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Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 3: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive

Reference

REN/ERM-TFES-004-3

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Foreword

This Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [i.1] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [i.2] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

Technical specifications relevant to Directive 1999/5/EC [i.2] are given in annex A.

The present document is part 3 of a multi-part deliverable covering the Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks, as identified below:

Part 1: "Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 2: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 3: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 4: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 5: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 6: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 7: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 8: "Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 9: "Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 10: "Harmonized EN for IMT-2000, FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 11: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 12: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 13: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 14: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 15: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (FDD Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 16: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";

Part 17: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".

National transposition dates	
Date of adoption of this EN:	19 February 2010
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2010
Date of withdrawal of any conflicting National Standard (dow):	30 November 2011

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.2]. The modular structure is shown in EG 201 399 [i.3].

1 Scope

The present document applies to the following radio equipment type:

- Base Stations for IMT-2000 CDMA Direct Spread (UTRA FDD and E-UTRA FDD).

This radio equipment type is capable of operating in all or any part of the frequency bands given in table 1-1.

Table 1-1: UTRA FDD Base Station operating bands

UTRA FDD band	Direction of transmission	UTRA FDD Base Station operating bands
I	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz
III	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
VII	Transmit	2 620 MHz to 2 690 MHz
	Receive	2 500 MHz to 2 570 MHz
VIII	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
XV	Transmit	2 600 MHz to 2 620 MHz
	Receive	1 900 MHz to 1 920 MHz
XVI	Transmit	2 585 MHz to 2 600 MHz
	Receive	2 010 MHz to 2 025 MHz

The present document covers requirements for UTRA FDD Base Stations for Releases 99, 4, 5, 6, 7 and 8 and E-UTRA FDD Base Stations for Release 8. In addition, the present document covers requirements for UTRA FDD Base Stations in the operating bands specified in TS 102 735 [i.4].

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (R&TTE Directive), article 3.2, which states that "… radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [i.2] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site http://www.newapproach.org/.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] Void.

[2] ETSI TS 125 141 (V8.8.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 8.8.0 Release 8)".

[3] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".

[4] ITU-T Recommendation O.153 (1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".

[5] ETSI EN 301 908-1 (V4.1.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive".

[6] ETSI TS 145 004 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 8.0.0 Release 8)".

[7] ETSI EN 301 908-14 (V4.1.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 14: Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

[i.2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

[i.4] ETSI TS 102 735 (V7.0.1): "Universal Mobile Telecommunications System (UMTS); Band-specific requirements for UMTS Frequency Division Duplex (FDD) operation in the bands 1 900 MHz to 1 920 MHz paired with 2 600 MHz to 2 620 MHz and 2 010 MHz to 2 025 MHz paired with 2 585 MHz to 2 600 MHz".

[i.5] ETSI TR 102 215 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Recommended approach, and possible limits for measurement uncertainty for the measurement of radiated electromagnetic fields above 1 GHz".

[i.6] ETSI TR 100 028 (all parts) (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

3 Definitions, symbols 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 Base Station

NOTE: This is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a BS to provide additional operational and/or control features to the radio equipment, (e.g. to extend control to another position or location);
- the equipment cannot be used on a stand alone basis to provide user functions independently of a BS; and
- the BS 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).

Base Station class: wide area Base Station, medium range Base Station, local area Base Station or home Base Station, as declared by the manufacturer

chip rate: rate of "chips" (modulated symbols after spreading) per second

NOTE: The UTRA FDD chip rate is 3,84 Mchip/s.

downlink operating band: part of the operating band designated for downlink (BS transmit)

environmental profile: range of environmental conditions under which equipment, within the scope of the present document, is required to comply with the provisions of the present document

home Base Station: Base Stations characterized by requirements derived from femtocell scenarios

local area Base Station: Base Stations characterized by requirements derived from picocell scenarios with a BS to UE minimum coupling loss equal to 45 dB

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 mod, when applied to a WCDMA-modulated signal. The period of measurement shall be at least one timeslot unless otherwise stated

NOTE: α = 0,22 is the roll-off factor of the WCDMA signal.

medium range Base Station: Base Stations characterized by requirements derived from microcell scenarios with a BS to UE minimum coupling loss equal to 53 dB

operating band: frequency range that is defined with a specific set of technical requirements, in which UTRA FDD operates

NOTE: The operating band(s) for a UTRA FDD BS is declared by the manufacturer according to the designations in table 1-1.

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: rated output power of the Base Station is the mean power level per carrier that the manufacturer has declared to be available at the antenna connector

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: The RRC filtered mean power of a perfectly modulated WCDMA signal is 0,246 dB lower than the mean power of the same signal.

uplink operating band: part of the operating band designated for uplink (BS receive)

wide area Base Station: Base Stations characterized by requirements derived from Macro Cell scenarios with a BS to UE minimum coupling loss equal to 70 dB

NOTE: This Base Station class has the same requirements as the general purpose Base Station in Releases 99, 4 and 5.

3.2 Symbols

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

Δf	Separation between the carrier centre frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency
Δf_{max}	The largest value of Δf used for defining the requirement
CPICH Êc	Common Pilot Channel code power (on the adjacent channel)
F_{high}	The highest BS transmit frequency of the downlink operating band
F_{low}	The lowest BS transmit frequency of the downlink operating band
F_{uw}	Frequency of unwanted signal
Ioh	Total received power density excluding own Home BS signal
P_{max}	Maximum output power

3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
ATT	Attenuator
AWGN	Additive White Gaussian Noise
B	appropriate frequency in the Bottom of the operating band of the BS
BER	Bit Error Ratio
BS	Base Station
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
CPICH	Common Pilot Channel
CW	Continuous Wave
DC	Direct Current
DCS	Digital Cellular System
DUT	Device Under Test
E-UTRA	Evolved Universal Terrestrial Radio Access
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
FDD	Frequency Division Duplexing
GMSK	Gaussian Minimum Shift Keying
GSM	Global System for Mobile communications
IMT-2000	International Mobile Telecommunications 2000
M	appropriate frequency in the Middle of the operating band of the BS
MIMO	Multiple Input Multiple Output
MS	Mobile Station
PCCPCH	Primary Common Control Physical CHannel
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency

RMS	Root Mean Square
RRC	Root-Raised Cosine
Rx	Receiver
SCCPCH	Secondary Common Control Physical CHannel
T	appropriate frequency in the Top of the operating band of the BS
TDD	Time Division Duplexing
Tx	Transmitter
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment
UL	Up Link (reverse link)
UMTS	Universal Mobile Telecommunications System
UTRA	Universal Terrestrial Radio Access
WCDMA	Wideband Code Division Multiple Access

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

For guidance on how a supplier can declare the environmental profile, see annex C.

4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band (e.g. band I, III, VII, VIII, XV and XVI) is shared between systems of the IMT-2000 family (for band III and VIII also GSM) or systems having compatible characteristics. Requirements for E-UTRA FDD Base Stations are given in EN 301 908-14 [7].

4.2.1 Introduction

To meet the essential requirement under article 3.2 of Directive 1999/5/EC [i.2] (R&TTE Directive) for IMT-2000 Base Stations (BS), seven essential parameters in addition to those in EN 301 908-1 [5] have been identified. Table 4.2.1-1 provides a cross reference between these seven essential parameters and the corresponding ten technical requirements for equipment within the scope of the present document.

Table 4.2.1-1: Cross references

Essential parameter	Corresponding technical requirements
Spectrum emissions mask	4.2.2 Spectrum emissions mask
	4.2.3 Adjacent Channel Leakage power Ratio (ACLR)
	4.2.11 Home BS output power for adjacent channel protection
Conducted spurious emissions from the transmitter antenna connector	4.2.4 Transmitter spurious emissions
Accuracy of maximum output power	4.2.5 Base Station maximum output power
Intermodulation attenuation of the transmitter	4.2.6 Transmit intermodulation
Conducted spurious emissions from the receiver antenna connector	4.2.7 Receiver spurious emissions
Impact of interference on receiver performance	4.2.8 Blocking characteristics
	4.2.9 Receiver intermodulation characteristics
Receiver adjacent channel selectivity	4.2.10 Receiver Adjacent Channel Selectivity (ACS)