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Contents

Foreword

This Technical Specification has been produced by the 3GPP.

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where:

x the first digit:

1 presented to TSG for information;

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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 Base Station minimum RF characteristics of the FDD mode of UTRA.

2 References

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

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

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

[2] (void)

[3] 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".

[4] 3GPP TR 25.942 "RF System Scenarios".

[5] 3GPP TS 45.004: "Digital cellular telecommunications system (Phase 2+); Modulation".

[6] 3GPP TS 25.213: "Spreading and modulation (FDD)".

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

[8] 3GPP TS 36.104: " Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".

[9] ECC/DEC/(09)03 " Harmonised conditions for MFCN in the band 790-862 MHz", 30 Oct. 2009

[10] 3GPP TS 37.104: " E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception".

[11] 3GPP TS 25.331: " Radio Resource Control. Protocol Specification".

[12] 3GPP TS 25.214: "Physical layer procedures (FDD) ".

[13] CEPT ECC Decision (13)03, “The harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)”.

3 Definitions and abbreviations

3.1 Definitions

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

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

Rated output power: mean power level per carrier that the manufacturer has declared to be available at the antenna connector.

Maximum output Power: mean power level per carrier of the base station measured at the antenna connector in a specified reference condition.

Mean power: power (transmitted or received) in a bandwidth of at least (1+ α) times the chip rate of the radio access mode.

NOTE 1: α = 0,22 is the roll-off factor of the WCDMA signal. The roll-off factor α is defined in section 6.8

NOTE 2: The period of measurement shall be at least one timeslot unless otherwise stated.

MIMO mode: downlink MIMO configuration with two transmit antennas

MIMO mode with four transmit antennas: downlink MIMO configuration with four transmit antennas.

Power control dynamic range: difference between the maximum and the minimum transmit output power of a code channel for a specified reference condition.

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

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

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

Code domain power: part of the mean power which correlates with a particular (OVSF) code channel.

NOTE: The sum of all powers in the code domain equals the mean power in a bandwidth of (1+ α) times the chip rate of the radio access mode.

Total power dynamic range: difference between the maximum and the minimum total transmit output power for a specified reference condition.

Secondary serving HS-DSCH cell(s): set of cells where the UE is configured to simultaneously monitor an HS-SCCH set and receive the HS-DSCH if it is scheduled in that cell.

NOTE: There can be up to 7 secondary serving HS-DSCH cells in addition to the serving HS-DSCH cell.

Channel bandwidth: RF bandwidth supporting a single UTRA RF carrier.

NOTE: the channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

Channel edge: lowest or highest frequency of the UTRA carrier, separated by the channel bandwidth.

Base Station RF Bandwidth: bandwidth in which a base station transmits and/or receives single or multiple carriers simultaneously within each supported operating band.

NOTE: In single carrier operation the channel bandwidth is equal to Base Station RF Bandwidth

Base Station RF Bandwidth edge: frequency of one of the edges of the Base Station RF Bandwidth.

Contiguous spectrum: spectrum consisting of a contiguous block of spectrum with no sub-block gap(s).

Highest carrier: carrier with the highest carrier centre frequency transmitted/received in the specified operating band(s).

Non-contiguous spectrum: spectrum consisting of two or more sub-blocks separated by sub-block gap(s).

Radio Bandwidth: frequency difference between the upper edge of the highest used carrier and the lower edge of the lowest used carrier.

Sub-block: one contiguous allocated block of spectrum for use by the same base station.

NOTE: There may be multiple instances of sub-blocks within an Base Station RF Bandwidth.

Sub-block bandwidth: RF bandwidth of one sub-block.

Sub-block gap: frequency gap between two consecutive sub-blocks within an Base Station RF Bandwidth, where the RF requirements in the gap are based on co-existence for un-coordinated operation.

Lower sub-block edge: frequency at the lower edge of one sub-block.

NOTE: It is used as a frequency reference point for both transmitter and receiver requirements.

Lowest carrier: carrier with the lowest carrier centre frequency transmitted/received in the specified operating band(s).

Upper sub-block edge: frequency at the higher edge of one sub-block.

NOTE: It is used as a frequency reference point for both transmitter and receiver requirements.

Inter-band gap: The frequency gap between two supported consecutive operating bands.

Inter RF Bandwidth gap: frequency gap between two consecutive Base Station RF Bandwidths that respectively correspond to two supported operating bands.

Multi-band base station: base station characterized by the ability of its transmitter and/or receiver to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).

Multi-band transmitter: transmitter characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).

Multi-band receiver: receiver characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).

Rated total output power: the total power level that the manufacturer has declared to be available at the antenna connector.

Sub-band: A sub-band of an operating band contains a part of the uplink and downlink frequency range of the operating band.

Superseding-band: A superseding-band of an operating band includes the whole of the uplink and downlink frequency range of the operating band.

3.2 Abbreviations

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

4C-HSDPA	Four-Carrier HSDPA. HSDPA operation configured on 3 or 4 DL carriers
8C-HSDPA	Eight-Carrier HSDPA. HSDPA operation configured for 5 to 8 DL carriers
16QAM	16 Quadrature Amplitude Modulation
ACIR	Adjacent Channel Interference Ratio
ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
BS	Base Station
BER	Bit Error Ratio
BLER	Block Error Ratio
CACLR	Cumulative ACLR
CPICH	Common Pilot Channel
CW	Continuous Wave (unmodulated signal)
DB-DC-HSDPA	Dual Band Dual Cell HSDPA
DB-DC-HSUPA	Dual Band Dual Cell HSUPA
DC-HSDPA	Dual Cell HSDPA
DC-HSUPA	Dual Cell HSUPA
DL	Down Link (forward link)
DTT	Digital Terrestrial Television
EIRP	Effective Isotropic Radiated Power
FDD	Frequency Division Duplexing
GSM	Global System for Mobile Communications
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
IE	Information Element
LA	Local Area
MIMO	Multiple Input Multiple Output
MR	Medium Range
NC-4C-HSDPA	Non-contiguous Four-Carrier HSDPA. HSDPA operation for two non-adjacent blocks within a single band configured on 2, 3 or 4 DL carriers.
P-CPICH	Primary CPICH
PHS	Personal Handyphone System
PPM	Parts Per Million
RAT	Radio Access Technology
RF	Radio Frequency
QPSK	Quadrature Phase Shift Keying
RSSI	Received Signal Strength Indicator
S-CPICH	Secondary CPICH
SIR	Signal to Interference ratio
TAE	Time Alignment Error
TDD	Time Division Duplexing
TPC	Transmit Power Control
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment
UL	Up Link (reverse link)
WCDMA	Wideband Code Division Multiple Access
WA	Wide Area

3.3 Symbols

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

α	Roll-off factor
E_b	Average energy per information bit
E_c	Total energy per PN chip
f	Frequency Δf Frequency offset of the measurement filter -3dB point, as defined in section 6.6.2.1
Δf_{max}	The largest value of Δf used for defining the requirement

f_offset	Frequency offset of the measurement filter centre frequency, as defined in section 6.6.2.1
F_{DL_low}	The lowest frequency of the downlink operating band
F_{DL_high}	The highest frequency of the downlink operating band
F_{DL_Offset}	The offset parameter used to calculate the UARFCN for downlink
F_{UL_low}	The lowest frequency of the uplink operating band
F_{UL_high}	The highest frequency of the uplink operating band
F_{UL_Offset}	The offset parameter used to calculate the UARFCN for uplink
F_{uw}	Frequency offset of unwanted signal
$P_{EM,N}$	Declared emission level for channel N
$P_{EM,B32,ind}$	Declared emission level in Band 32, ind=a, b, c, d, e
Pout	Output power
Prated,c	Rated output power (per carrier)
Pmax,c	Maximum output power (per carrier)
Rx	Receiver
Tx	Transmitter
W_{gap}	Sub-block gap or Inter RF Bandwidth gap size

4 General

4.1 Relationship between Minimum Requirements and Test Requirements

The Minimum Requirements given in this specification make no allowance for measurement uncertainty. The test specification 25.141 section 4 defines Test Tolerances. These Test Tolerances are individually calculated for each test. The Test Tolerances are used to relax the Minimum Requirements in this specification to create Test Requirements.

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

The Shared Risk principle is defined in ITU-R M.1545.

4.2 Base station classes

The requirements in this specification apply to Wide Area Base Stations, Medium Range Base Stations, Local Area Base Stations and Home Base Stations unless otherwise stated.

Wide Area Base Stations are characterised by requirements derived from Macro Cell scenarios with a BS to UE minimum coupling loss equal to 70 dB. The Wide Area Base Station class has the same requirements as the base station for General Purpose application in Release 99, 4 and 5.

Medium Range Base Stations are characterised by requirements derived from Micro Cell scenarios with a BS to UE minimum coupling loss equal to 53 dB.

Local Area Base Stations are characterised by requirements derived from Pico Cell scenarios with a BS to UE minimum coupling loss equal to 45 dB.

Home Base Stations are characterised by requirements derived from Femto Cell scenarios.

4.3 Regional requirements

Some requirements in TS 25.104 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.
5.3	Tx-Rx Frequency Separation	The requirement is applied according to what frequency bands in Clause 5.2 that are supported by the BS.
5.4	Channel arrangement	The requirement is applied according to what frequency bands in Clause 5.2 that are supported by the BS.
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. Additional spectrum protection requirements may apply regionally.
6.6.2.2.1	Adjacent Channel Leakage power Ratio	In Japan, the requirement depicted in the note of Table 6.7 shall 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 [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 [1], are applied.
6.6.3.3	Co-existence with other systems in the same geographical area	These requirements may apply in geographic areas in which both UTRA FDD and GSM, DCS, PCS, CDMA, E-UTRA and/or UTRA BS operating in another frequency band are deployed.
6.6.3.4	Co-existence with co-located and co-sited base stations	These requirements may be applied for the protection of other BS receivers when GSM, DCS, PCS, CDMA, E-UTRA and/or UTRA BS operating in another frequency band are co-located with a UTRA FDD BS.
6.6.3.5	Co-existence with PHS	This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA FDD are deployed.
6.6.3.6	Co-existence with services in adjacent frequency bands	This requirement may be applied for the protection in bands adjacent to the downlink bands as defined in clause 5.2 in geographic areas in which both an adjacent band service and UTRA FDD are deployed.
6.6.3.8	Protection of public safety operations	This requirement shall be applied to BS operating in Bands XIII and XIV to ensure that appropriate interference protection is provided to 700 MHz public safety operations.
7.4.2	Adjacent Channel Selectivity Co-location with UTRA-TDD	This requirement may be applied for the protection of UTRA-FDD BS receivers when UTRA-FDD BS and UTRA-TDD BS are co-located.
7.5	Blocking characteristic	The requirement is applied according to what frequency bands in Clause 5.2 that are supported by the BS.
7.5.2	Blocking characteristics Co-location with GSM900, DCS 1800, PCS1900 and/or UTRA	This requirement may be applied for the protection of UTRA FDD BS receivers when UTRA FDD BS and GSM 900, DCS1800, PCS1900, GSM850 and/or UTRA BS (operating in different frequency bands) are co-located.
7.5.3	Blocking characteristics Co-location with UTRA TDD	This requirement may be applied for the protection of UTRA FDD BS receivers when UTRA FDD BS and UTRA TDD BS are co-located.
7.6	Intermodulation characteristics	The requirement is applied according to what frequency bands in Clause 5.2 that are supported by the BS.
7.7	Spurious emissions	The requirement is applied according to what frequency bands in Clause 5.2 that are supported by the BS.