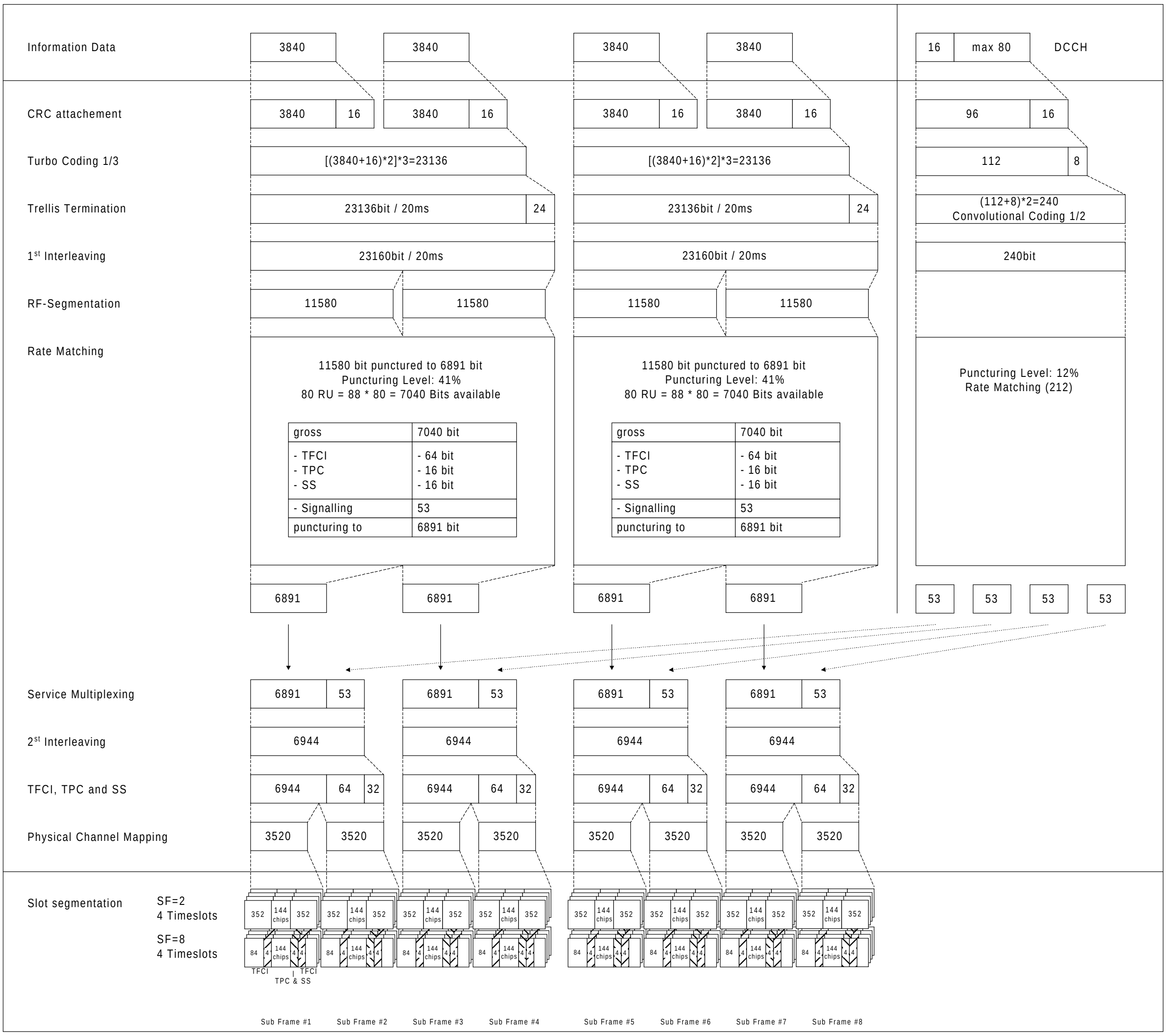
A.2.4.1 3,84Mcps TDD option

Parameter	
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	44% / 15.3%



A.2.4.2 1,28Mcps TDD option

Parameter	
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 / ½ DCCH	41% / 12%



A.2.5 RACH reference measurement channel

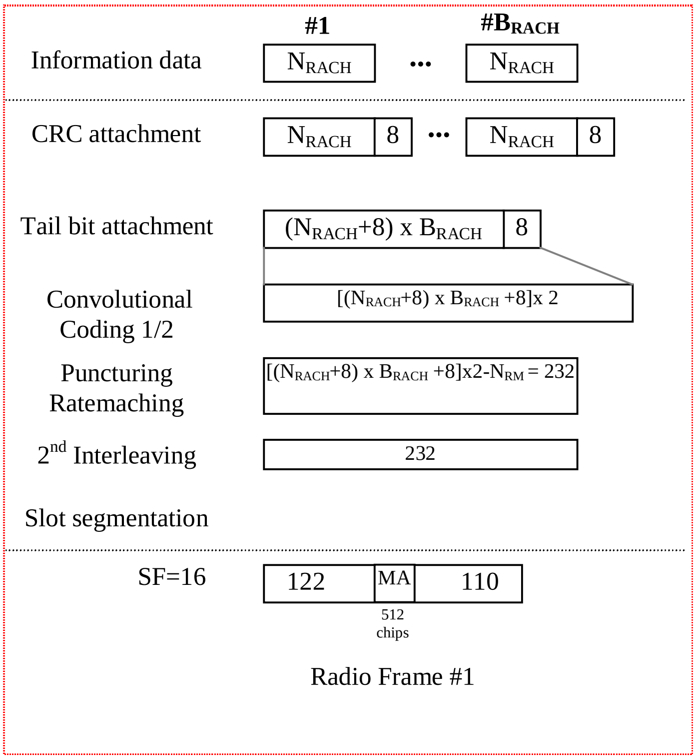
A.2.5.1 3,84Mcps TDD option

Parameter	
Information data rate e.g. 2 TBs (B_{RACH}=2): **SF16:** 0% puncturing rate at CR=1/2 10% puncturing rate at CR=1/2 $N_{RACH} = \frac{\frac{232 + N_{RM}}{2} - 8}{B_{RACH}} - 8$ **SF8:** 0% puncturing rate at CR=1/2 10% puncturing rate at CR=1/2 $N_{RACH} = \frac{\frac{464 + N_{RM}}{2} - 8}{B_{RACH}} - 16$	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

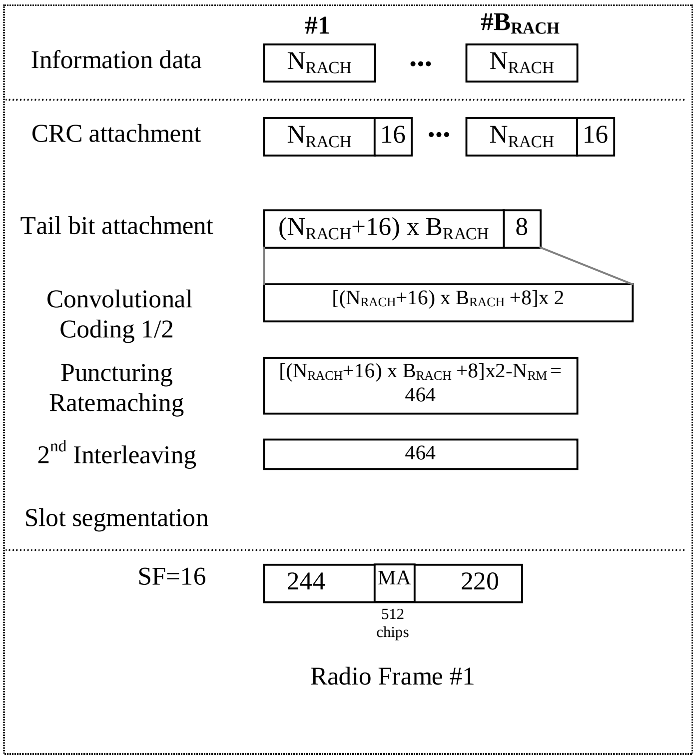
N_{RACH} = number of bits per TB

B_{RACH} = number of TBs

A.2.5.1.1 RACH mapped to 1 code SF16



A.2.5.1.2 RACH mapped to 1 code SF8



A.2.5.2 1,28Mcps TDD option

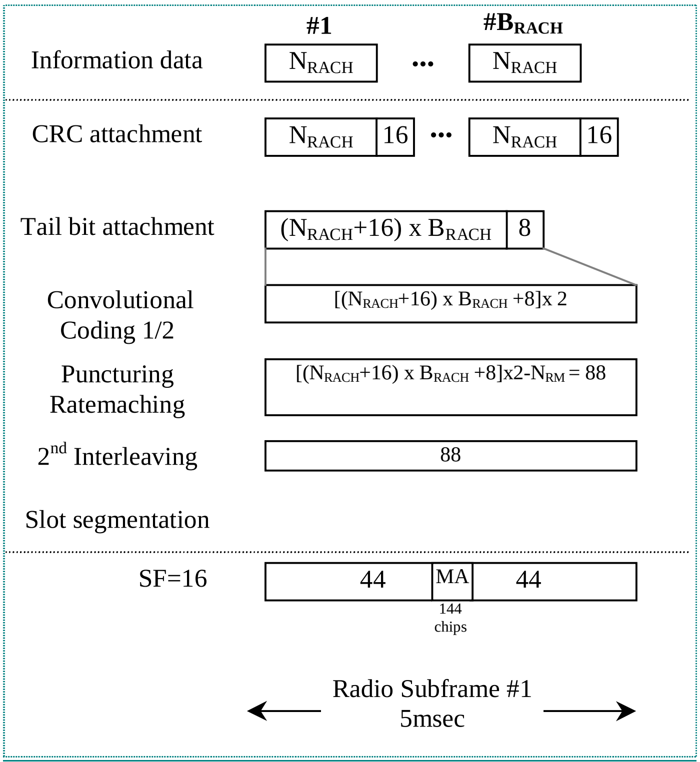
Parameter	
Information data rate: $$N_{RACH} = \frac{\frac{88 * \frac{16}{SF}\left(\frac{N_{RM}}{100}+1\right)}{2} - 8}{B_{RACH}} - 16$$ **SF16** (RU's allocated:1): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2 **SF8** (RU's allocated:2): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2 **SF4** (RU's allocated:4): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2	Transport Block Set Size=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

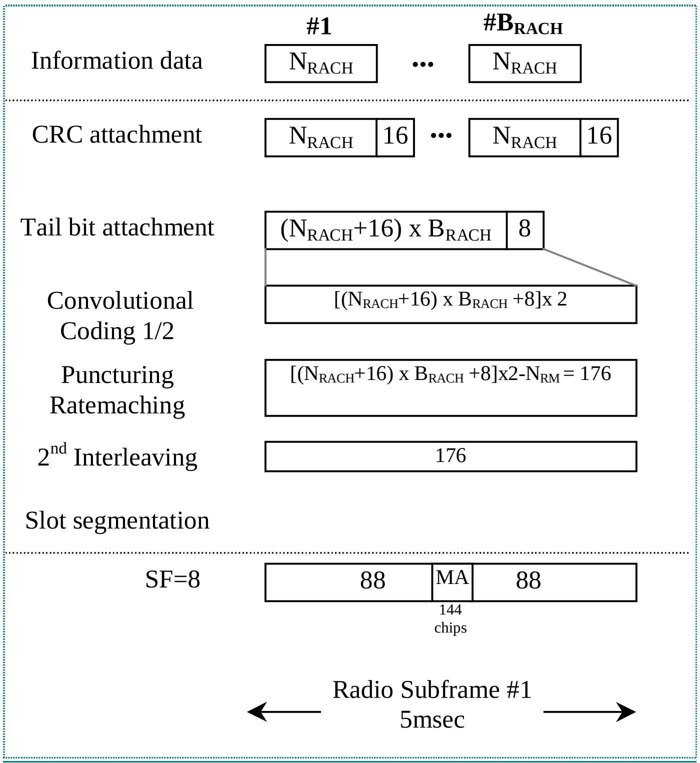
B_{RACH} = number of TBs

N_{RM} = puncturing rate

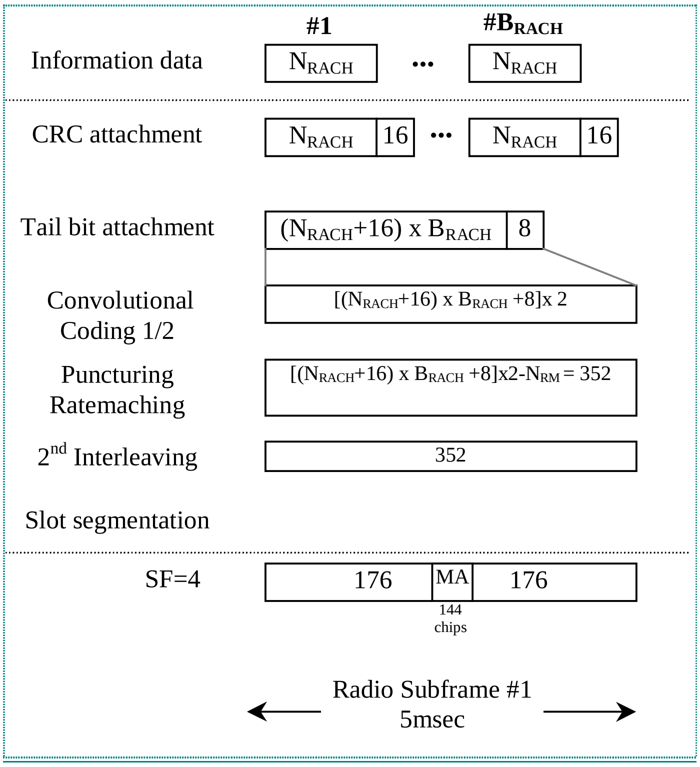
A.2.5.2.1 RACH mapped to 1 code SF16



A.2.5.2.2 RACH mapped to 1 code SF8



A.2.5.2.3 RACH mapped to 1 code SF4


#1
#B_RACH
Information data
N_RACH
N_RACH
CRC attachment
N_RACH 16
N_RACH 16
Tail bit attachment
(N_RACH+16) x B_RACH 8
Convolutional Coding 1/2
[(N_RACH+16) x B_RACH +8]x 2
Puncturing Ratemaching
[(N_RACH+16) x B_RACH +8]x2-N_RM = 352
2nd Interleaving
352
Slot segmentation
SF=4
176 MA 176
144 chips
Radio Subframe #1
5msec

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 3,84Mcps 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.

Table B2.1: 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 1,28Mcps TDD option

Table B2.2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table B2.2: Propagation Conditions for Multi path Fading Environments for 1,28Mcps TDD

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 (normative): Global in-channel Tx test

C.1 General

The global in-channel Tx test enables the measurement of all relevant parameters that describe the in-channel quality of the output signal of the Tx under test in a single measurement process.

The objective of this Annex is to list the results that shall be available from the global in-Channel TX-Test. To aid understanding, an example algorithmic description of the measurement process is provided. It is not intended that this particular method is required. It is however required that any algorithm that is used for in-channel Tx tests should deliver the required results with the required accuracy.

All notes referred to in the various subclauses of C.2 are put together in clause C.4

C.2 Definition of the process

C.2.1 Basic principle

The process is based on the comparison of the actual **output signal of the Tx under test**, received by an ideal receiver, with a **reference signal**, that is generated by the measuring equipment and represents an ideal error free received signal. The reference signal shall be composed of the same number of codes at the correct spreading factors as contained in the test signal. Note, for simplification, the notation below assumes only one code and one spreading factor. All signals are represented as equivalent (generally complex) baseband signals.

C.2.2 Output signal of the Tx under test

The output signal of the Tx under test is acquired by the measuring equipment, filtered by a matched filter (RRC characteristic with roll-off α = 0,22, correct in shape and in position on the frequency axis) and stored at one sample per chip at the intersymbol interference free instants.

The following form represents the physical signal in the entire measurement interval:

one vector **Z**, containing N = ns x sf + ma complex samples;

with

ns: <u>n</u>umber of <u>s</u>ymbols in the measurement interval;

sf: number of chips per symbol. (sf: <u>s</u>preading <u>f</u>actor) (see Note: Symbol length)

ma: number of <u>m</u>id<u>a</u>mble chips (TDD only)

C.2.3 Reference signal

The reference signal is constructed by the measuring equipment according to the relevant Tx specifications.

It is filtered by the same matched filter, mentioned in C.2.2, and stored at the intersymbol interference free instants. The following form represents the reference signal in the entire measurement interval:

one vector **R**, containing N = ns x sf + ma complex samples;

where ns, sf and ma have the same meaning as defined above in C.2.2.

C.2.4 Classification of measurement results

The measurement results achieved by the global in-channel Tx test can be classified into two types:

- **Results of type "deviation"**, where the error-free parameter has a non-zero magnitude. (These are the parameters that represent the signal). These parameters are:

  RF Frequency

  Power (in case of single code)

  Code Domain Power (in case of multi-code)

  Timing (only for UE)

  (Additional parameters: see Note: Deviation)

- **Results of type "residual"**, where the error-free parameter has value zero. (These are the parameters that represent the error values of the measured signal; ideally, their magnitude is zero). These parameters are:

  Error Vector Magnitude (EVM)

  Peak Code Domain Error (PCDE)

  (Additional parameters: see Note: Residual)

C.2.5 Process definition to achieve results of type "deviation"

The reference signal (**R**; see subclause C.2.3) is varied with respect to the parameters mentioned in subclause C.2.4 under "results of type deviation" in order to achieve best fit with the recorded signal under test (**Z**; see subclause C.2.2). Best fit is achieved when the RMS difference value between the signal under test and the varied reference signal is an absolute minimum. The varied reference signal, after the best-fit process, will be called **R'.**

Those parameter values, which - after the best-fit process – are leading to **R',** represent directly the wanted results of type "deviation". These parameter values are expressed as deviations from the reference value, using the same units as the corresponding reference value.

In case of multi-code transmission, the best-fit process of the type "deviation" parameters frequency, timing (and any additional parameter as e.g. RF phase) is not done with respect to the individual codes, but commonly for the complete code set used; therefore, the process returns one measurement value only for each parameter.

The only exception is the type "deviation" parameter Code Domain Power: The Code Domain Power is varied individually for each used code; therefore, the process returns k individual code power deviations (k: number of codes).

C.2.6 Process definition to achieve results of type "residual"

The difference between the varied reference signal (**R'**; see subclauseC.2.5.) and the Tx signal under test (**Z**; see subclause C.2.2) is the error vector **E** versus time:

E = **Z** – **R'.**

Depending on the parameter to be evaluated, it is appropriate to represent **E** in one of the following two different forms:

- **Form EVM** (representing the physical error signal in the entire measurement interval)

  One vector **E**, containing N = ns x sf + ma complex samples;

  where ns, sf and ma have the same meaning as defined above in C.2.2.

- **Form PCDE** (derived from Form EVM by separating the samples into symbol intervals)

  ns time-sequential vectors **e** with sf complex samples comprising one symbol interval.

E gives results of type "residual" applying the two algorithms defined in subclauses C.2.6.1 and C.2.6.2.

C.2.6.1 Error Vector Magnitude (EVM)

The Error Vector Magnitude EVM is calculated according to the following steps:

(1) Take the error vector **E** defined in subclause C.2.6 (Form EVM) and calculate the RMS value of **E**; the result will be called RMS(**E**).

(2) Take the reference vector **R** defined in subclause C.2.3 and calculate the RMS value of **R**; the result will be called RMS(**R**).

(3) Calculate EVM according to:

$$\mathrm{EVM} = \frac{\mathrm{RMS}(\mathbf{E})}{\mathrm{RMS}(\mathbf{R})} \,\mathrm{x}\, 100\%$$ (here, EVM is relative and expressed in %)

(see Note: TDD)

C.2.6.2 Peak Code Domain Error (PCDE)

The Peak Code Domain Error is calculated according to the following steps:

(1) Take the error vectors **e** defined in subclause C.2.6 (Form PCDE)

(2) Take the orthogonal vectors of the spreading code set C (all codes belonging to one spreading factor) as defined in TS 25.213 and TS 25.223 (range +1, -1). (see Note: Symbol length)

(3) To achieve meaningful results, it is necessary to descramble **e,** leading to **e'** (see Note: Scrambling code)

(4) Calculate the inner product of e' with **C**. Do this for all symbols of the measurement interval and for all codes in the code space.
This gives an array of format k x ns, each value representing an error-vector representing a specific symbol and a specific code, which can be exploited in a variety of ways.

k: number of codes

ns: number of symbols in the measurement interval

(5) Calculate k RMS values, each RMS value unifying n symbols within one code.
(These values can be called "Absolute CodeEVMs" [Volt].)

(6) Find the peak value among the k "absolute Code-EVMs".
(This value can be called "Absolute PeakCodeEVM" [Volt].)

(7) Calculate PCDE according to:

$$\mathrm{PCDE} = 10\lg\frac{(\mathrm{absolute\ PeakCodeEVM})^2}{(\mathrm{RMS}(\mathbf{R}))^2}\ \mathrm{dB}.$$ (a relative value in dB).

see Note: TDD

see Note: Synch channel

C.3 Applications

This process may be applied in the measurements defined in the following subclauses:

6.3 Frequency Stability

6.4 Output Power Dynamics

6.4.2 Power control steps

6.4.3 Power control dynamic range

6.4.4 Minimum transmit power

6.4.5 Primary CCPCH power

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.8 Transmit Modulation

6.8.1 Modulation accuracy

6.8.2 Peak Code Domain Error

C.4 Notes

NOTE: Symbol length
A general code-multiplexed signal is multi-code and multi-rate. In order to avoid unnecessary complexity, the measurement applications use a unique symbol-length, corresponding to a specific spreading factor, regardless of the really intended spreading factor. Nevertheless, the complexity with a multi-code / multi-rate signal can be mastered by introducing appropriate definitions.

NOTE: Deviation
It is conceivable to regard more parameters as type „deviation", e.g. chip clock and RF phase. However, because chip clock and RF frequency are linked together by a statement in the core specifications [1], it is sufficient to process RF frequency only.
The parameter RF phase must be varied within the best-fit process (C.2.5). Although necessary, this parameter-variation does not describe any error, as the modulation schemes used in the system do not depend on an absolute RF-phase.

NOTE: Residual
It is conceivable to regard more parameters as type „residual", e.g. IQ origin offset. As it is not the intention of the test to separate for different error sources, but to quantify the quality of the signal, all such parameters are not extracted by the best-fit process, instead remain part of EVM and PCDE.

NOTE: Scrambling code
To interpret the measurement results in practice, it should be kept in mind that erroneous code power on unused codes is generally de-scrambled differently under test conditions and under real life conditions, whereas erroneous code power on used codes is generally de-scrambled equally under test conditions and under real life conditions. It might be indicated if a used or unused code hits PCDE.

NOTE: TDD
EVM covers the midamble part as well as the data part; however PCDE disregards the midamble part.

NOTE: Synch channel
A BS signal contains a physical synch channel, which is non-orthogonal, related to the other DPCHs. In this context note: The code channel bearing the result of PCDE is exactly one of the DPCHs (never the synch channel). The origin of PCDE (erroneous code power) can be any DPCH and/or the synch channel.

Annex D (informative): Change history

CRs approved at TSG-RAN#7.

RAN doc	Spec	CR	Rev	Phase	Subject	Cat	Current	New
RP-000023	25.142	001		R99	Conformance test descriptions for spectrum emission mask and ACLR	C	3.0.0	3.1.0
RP-000023	25.142	002		R99	Conformance test description for Adjacent Channel Selectivity (ACS)	F	3.0.0	3.1.0
RP-000023	25.142	003		R99	Conformance test description for blocking characteristics	F	3.0.0	3.1.0
RP-000023	25.142	004	1	R99	Conformance test description for performance requirements	F	3.0.0	3.1.0
RP-000023	25.142	005		R99	Protection outside a licensee's frequency block	F	3.0.0	3.1.0
RP-000023	25.142	006		R99	ACLR	F	3.0.0	3.1.0
RP-000023	25.142	007		R99	Corrected reference sensitivity value	F	3.0.0	3.1.0
RP-000023	25.142	008		R99	Conformance test description for Tx spurious emissions	F	3.0.0	3.1.0
RP-000023	25.142	009		R99	Clause 5: General test conditions and declarations	F	3.0.0	3.1.0
RP-000023	25.142	010		R99	Conformance test description for Primary CCPCH power	F	3.0.0	3.1.0
RP-000023	25.142	011		R99	Conformance test description for transmit OFF power	F	3.0.0	3.1.0
RP-000023	25.142	012		R99	Conformance test description for Rx spurious emissions	F	3.0.0	3.1.0

CRs approved at TSG-RAN#8.

Doc-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Current	New
RP-000212	25.142	013		R99	UL Reference Measurement Channels	F	3.1.0	3.2.0
RP-000212	25.142	014		R99	Regional requirements in TS 25.142	F	3.1.0	3.2.0
RP-000212	25.142	015		R99	Conformance test description for receiver dynamic range.	F	3.1.0	3.2.0
RP-000212	25.142	016		R99	Correction of the interfering power level for performance requirements	F	3.1.0	3.2.0
RP-000212	25.142	017		R99	Definitions of maximum output power and rated output power	F	3.1.0	3.2.0
RP-000212	25.142	018		R99	Correction of blocking requirements	F	3.1.0	3.2.0
RP-000212	25.142	020		R99	Conformance test description for modulation accuracy	F	3.1.0	3.2.0
RP-000212	25.142	021		R99	Modification to the handling of BS TDD Measurement Uncertainty	F	3.1.0	3.2.0
RP-000212	25.142	022		R99	Clarification of the specification on Peak Code Domain Error (PCDE)	F	3.1.0	3.2.0
RP-000212	25.142	023		R99	Relationship between RF generation and chip clock	F	3.1.0	3.2.0
RP-000212	25.142	024		R99	Correction on Receiver tests, terminating RX port	F	3.1.0	3.2.0
RP-000212	25.142	025		R99	Revision of Annex C: Global in-channel Tx test	F	3.1.0	3.2.0
RP-000212	25.142	026		R99	Conformance test description for spectrum emission mask	F	3.1.0	3.2.0
RP-000212	25.142	027		R99	Test connection definition	F	3.1.0	3.2.0

CRs approved at TSG-RAN#9.

Doc-1st-Level	Spec	CR	Re	Phase	Subject	Cat	Current	New

			v					
RP-000402	25.142	28		R99	Handling of measurement uncertainties in Base station conformance testing (TDD)	F	3.2.1	3.3.0
RP-000402	25.142	29		R99	Conformance test description for maximum output power	F	3.2.1	3.3.0
RP-000402	25.142	30		R99	Conformance test description for minimum transmit power	F	3.2.1	3.3.0
RP-000402	25.142	31		R99	Conformance test description for power control steps	F	3.2.1	3.3.0
RP-000402	25.142	32		R99	Conformance test description for spectrum emission mask	F	3.2.1	3.3.0
RP-000402	25.142	33		R99	Corrections to spectrum mask	F	3.2.1	3.3.0
RP-000402	25.142	34		R99	Conformance test description for modulation accuracy	F	3.2.1	3.3.0
RP-000402	25.142	35		R99	Conformance test description for blocking characteristics	F	3.2.1	3.3.0
RP-000402	25.142	36		R99	Conformance test description for performance requirements	F	3.2.1	3.3.0
RP-000402	25.142	37		R99	Conformance test description for spectrum emission mask	F	3.2.1	3.3.0

CRs approved at TSG-RAN#10

Doc-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Current	New
RP-000594	25.142	38		R99	Clarifications for EVM definition	F	3.3.0	3.4.0
RP-000594	25.142	39		R99	Conformance test description for frequency stability	F	3.3.0	3.4.0
RP-000594	25.142	40		R99	Conformance test description for inner loop power control	F	3.3.0	3.4.0
RP-000594	25.142	41		R99	Conformance test description for power control dynamic range	F	3.3.0	3.4.0
RP-000594	25.142	42		R99	Conformance test description for transmit ON/OFF power	F	3.3.0	3.4.0
RP-000594	25.142	43		R99	Conformance test description for occupied bandwidth	F	3.3.0	3.4.0
RP-000594	25.142	44		R99	Conformance test description for performance requirements	F	3.3.0	3.4.0
RP-000594	25.142	45		R99	Editorial correction to ACLR test	F	3.3.0	3.4.0
RP-000594	25.142	46		R99	Correction to reference measurement channels	F	3.3.0	3.4.0

3GPP TSG RAN WG4 Meeting #16 **R4-010432**

Vienna, Austria 19th - 23rd February 2001

CR-Form-v3

CHANGE REQUEST

⌘ **34.124**	**CR 6**	⌘ rev **-**	⌘ Current version: **3.2.0** ⌘

For ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [ ] Core Network [ ]

Title:	⌘	UE electromagnetic compatibility (EMC) for 1.28Mcps TDD Option
Source:	⌘	RAN WG4
Work item code:	⌘	LCRTDD-RF ***Date:*** ⌘ 21 February 2001
Category:	⌘	**B** ***Release:*** ⌘ REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	This CR collects the wording of the changes necessary for introducing the feature '1.28Mcps TDD option' into the TS34.124. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.
Summary of change:	⌘	Referenced the approved contents of CR25.113 for BS side, the '1.28Mcps TDD option' related descriptions are added in the corresponding sections in existing TS34.124 for UE side. And this CR based on the latest approved CR TSGR4#16(01) 0247.
Consequences if not approved:	⌘	

Clauses affected:	⌘	1,4,8.2
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (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 the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater 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 document.

1 Scope

The present document establishes the essential EMC requirements for "3rd generation" digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP user equipment (UE).

The equipment conforming to the requirements laid out in the present document and used in its intended electromagnetic environment in accordance with the manufacturers instructions

- shall not generate electromagnetic disturbances at a level .which may interfere with the intended operation of other equipment;
- has an adequate level of intrinsic immunity to electromagnetic disturbances to operate as intended;

The present document specifies the applicable EMC tests, the methods of measurement, the frequency range, the limits and the minimum performance criteria for all types of UTRA UE´s operating in FDD or TDD modes and their accessories. The TDD has two options. The two options are the 3,84Mcps and 1,28Mcps options respectively. The requirements are listed in different subsections only if the parameters deviate.

Base station equipment operating within network infrastructure is outside the scope of the present document. However, the present document does cover mobile and portable equipment that is intended to be operated in a fixed location while connected to the AC mains. Base stations in the radio access network are covered by the technical specification TS25.113 [1].

Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries have been included. Technical specifications for conducted emissions from the antenna connector are found in the 3GPP specifications for the radio interface, e.g. TS34.121 [2] and TS34.122 [3], for the effective use of the radio spectrum.

The immunity requirements have been selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels however, do not cover extreme cases, which may occur in any location but with low probability of occurrence.

The environment classification used in the present document refers to the environment classification used in the Generic Standards IEC 61000-6-1 [4], IEC 61000-6-3 [5], except the vehicular environment class which refers to ISO 7637 Part 1 [6] and Part 2 [7].

Compliance of radio equipment to the requirements of the present document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements).

Compliance to the requirements of the present document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

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, subsequent revisions do apply. 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] 3G TS 25.113: "3rd Generation Partnership Project; Technical Specification Group (TSG) RAN WG4; Base station EMC".

[2] 3G TS 34.121: "3rd Generation Partnership Project; Technical Specification Group (TSG) T WG1; Terminal Conformance Specification; Radio transmission and reception (FDD)".

[3] 3G TS 34.122: "3rd Generation Partnership Project; Technical Specification Group (TSG) T WG1; Terminal Conformance Specification; Radio transmission and reception (TDD)".

[4] IEC 61000-6-1 (1997): "Electromagnetic compatibility (EMC) – Part 6: Generic standards - Section 1: Immunity standard for residential, commercial and light-industrial environments".

[5] IEC 61000-6-3 (1996): "Electromagnetic compatibility (EMC) – Part 6: Generic standards - Section 3: Emission standard for residential, commercial and light-industrial environments.

[6] ISO 7637-1 (1990): "Road vehicles - Electrical disturbance by conduction and coupling - Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage - Electrical transient conduction along supply lines only".

[7] ISO 7637-2 (1990): "Road vehicles - Electrical disturbance by conduction and coupling - Part 2: Commercial vehicles with nominal 24 V supply voltage - Electrical transient conduction along supply lines only".

[8] 3G TR 25.990; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network (RAN); Vocabulary
3GPP TR 21 905: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP specifications".

[9] IEC 60050(161) (1998): "International Electrotechnical Vocabulary - Chapter 161: Electromagnetic compatibility".

[10] 3G TS 34.108: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal; Common test environments for user equipment (UE). Conformance Testing".

[11] ITU-R Recommendation SM.329~~-7 (1997)~~8: "Spurious emissions".

[12] 3GPP TS 25.101: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) FDD; Radio transmission and Reception".

[13] 3GPP TS 25.102: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) TDD; Radio transmission and Reception".

[14] IEC CISPR publication 22; 3rd edition (1997-11): "Information technology equipment; Radio disturbance characteristics – Limits and methods of measurement".

[15] 3G TS 34.109: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal. Terminal Logical Test Interface; Special conformance testing functions".

[16] IEC CISPR publication 16-1; (1993); Radio disturbance and immunity measuring apparatus"; Am.1 (1997): "Specification for radio disturbance and immunity measuring apparatus and methods".

[17] IEC 61000-3-2; (1995-03): "Electromagnetic compatibility; Part 3 - Limits; section 2 – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)"; Am.1 (1997-09)".

[18] IEC 61000-3-3; (1994-12): "Electromagnetic compatibility; Part 3 - Limits; section 2 – Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A"

[19] IEC 61000-4-2: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 2: Electrostatic discharge immunity test – Basic EMC publication".

[20] IEC 61000-4-3: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 3: Radiated, radio-frequency electromagnetic field immunity test".

[21] IEC 61000-4-4: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 4: Electrical fast transient/burst immunity test – Basic EMC publication".

[22] IEC 61000-4-5: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 5: Surge immunity test".

[23] IEC 61000-4-6: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 6: immunity to conducted disturbances induced by radio frequency fields".

[24] IEC 61000-4-11: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 11:Voltage dips, short interruptions, and voltage variations immunity test".

[25] ETR 027 (1991): "Radio Equipment and Systems (RES); Methods of measurement for private mobile radio equipment".

[26] ITU-T Recommendation P.64: "Telephone transmission quality, Telephone installations, Local line networks, Objective electro-acoustical measurements. Determination of sensitivity/frequency characteristics of local telephone systems".

[27] ITU-T Recommendation P.76: "Telephone transmission quality, Measurements related to speech loudness, Determination of loudness ratings; Fundamental principles, Annex A".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Ancillary equipment: Equipment (apparatus), used in connection with a user equipment (UE) is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a UE to provide additional operational and/or control features to the UE, (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide user functions independently of a UE; and
- the UE to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

BLER (BLock Error Ratio): BLER is block error ratio. The BLER calculation shall be based on evaluating the CRC on each transport block .

Camped on a cell: The UE is in idle mode and has completed the cell selection/reselection process and has chosen a cell. The UE monitors system information and (in most cases) paging information. Note that the services may be limited, and that the PLMN may not be aware of the existence of the UE within the chosen cell.

Continuous phenomena (continuous disturbance): Electromagnetic disturbance, the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects (IEC 60050-161 [9]).

Data application ancillary: ancillary which provides send and/or receive data access to UMTS services via UE

Enclosure port: physical boundary of the apparatus through which electromagnetic fields may radiate or impinge. In the case of integral antenna equipment, this port is inseparable from the antenna port.

End- User data: Manufacturer defined data patterns for data transfer testing. Represents EUT´s typical user application (eg. photo, video, textfile, message) in its characteristics.

Idle mode: Idle mode is the state of User Equipment (UE) when switched on but with no Radio Resource Control (RRC) connection.

Integral antenna: antenna designed to be connected directly to the equipment with or without the use of an external connector and considered to be part of the equipment. An integral antenna may be fitted internally or externally to the equipment.

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.

Necessary bandwidth
For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

Out of band emissions
Emission on a frequency or frequencies immediately outside the necessary bandwidth, which results from, the modulation process, but excluding spurious emissions.

NOTE 1 – Any unwanted emission which falls at frequencies separated from the centre frequency of the emission by less than 250% of the necessary bandwidth of the emission will generally be considered out-of-band emission.

Port
particular interface, of the specified equipment (apparatus), with the electromagnetic environment. For example, any connection point on an equipment intended for connection of cables to or from that equipment is considered as a port (see figure 1).

Figure 1: Examples of ports

Spurious emission from ITU-R SM 329-~~7~~8 [11]
Emission on a frequency, or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions.

NOTE 1 – For the purpose of this Recommendation all emissions, including intermodulation products, conversion products and parasitic emissions, which fall at frequencies separated from the centre frequency of the emission by 250% or more of the necessary bandwidth of the emission will generally be considered spurious emissions.

Telecommunication port
ports which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks), local area networks (e.g. Ethernet, Token Ring) and similar networks (see CISPR 22 [14]).

Transient phenomena
Pertaining to or designating a phenomena or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest (IEC 60050-161 [9])

Traffic mode
is the state of User Equipment (UE) when switched on and with Radio Resource Control (RRC) connection established.

Universal mobile telecommunications system (UMTS)
The telecommunications system, incorporating mobile cellular and other functionality, that is the subject of specifications produced by 3GPP

User equipment (UE)
is a "Mobile Station" (MS) which is an entity capable of accessing a set of UMTS services via one or more radio interfaces. This entity may be stationary or in motion within the UMTS service area while accessing the UMTS services, and may simultaneously serve one or more users.

3.2 Abbreviations

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

AC	Alternating Current
BCCH	Broadcast Control Channel *)
BS	Base Station
BSS	Base Station System
BTS	Base Transceiver Station
CCCH	Common Control Channel *)
CW	Continuous Wave (unmodulated carrier wave)
DC	Direct Current
DL	Down Link (From BTS to UE)
DTX	Discontinuous Transmission *)
EMC	Electromagnetic Compatibility
ESD	ElectroStatic Discharge
EUT	Equipment Under Test (UE or UE with ancillaries)
FDD	Frequency Division Duplex
LISN	Line Impedance Stabilizing Network
MRP	Mouth Reference Point (artificial head)
PCCPCH	Primary Common Control Physical Channel
RF	Radio Frequency
rms	root mean square
RRC	Radio Resource Control
SPL	Sound Pressure Level
TCH	Traffic channel
TDD	Time Division Duplex
UARFCN	UTRA Absolute Radio Frequency Channel Number *)
UE	User Equipment
UL	Up Link (From UE to BTS)
UMTS	Universal Mobile Telecommunication System
UTRA	Universal Terrestrial Radio Access network

*) refer to Terminology specifications 3G TS 21.905 and 3G TS 25.990 [8] for further details.

4 Test conditions

4.1 General

The equipment shall be tested under normal test conditions according to the relevant product and basic standards (See Annex D of TS 25.101 and Annex C of TS 25.102 for environmental conditions). If these conditions are not specified then the manufacturers declared range of humidity, temperature and supply voltage shall be used. The test conditions shall be recorded in the test report.

Whenever the Equipment under test (EUT) is provided with a detachable antenna, the EUT shall be tested with the antenna fitted in a manner typical of normal intended use, unless specified otherwise.

Where the equipment incorporates an external 50 Ω RF antenna connector that is normally connected via a coaxial cable, then the wanted signal to establish a communication link also uses a coaxial cable;

Where the equipment has an external 50 Ω RF antenna connector that is not normally connected via a coaxial cable or where the equipment has no external 50 Ω RF connector (i.e., integral antenna equipment), then the wanted signal, to establish a communication link, shall be delivered from the equipment to an antenna located within the test environment;

4.2 Arrangements for establishing a communication link

The wanted RF input signal nominal frequency shall be selected by setting the UTRA Absolute Radio Frequency Channel Number (UARFCN) to an appropriate number.

A communication link shall be set up with a suitable base station simulator (hereafter called "the test system"). The test system shall be located outside of the test environment

When the EUT is required to be in the traffic mode, a call is set up according to the Generic call set-up procedure and the following conditions shall be met:

See TS 34.108 [10] and TS 34.109 [15] Logical Test Interface for details regarding generic call set-up procedure and BER, BLER test loop scenarios.

- set and send continuously Up power control commands to the UE;
- the DTX shall be disabled;
- For FDD and 3.84 Mcps TDD option Inner Loop Power Control shall be enabled, -and for 1.28 Mcps TDD option closed loop power control shall be enabled;
- transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbps;
- adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment;
- For immunity testing , the wanted input signal level shall be set to 40 dB above the reference sensitivity level to provide a stable communication link. The reference sensitivity level is defined in 3G TS 25.101 [12] and in 3G TS 25.102 respectively..
- For emission testing, the wanted input signal level shall be no more than 15 dB above the reference sensitivity level, such that the performance of the measuring receiver is not limited by strong signal effects.

When the EUT is required to be in the idle mode, the following conditions shall be met:

- UE shall be camped on a cell
- UE shall perform Location Registration (LR) before the test, but not during the test;
- UE´s neighbour cell list shall be empty;
- Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval);

For immunity tests subclause 4.3, shall apply and the conditions shall be as follows:

4.3 Narrow band responses on receivers

4.3.1 FDD and 3,84Mcps TDD option

Responses on receivers or duplex transceivers occurring during the test at discrete frequencies, which are narrow band responses (spurious responses), are identified by the following method:

- If during an immunity test the quantity being monitored goes outside the specified tolerances, it is necessary to establish whether the deviation is due to an unwanted effect on the receiver of the UE or on the test system (narrow band response) or to a wide band (EMC) phenomenon. Therefore, the test shall be repeated with the UARFCN increased or decreased by 25 (DL / UL).
- if the deviation does not disappear, the procedure is repeated with the UARFCN increased or decreased by 50 from the original value (DL / UL);
- if the deviation does not disappear with the increased and/or decreased UARFCN, the phenomenon is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses are disregarded.

The procedure above does not apply to conducted immunity tests in the frequency range 150 kHz to 80 MHz.

4.3.2 1,28Mcps TDD option

Responses on receivers or duplex transceivers occurring during the test at discrete frequencies, which are narrow band responses (spurious responses), are identified by the following method:

- If during an immunity test the quantity being monitored goes outside the specified tolerances, it is necessary to establish whether the deviation is due to an unwanted effect on the receiver of the UE or on the test system (narrow band response) or to a wide band (EMC) phenomenon. Therefore, the test shall be repeated with the UARFCN increased or decreased by 8 (DL / UL).
- if the deviation does not disappear, the procedure is repeated with the UARFCN increased or decreased by 16 from the original value (DL / UL);
- if the deviation does not disappear with the increased and/or decreased UARFCN, the phenomenon is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses are disregarded.

The procedure above does not apply to conducted immunity tests in the frequency range 150 kHz to 80 MHz.

5 Performance assessment

5.1 General

The manufacturer shall at the time of submission of the equipment for test, supply the following information to be recorded in the test report:

- the primary functions of the radio equipment to be tested during and after the EMC testing;
- if applicable, the method to be used to verify that a communications link is established and maintained;
- the intended functions of the radio equipment which shall be in accordance with the documentation accompanying the equipment;
- the user-control functions and stored data that are required for normal operation and the method to be used to assess whether these have been lost after EMC stress;
- the ancillary equipment to be combined with the radio equipment for testing (where applicable);
- information about ancillary equipment intended to be used with the radio equipment;
- an exhaustive list of ports, classified as either power or signal/control. Power ports shall further be classified as AC or DC power;
- the humidity range, temperature, and supply voltage for all equipment submitted for testing.

5.2 Equipment which can provide a continuous communication link

The test arrangement and signals, given in clause 4, apply to radio equipment or a combination of radio equipment and ancillary equipment that permits the establishment of a communication link. The assessment of equipment performance shall be based on speech call and data transfer according to the criteria in clause 6.

5.3 Equipment which can only provide a discontinuous communication link (packet data/transmission)

If the equipment does not permit or allow for a communications link to be established and maintained during the EMC tests (as in subclause 5.2), the manufacturer shall define the performance assessment. The manufacturer shall provide the method of observing the degradation of performance of the equipment.

5.4 Equipment which does not provide a communication link

If the equipment is of a specialised nature which does not permit a communication link to be established, the manufacturer shall define the method of test to determine the acceptable level of performance or degradation of performance during and/or after the test. The manufacturer shall provide the method of observing the degradation of performance of the equipment.

The performance assessment carried out shall be simple, but at the same time give adequate proof that the primary functions of the equipment are operational.

5.5 Conformance of ancillary equipment

Ancillary equipment shall be tested with it connected to a UE in which case compliance shall be demonstrated to the appropriate clauses of the present document.

5.6 Equipment classification

Equipment is classified according to the source of power.

- if power is derived from a fixed AC or DC supply network installation the equipment is classified "for fixed use";
- if power is derived from a vehicular power supply (car battery + alternator) the equipment is classified "for vehicular use";
- if power is derived from an integral battery the equipment is classified "for portable use";

6 Performance criteria

The maintenance of a communications link shall be assessed by using an indicator, which may be part of the test system or the equipment under test.

Specifically the equipment shall meet the minimum performance criteria as specified in the following subclauses as appropriate.

Portable equipment intended for use whilst powered by the main battery of a vehicle shall additionally fulfil the applicable requirements set out by the present document for mobile equipment for vehicular use.

Portable equipment intended for use whilst powered by AC mains shall additionally fulfil the applicable requirements set out by the present document for equipment for fixed use.

If an equipment is of such nature, that the performance criteria described in the following subclauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after testing, as required by the present document.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following subclauses.

In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.

The requirements apply to all types of UTRA (FDD or TDD) for the UE.

6.1 Performance criteria for continuous phenomena

A communication link shall be established at the start of the test, and maintained during the test, subclauses 4.1 and 4.2.

In the data transfer mode, the performance criteria can be one of the following error ratios:

- if the BER (as referred in TS34.109) is used, it shall not exceed 0.001 during the test sequence;
- if the BLER (as referred in TS34.109) is used, it shall not exceed 0.01 during the test sequence;

In the speech mode, the performance criteria shall be that the up link and downlink speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (Annex A).

NOTE: When there is a high level noise background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

In addition to confirming the above performance in traffic mode, the test shall be performed in idle mode, and the transmitter shall not unintentionally operate.

6.2 Performance criteria for Transient phenomena

A communications link shall be established at the start of the test, subclauses 4.1 and 4.2.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance in traffic mode, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

7 Applicability overview tables

7.1 Emission

Table 1: Emission applicability

		Equipment test requirement				
Phenomenon	**Application**	**Equipment connected to fixed AC or DC power installations**	**Equipment connected to vehicular DC supplies**	**Equipment powered by integral battery**	**Reference subclause in the present document**	**Reference Standard**
Radiated emission	Enclosure	applicable	applicable	applicable	8.2	ITU-R SM.329-~~7~~ ~~1997~~8 [11] TS25.101 [12]
Conducted emission	DC power input/output port	applicable	applicable	not applicable	8.3	CISPR 22 [14], CISPR 16-1 [16]
Conducted emission	AC mains input/output port	applicable	not applicable	not applicable	8.4	CISPR 22 [14],
Harmonic current emissions	AC mains input port	applicable	not applicable	not applicable	8.5	IEC 61000-3-2 [17]
Voltage fluctuations and flicker	AC mains input port	applicable	not applicable	not applicable	8.6	IEC 61000-3-3 [18]

7.2 Immunity

Table 2: Immunity applicability

Phenomenon	Application	Equipment test requirement: Equipment connected to fixed AC or DC power installations	Equipment test requirement: Equipment connected to vehicular DC supplies	Equipment test requirement: Equipment powered by integral battery	Reference subclause in the present document	Reference standard
RF electro-magnetic field (80 MHz to 1000 MHz)	Enclosure	applicable	applicable	applicable	9.2	IEC 61000-4-3 [20]
Electrostatic discharge	Enclosure	applicable	applicable	applicable	9.3	IEC 61000-4-2 [19]
Fast transients common mode	Signal and control ports, DC and AC power input ports	applicable	not applicable	not applicable	9.4	IEC 61000-4-4 [21]
RF common mode 0,15 MHz to 80 MHz	Signal and control ports, DC and AC power input ports	applicable	applicable	applicable	9.5	IEC 61000-4-6 [23]
Transients and surges, vehicular environment	DC power input ports	not applicable	applicable	not applicable	9.6	ISO 7637 Part 1 [6] And ISO 7637 Part 2 [7]
Voltage dips and interruptions	AC mains power input ports	applicable	not applicable	not applicable	9.7	IEC 61000-4-11 [24]
Surges, common and differential mode	DC and AC power input ports	applicable	not applicable	not applicable	9.8	IEC 61000-4-5 [22]

8 Methods of measurement and limits for EMC emissions

8.1 Test configurations

This subclause defines the configurations for emission tests as follows:

- the equipment shall be tested under normal test conditions;
- the test configuration shall be as close to normal intended use as possible;
- if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum configuration of ancillary equipment necessary to exercise the ports;
- if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operation conditions and to ensure that all the different types of termination are tested;
- the test conditions, test configuration and mode of operation shall be recorded in the test report;

- ports which in normal operation are connected shall be connected to an ancillary equipment or to a representative piece of cable correctly terminated to simulate the input/output characteristics of the ancillary equipment, Radio Frequency (RF) input/output ports shall be correctly terminated;
- ports that are not connected to cables during normal operation, e.g. service connectors, programming connectors; temporary connectors etc. shall not be connected to any cables for the purpose of EMC testing. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the EUT, precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables;
- emission tests shall be performed in two modes of operation: - with a communication link established (traffic mode); and
  - in the idle mode.

8.2 Radiated Emission

This test is applicable to radio communications equipment and ancillary equipment.

This test shall be performed on the radio equipment and/or a representative configuration of the ancillary equipment.

8.2.1 Definition

This test assesses the ability of radio equipment and ancillary equipment to limit unwanted emissions from the enclosure port.

8.2.2 Test method

~~The~~Whenever possible the site shall be a fully anechoic chamber (FAC) simulating the free-space conditions. EUT shall be placed on a non-conducting support. Maximum average power of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyzer).

At each frequency at which a component is detected, the EUT shall be rotated to obtain maximum response, and the effective radiated power (e.r.p.) of that component determined by a substitution measurement, which shall be the reference method. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.

NOTE: Effective radiated power e.r.p. refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.

e.r.p. (dBm) = e.i.r.p. (dBm) – 2.15 Ref. ITU-R SM. 329-~~7~~ 8 ANNEX 1 [11]

Measurements are made with a tuned dipole antenna or a reference antenna with a known gain referenced to an isotropic antenna.

If a different test site or method is used, this shall be stated in the test report. The results shall be converted to the reference method values and the validity of the conversion shall be demonstrated.

8.2.3 Limits

The references for these requirements are ITU-R SM 329-~~7~~8 [11] and TS 25.101 subclauses 6.6.3.1. and 7.9.1. [12] and TS 25.102 subclauses 6.6.3 and 7.9. respectively.

8.2.3.1 FDD and 3,84Mcps TDD option

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out of band emissions and spurious emissions are based on ITU-R SM 329-~~7~~ 8 [11].

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

Table 3.1: Radiated Spurious emissions requirements

Frequency	Minimum requirement (e.r.p.)/ Reference Bandwidth Idle mode	Minimum requirement (e.r.p.) / Reference Bandwidth Traffic mode
30 MHz ≤ f < 1000 MHz	-57dBm / 100 kHz	-36 dBm / 100 kHz
1 GHz ≤ f < 12.75 GHz fc – 12.5 MHz < f < fc + 12.5 MHz	-47dBm / 1~~00 k~~MHz Not defined	-30 dBm / 1 MHz Not defined

NOTE: fc is the centre frequency of the TCH. The frequency range fc ± 12.5 MHz are covered by the "Out of Band" emission requirements of 3G TS 34.121[2] and 3G TS 34.122 [3]

8.2.3.2 1.28 Mcps TDD option

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out of band emissions and spurious emissions are based on ITU-R SM 329-8 [11].

These requirements are only applicable for frequencies, which are greater than 4 MHz away from the UE centre carrier frequency

Table 3.1: Radiated Spurious emissions requirements

Frequency	Minimum requirement (e.r.p.)/ Reference Bandwidth Idle mode	Minimum requirement (e.r.p.) / Reference Bandwidth Traffic mode
30 MHz ≤ f < 1000 MHz	-57dBm / 100 kHz	-36 dBm / 100 kHz
1 GHz ≤ f < 12.75 GHz fc – 4 MHz < f < fc + 4 MHz	-47dBm / 1MHz Not defined	-30 dBm / 1 MHz Not defined

NOTE: fc is the centre frequency of the TCH. The frequency range fc ± 4 MHz are covered by the "Out of Band" emission requirements of 3G TS 34.121[2] and 3G TS 34.122 [3] .

8.3 Conducted emission DC power input/output port

This test is applicable to all equipment, which may have DC cables longer than 3 m.

If the DC power cable of the UE and/or the ancillary equipment is intended to be less than 3 m in length, and intended only for direct connection to a dedicated AC to DC power supply, then the measurement shall be performed only on the AC power input of that power supply as specified in subclause 8.4.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

8.3.1 Definition

This test assesses the ability of radio equipment and ancillary equipment to limit internal noise from the DC power input/output ports.

8.3.2 Test method

The test method shall be in accordance with CISPR 22 [14], and the Line Impedance Stabilising Networks (LISN) shall be connected to a DC power source.

In the case of DC output ports, the ports shall be connected via a LISN to a load drawing the rated current of the source.

A measuring receiver shall be connected to each LISN measurement port in turn and the conducted emission recorded. The LISN measurement ports not being used for measurement shall be terminated with a 50 Ω load.

The equipment shall be installed with a ground plane as defined in CISPR 22 [14], The reference earth point of the LISNs shall be connected to the reference ground plane with a conductor as short as possible.

The measurement receiver shall be in accordance with the requirements of section one of CISPR 16-1 [16]

8.3.3 Limits

The equipment shall meet the limits defined in table 4 (including the average limit and the quasi-peak limit) when using, respectively, an average detector receiver and a quasi-peak detector receiver and measured in accordance with the method described in subclause 8.2.2 above. If the average limit is met when using a quasi-peak detector, the equipment shall be deemed to meet both limits and measurement with the average detector receiver is not necessary.

Table 4: Limits

Frequency range	Quasi-peak	Average
> 0,15-0,5 MHz	66 - 56 dBµV	56 - 46 dBµV
> 0,5- 5 MHz	56 dBµV	46 dBµV
> 5-30 MHz	60 dBµV	50 dBµV
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

8.4 Conducted emissions, AC mains power input/output port

This test is applicable to equipment powered by the AC mains.

This test is not applicable to AC output ports, which are connected directly (or via a switch or circuit breaker) to the AC input port.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

8.4.1 Definition

This test assesses the ability of radio equipment and ancillary equipment to limit internal noise from the AC mains power input/output ports.

8.4.2 Test method

The test method shall be in accordance with CISPR 22 [14],

Mains connected ancillary equipment which is not part of the EUT shall be connected to the mains via a separate LISN. According to subclause 11.9 of CISPR 16-1 [16], the Protective Earth (PE) wire shall also be terminated by a 50 Ω//50 µH common mode RF impedance.

8.4.3 Limits

The equipment shall meet the limits defined in table 5 (including the average limit and the quasi-peak limit) when using, respectively, an average detector receiver and a quasi-peak detector receiver and measured in accordance with the method described in subclause 8.3.2 above. If the average limit is met when using a quasi-peak detector, the equipment shall be deemed to meet both limits and measurement with the average detector receiver is not necessary.

Table 5: Limits for conducted emissions

Frequency range	Quasi-peak	Average
> 0,15-0,5 MHz	66 - 56 dBµV	56 - 46 dBµV
> 0.5- 5 MHz	56 dBµV	46 dBµV
> 5-30 MHz	60 dBµV	50 dBµV
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

8.5 Harmonic current emissions (AC mains input port)

The requirements of IEC 61000-3-2 [17] for harmonic current emission apply for equipment covered by the scope of the present document.

8.6 Voltage fluctuations and flicker (AC mains input port)

The requirements of IEC 61000-3-3 [18] for voltage fluctuations and flicker apply for equipment covered by the scope of the present document.

9 Test methods and levels for immunity tests

9.1 Test configurations

This subclause defines the configurations for immunity tests as follows:

- the equipment shall be tested under normal test conditions as specified in the core specification ,e.g., TS 34.109 [15];
- the test configuration shall be as close to normal intended use as possible;
- if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum configuration of ancillary equipment necessary to exercise the ports;
- if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operation conditions and to ensure that all the different types of termination are tested;
- the test conditions, test configuration and mode of operation shall be recorded in the test report;
- ports which in normal operation are connected shall be connected to an ancillary equipment or to a representative piece of cable correctly terminated to simulate the input/output characteristics of the ancillary equipment, Radio Frequency (RF) input/output ports shall be correctly terminated;
- ports, which are not, connected to cables during normal operation, e.g. service connectors, programming connectors, temporary connectors etc. shall not be connected to any cables for the purpose of EMC testing. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the EUT, precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables;
- the test arrangements for transmitter and receiver sections of the transceiver are described separately for the sake of clarity. However, where possible the test of the transmitter section and receiver section of the EUT may be carried out simultaneously to reduce test time;
- immunity tests shall be performed in two modes of operation:

- with a communication link established (traffic mode); and
- in the idle mode.

See subclauses 6.1 and 6.2.

9.2 RF electromagnetic field (80 MHz - 1000 MHz)

The test shall be performed on a representative configuration of the equipment or a representative configuration of the combination of UE and ancillary equipment.

9.2.1 Definition

This test assesses the ability of UE and ancillary equipment to operate as intended in the presence of a radio frequency electromagnetic field disturbance at the enclosure.

9.2.2 Test method and level

The test method shall be in accordance with IEC 61000-4-3 [20]

- for UE and ancillary equipment the following requirements shall apply;
- the test level shall be 3 V/m amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 kHz;
- the stepped frequency increments shall be 1 % of the momentary frequency;
- when using the max hold detector method (see ANNEX A) at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied;
- the test shall be performed over the frequency range 80 MHz to 1 000 MHz;
- responses in stand alone receivers or receivers which are part of transceivers occurring at discrete frequencies which are narrow band responses, shall be disregarded, see subclause 4.3;
- the frequencies selected during the test shall be recorded in the test report.

9.2.3 Performance criteria

The performance criteria of subclause 6.1 shall apply.

9.3 Electrostatic discharge

The test shall be performed on a representative configuration of the equipment or a representative configuration of the combination of UE and ancillary equipment.

9.3.1 Definition

This test assesses the ability of UE and ancillary equipment to operate as intended in the event of an electrostatic discharge.

9.3.2 Test method and level

The test method shall be in accordance with IEC 61000-4-2 [19]:

- for contact discharge, the equipment shall pass at ±2 kV and ±4 kV;
- for air discharge the equipment shall pass at ±2 kV, ±4 kV and ±8 kV (only for non-conducting surfaces, see IEC 61000-4-2 [19]).

NOTE: The EUT shall be fully discharged between each ESD exposure by connecting its ground point (where applicable) to the HCP by a resistive wire with a 470 kΩ. resistor in either end.

9.3.3 Performance criteria

The performance criteria of subclause 6.2 shall apply.

9.4 Fast transients common mode

The test shall be performed on AC mains power input ports.

This test shall be performed on signal ports, control ports and DC power input/output ports if the cables may be longer than 3 m.

Where this test is not carried out on a port or any other ports because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports which were not tested for this reason shall be included in the test report.

This test shall be performed on a representative configuration of the equipment or a representative configuration of the combination of UE and ancillary equipment.

9.4.1 Definition

This test assesses the ability of UE and ancillary equipment to operate as intended in the event of fast transients present on one of the input/output ports.

9.4.2 Test method and level

The test method shall be in accordance with IEC 61000-4-4 [21]

- the test level for signal and control ports shall be 0,5 kV open circuit voltage as given in IEC 61000-4-4 [21];
- the test level for DC power input/output ports shall be 0,5 kV open circuit voltage as given in IEC 61000-4-4 [21];
- the test level for AC mains power input ports shall be 1 kV open circuit voltage as given in IEC 61000-4-4 [21].

9.4.3 Performance criteria

The performance criteria of subclause 6.2 shall apply.

9.5 RF common mode (0,15 MHz to 80 MHz)

This test is applicable for UE for fixed, mobile, and portable use and for ancillary equipment.

This test shall be performed on signal, control and DC power input/output ports, which may have cables longer than 3 m.

This test shall be performed on AC mains power input/output ports of UE for fixed use and for fixed ancillary equipment. Where this test is not carried out on a port or any other ports because the manufacturer declares that it is not intended to be used with cables longer than stated above, a list of ports which were not tested shall be included in the test report.

This test shall be performed on a representative configuration of the UE or a representative configuration of the combination of UE and ancillary equipment.

9.5.1 Definition

This test assesses the ability of equipment and ancillary equipment to operate as intended in the presence of a radio frequency electromagnetic disturbance.

9.5.2 Test method and level

The test method shall be in accordance with IEC 61000-4-6 [23].

- the test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 kHz;
- the stepped frequency increments shall be either 50 kHz or 1 % frequency increment of the momentary frequency in the frequency range 150 kHz - 5 MHz and 1 % frequency increment of the momentary frequency in the frequency range 5 MHz - 80 MHz;
- when using the max hold detector method (see ANNEX A) at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied;
- the test level shall be severity level 2 as given in IEC 61000-4-6 [23] corresponding to 3 V rms, at a transfer impedance of 150 Ω;
- the test shall be performed over the frequency range 150 kHz - 80 MHz;
- responses of stand alone receivers or receivers which are part of transceivers occurring at discrete frequencies which are narrow band responses, shall be disregarded, see subclause 4.3;
- the frequencies selected during the test and the test method used shall be recorded in the test report.

9.5.3 Performance criteria

The performance criteria of subclause 6.1 shall apply.

9.6 Transients and surges, vehicular environment

The tests are applicable to UE intended for use in a vehicular environment.

These tests shall be performed on 12 V and 24 V DC power input.

These tests shall be performed on a representative configuration of the equipment or a representative configuration of the combination of UE and ancillary equipment.

9.6.1 Definition

These tests assess the ability of UE and ancillary equipment to operate as intended in the event of transients and surges present on the DC power input ports in a vehicular environment.

9.6.2 Test method and level

The test method shall be in accordance with ISO 7637-1 [6] for nominal 12 V DC powered equipment and ISO 7637-2 [7] for nominal 24 V DC powered equipment. The requirements are detailed as follows:

9.6.2.1 12 V DC powered equipment

Where the manufacturer in his installation documentation requires the EUT to have a direct connection to the 12 V main vehicle battery the following requirements in accordance with ISO 7637-1 [6] shall apply:

- pulse 3a and 3b, level II (±50 V), with the test time reduced to 5 minutes for each;
  Supply voltage V_A = 13,5 ± 0,5 V DC

- pulse 4, level II, 5 pulses, with the characteristics as follows:
  V_s = -5 V, V_a = -2,5 V, t_6 = 25 ms, t_8 = 5 s, t_f = 5 ms.
  Supply voltage V_B = 12,0 ± 0,2 V DC

Where the manufacturer does not require the EUT to have a direct connection to the 12 V main vehicle battery, the following pulses apply in addition:

- pulse 1, level II (-50 V), t_1 = 2,5 s, 10 pulses; Supply voltage V_A = 13,5 ± 0,5 V DC;
- pulse 2, level II (+50 V), t_1 = 2,5 s, 10 pulses. Supply voltage V_A = 13,5 ± 0,5 V DC.

Where the manufacturer declares that the EUT requires a direct connection to the vehicle battery, and the corresponding tests are not carried out, this shall be stated in the test report.

9.6.2.2 24 V DC powered equipment

Where the manufacturer in his installation documentation requires the EUT to have a direct connection to the 24 V main vehicle battery the following requirements in accordance with ISO 7637-2 [7] shall apply:

- pulse 3a and 3b, level II (±70 V), with the test time reduced to 5 minutes for each;
  Supply voltage V_A = 27 ± 1 V DC
- pulse 4, level II, 5 pulses, with the characteristics as follows:
  V_s = -10 V, V_a = -5 V, t_6 = 25 ms, t_8 = 5 s, t_f = 5 ms.
  Supply voltage V_B = 24 ± 0,4 V DC

Where the manufacturer does not require the EUT to have a direct connection to the 24 V main vehicle battery, the following pulses apply in addition:

- pulse 1, level II (-100 V), t_1 = 2,5 s, 10 pulses; Supply voltage V_A = 27 ± 1 V DC;
- pulse 1b, level II (-550 V), t_1 = 2,5 s, 10 pulses R_i = 100 Ω;
  Supply voltage V_A = 27 ± 1 V DC;
- pulse 2, level II (+50 V), t_1 = 2,5 s, 10 pulses. Supply voltage V_A = 27 ± 1 V DC.

Where the manufacturer declares that the EUT requires a direct connection to the vehicle battery, and the corresponding tests are not carried out, this shall be stated in the test report.

For UE and ancillary equipment designed to operate at both DC voltages and where no manual adjustments are required, the requirement 9.6.2.2 and pulse 4 from 9.6.2.1 shall apply.

For UE designed to operate at 12 V DC power supply, but operating from a 24 V DC power adapter ancillary, then the UE shall comply with the requirements in 9.6.2.1 and the configuration of the UE and the power adapter shall comply with the requirements of 9.6.2.2.

9.6.3 Performance criteria

The performance criteria of subclause 6.2 shall apply. However, where the equipment is powered without the use of a parallel battery back-up, for pulses 1, 1a, 1b, 2 and 4 the communications link need not be maintained and may have to be re-established and volatile user data may have been lost.

9.7 Voltage dips and interruptions

The tests shall be performed on AC mains power input ports.

These tests shall be performed on a representative configuration of the UE or a representative configuration of the combination of UE and ancillary equipment.

9.7.1 Definition

These tests assess the ability of UE and ancillary equipment to operate as intended in the event of voltage dips and interruptions present on the AC mains power input ports.

9.7.2 Test method and level

The following requirements shall apply.

The test method shall be in accordance with IEC 61000-4-11 [24].

The test levels shall be:

- a voltage dip corresponding to a reduction of the supply voltage of 60 % for 5 periods;
- a voltage interruption corresponding to a reduction of the supply voltage of > 95 % for 250 periods.

9.7.3 Performance criteria

The performance criteria of subclause 6.2 shall apply. However, in the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up the communications link need not be maintained and may have to be re-established and volatile user data may have been lost. In the event of loss of the communications link or in the event of loss of user data, this fact shall be recorded in the test report, the product description and the user documentation.

9.8 Surges, common and differential mode

The tests shall be performed on AC mains power input ports.

These tests shall be performed on a representative configuration of the UE or a representative configuration of the combination of UE and ancillary equipment.

9.8.1 Definition

These tests assess the ability of UE and ancillary equipment to operate as intended in the event of surges being present at the AC mains power input ports.

9.8.2 Test method and level

The test method shall be in accordance with IEC 61000-4-5 [22].

The following requirements and evaluation of test results shall apply:

- the test level for ac mains power input ports shall be 1 kV line to ground and 0,5 kV line to line with the output impedance of the surge generator as given in the IEC 61000-4-5 [22];
- the test generator shall provide the 1,2/50 µsec pulse as defined in IEC 61000-4-5 [22].

9.8.3 Performance criteria

The performance criteria of sub-clause 6.2 shall apply.

Annex A (normative): Performance assessment voice call. Audio break through

A.1 Calibration of audio levels

For the portable the audio calibration is performed as follows:

Set the EUT volume to provide the nominal audio level if specified by the manufacturer. If no such level is specified, the centre volume step shall be used.

Prior to the test sequence, the reference level of the speech output signal on both the downlink and uplink shall be recorded on the test instrumentation, as shown in figure A.1. The reference level shall be equivalent to the SPL of 0 dBPa at 1 kHz at the input of the acoustical coupler described in ETR 027 [25], for the downlink, and –5dBPs at 1 kHz at the mouth reference point (MRP) defined in ITU_T recommendation P.64 [26] for the uplink.

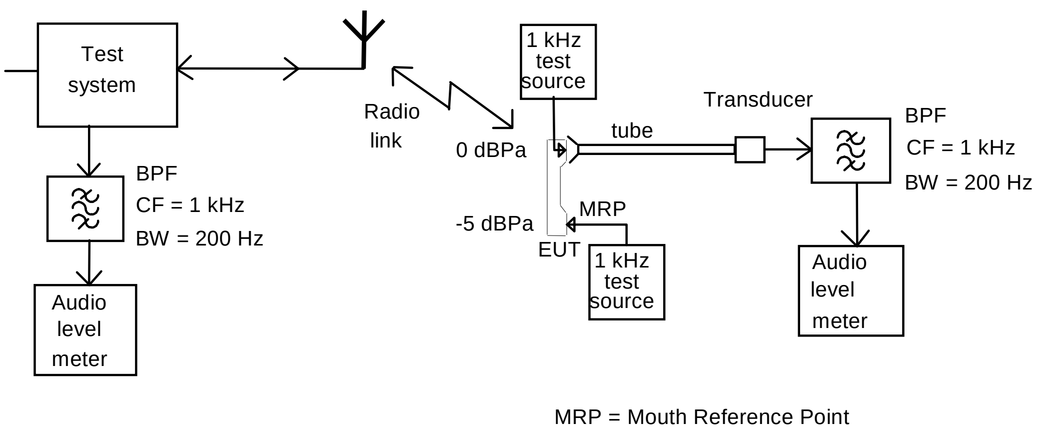
NOTE 1: The MRP is defined with respect to an artificial head defined in ITU-T P 76 [27] The handset shall be mounted on the artificial head such that the ear piece is centred at the artificial ear.

NOTE 2: If the equipment does not include acoustical transducers (e.g. a microphone or loudspeaker) the manufacturer shall specify the equivalent electrical reference levels.

The voice processor may often apply noise and echo cancellation algorithms, which attempt to eliminate or reduce steady state audio signals as e.g., the 1 kHz calibration signals. These algorithms may be disabled during the calibration procedure. Specialised test software may be required. If the algorithms can not be disabled then the reference level shall be measured using a max-hold detection on the audio level meter in order to determine the level before the noise and echo cancellation algorithms become effective.

In handsfree applications an external loudspeaker is used. The SPL from the external loudspeaker is normally much higher than from the earpiece of the portable in order overcome a high ambient noise level. The downlink reference level shall be increased in order to compensate for the difference. Alternatively, the distance between the loudspeaker and the measuring microphone shall be adjusted during the measurement procedure in accordance with the manufacturers specification. It is important that the dynamic range of the test instrumentation is not exceeded.

Normally no corrections are made to the uplink reference level. In case it is not possible to perform the above calibration (e.g., a PC card with headset) the manufacturer shall specify the distance between the MRP and the microphone.



NOTE: The EUT is in position during calibration of the uplink, but not during calibration of the downlink where the EUT is replaced by the 1 kHz test audio source. During calibration of the uplink the mouthpiece shall be placed with respect to the MRP in a way representing intended use.

Figure A.1: Audio breakthrough measurement, calibration set-up for portable equipment

A.2 Measurement of audio levels

When the audio levels are measured during testing the EUT software shall be configured for voice applications. If the algorithms for noise and echo cancellation are not disabled, then the level shall be measured using a max-hold detection on the audio level meter in order to determine the level before the noise and echo cancellation algorithms become effective.

The level of the output signal from the downlink speech channel of the EUT at the mobile or portable's ear piece shall be assessed by measuring the Sound Pressure Level (SPL) as shown in figure A.2. When an external loudspeaker is used the acoustical coupler shall be fixed to the loudspeaker in the position used during the calibration. The level of the decoded output signal from the uplink speech channel of the EUT at the analogue output of the test system shall be measured. Pick up of extraneous background noise by the microphone of the EUT shall be minimised.

NOTE: If the equipment is designed for use with external transducers, they shall be included in the test configuration. If the equipment does not include acoustical transducers the line voltage developed across specified termination impedance may be measured

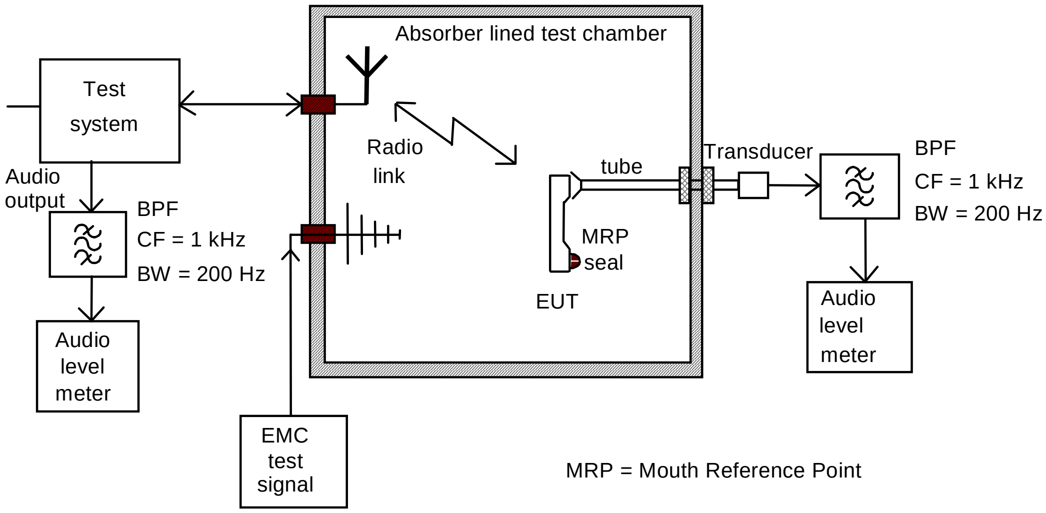


Figure A.2: Audio breakthrough measurement, test set-up for portable equipment

Annex B (normative): Performance assessment of data transfer call. Error Ratios

B.1 Calibration of data transfer

For the EUT, calibration of the data transfer may be performed by assessing the Bit Error Ratio (BER), Block Error Ratio (BLER) or End- User data error ratio before applying the RF immunity test signal (defined in clauses 9.2 and 9.5).

B.2 Derivation of Error Ratios

The manufacturer shall provide the method for calculating the Error Ratio. Known data patterns shall be transferred bi-directionally from end-to-end (the whole of the UL and DL will be exercised). Performance assessment shall be made at each frequency step. Comparison between transmitted known data and received data shall result in the Error Ratio.

The data patterns used should be of sufficient length to give valid results and should be equivalent to the used channel bit rate.

Possible data patterns for assessing the Error Ratio are BER, BLER and User Data. Detailed description of BER and BLER can be found from 3G TS 34.109 [15]

End- User Data may be used where BER and BLER measurements are not appropriate, and is a manufacturers decision (see below):

Note: For example, in the cases when the EUT consists of UE with data application ancillary and the data application ancillary itself does not support a loopback function that can be applied for the assesement of BER or BLER, as specified in TS34.109[15]. This would lead into a situation where the data application ancillary is not exercised, i.e the data transfer loop is not end-to-end.

The characteristics of the End- User Data used for testing (format, size, typical data throughput rate, additional error corrections etc.) and the necessary test equipment shall be delivered to enable the assessment of the EUT.

Following formula may apply to End- User Data:

$$\text{BitErrorRatio} = \left(\frac{\text{erroneuos(bits, bytes, symbols, etc.)}}{\text{correct(bits, bytes, symbols, etc.)}} * 100 \right) = n\%$$

(In case that high Error Ratios exist, ensure that errors are a consequence of EMC stress).

B.3 EUT without data application ancillary

Data monitoring Devices are here considered as part of the Test System. Arrangements should be made by the manufacturer, if needed, to couple the Data monitoring Device by a method which does not affect the radiated electromagnetic field (e.g. ultra sonic or optical).

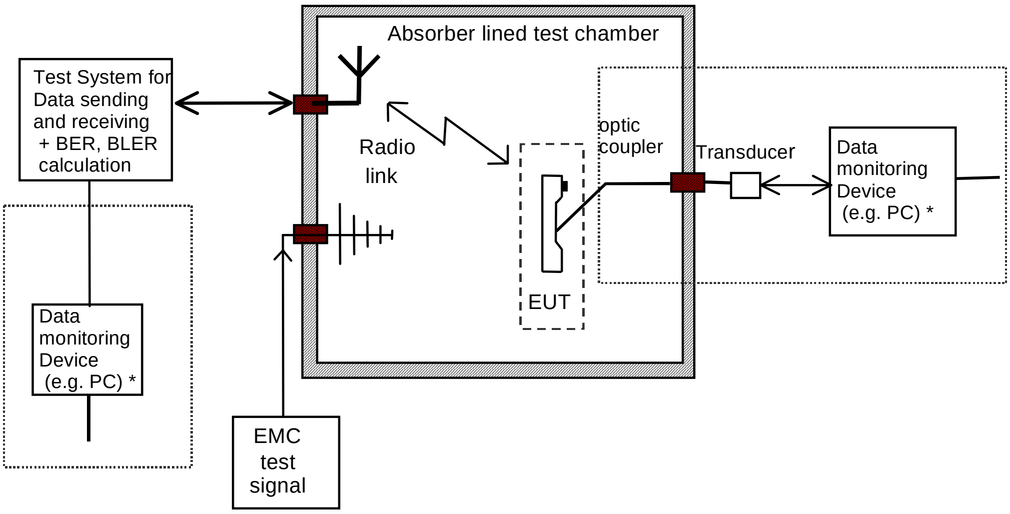


Figure B.1: Error Ratio assessment, test set-up for EUT without data application ancillary.

B.4 EUT with data application ancillary

The Data monitoring Device is here considered as a part of the Test System. The Data application ancillary should be part of the data transfer (UL and DL) loop and is included in the EUT configuration.

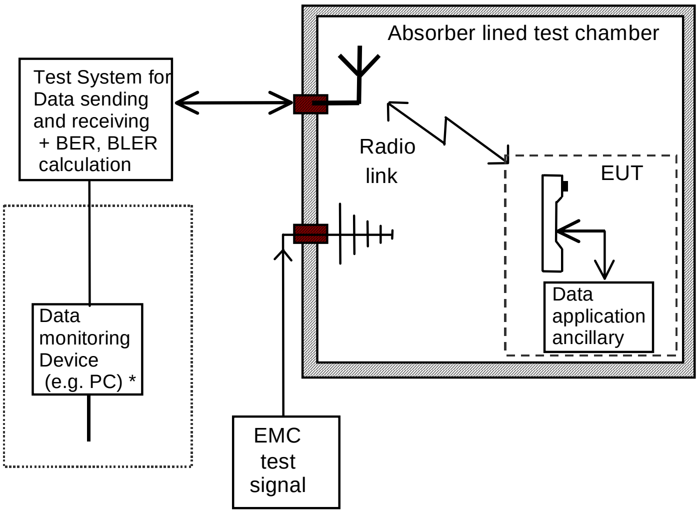


Figure B.2: Error ratio assessment, test set-up for EUT with data application ancillary.

History

Document history		
Version 1.0.0	July 1999	TS xx.xxx 1st draft
Version 1.0.1	August 1999	TS xx.xxx 2nd draft
Version 1.1.0	September 1999	TS 34.124: equal to TS xx.xxx v1.0.1 with format changes
Version 1.2.0	October 1999	TS 34.124 3rd draft
Version 1.2.1	November 1999	Addition of Copyright Notification and Postal address. Format updating
Version 1.2.2	December 1999	Addition of some definitions to clause 3.0 and some editorial changes
Version 1.3.0	February 2000	Update references, abbreviations, and call set-up definitions
Version 2.0.0	February 2000	Discussed and amended by SWG T1 EMC at meeting #08, and unanimously agreed to be submitted to TSG T1 for release 99 in March 2000
Version 2.0.1	March 2000	Editorial correction in table 3.1. Presented to TSG T#7 for approval
Version 3.0.0	March 2000	Approved as v3.0.0 at TSG T#7

Meeting-1st-Level	Doc-1st-Level	CR	Rev	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level
TP-09	TP-000136	001		Idle mode conditions and test loops	F	3.0.0	3.1.0	T1-000222
TP-09	TP-000136	002		Adding End- user data besides BER and BLER for EMC data testing	F	3.0.0	3.1.0	T1-000223
TP-09	TP-000136	003		Editorial modifications for purposes of clarification	D	3.0.0	3.1.0	T1-000224
TP-10	TP-000222	004		Editorial modifications for purposes of clarification.	D	3.1.0	3.2.0	T1-000320