

# ETSI EN 301 908-2 V4.2.1 (2010-03)

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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 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**

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Reference

REN/ERM-TFES-004-2

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Keywords

3G, 3GPP, cellular, digital, IMT-2000, mobile,  
radio, regulation, UMTS, WCDMA

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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 2 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".

<b>National transposition dates</b>	
Date of adoption of this EN:	19 February 2010
Date of latest announcement of this EN (doa):	31 May 2010
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:

- User Equipment for IMT-2000 CDMA Direct Spread (UTRA FDD and E-UTRA FDD).

These radio equipment types are capable of operating in all or any part of the frequency bands given in table 1-1.

**Table 1-1: UTRA FDD operating bands**

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

The present document covers requirements for UTRA FDD User Equipments from 3GPP Release 99, 4, 5, 6, 7 and 8 and E-UTRA FDD User Equipment Release 8. In addition, the present document covers requirements for UTRA FDD User Equipment 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 134 121-1 (V8.8.0): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) conformance specification; Radio transmission and reception (FDD); Part 1: Conformance specification (3GPP TS 34.121-1 version 8.8.0 Release 8)".
- [3] ETSI TS 134 108 (V8.8.0): "Universal Mobile Telecommunications System (UMTS); LTE; Common test environments for User Equipment (UE); Conformance testing (3GPP TS 34.108 version 8.8.0 Release 8)".
- [4] ETSI TS 134 109 (V8.0.0): "Universal Mobile Telecommunications System (UMTS); LTE; Terminal logical test interface; Special conformance testing functions (3GPP TS 34.109 version 8.0.0 Release 8)".
- [5] ETSI TS 125 101 (V8.8.0): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (FDD) (3GPP TS 25.101 version 8.8.0 Release 8)".
- [6] IEC 60068-2-1 (2007): "Environmental testing - Part 2-1: Tests. Test A: Cold".
- [7] IEC 60068-2-2 (2007): "Environmental testing - Part 2-2: Tests. Test B: Dry heat".
- [8] ETSI TS 125 214 (V8.6.0): "Universal Mobile Telecommunications System (UMTS); Physical layer procedures (FDD) (3GPP TS 25.214 version 8.6.0 Release 8)".
- [9] ETSI TS 145 004 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 8.0.0 Release 8)".
- [10] 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".
- [11] ETSI EN 301 908-13 (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 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".

## 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:

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

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

**data rate:** rate of the user information, which must be transmitted over the Air Interface

EXAMPLE: Output rate of the voice codec.

**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

**maximum output power:** measure of the maximum power the UE can transmit (i.e. the actual power as would be measured assuming no measurement error) in a bandwidth of at least  $(1 + \alpha)$  times the chip rate of the radio access mode

NOTE: The period of measurement is assumed to be at least one timeslot.

**mean power:** power (transmitted or received) in a bandwidth of at least  $(1 + \alpha)$  times the chip rate of the radio access mode, when applied to a WCDMA modulated signal

NOTE: The period of measurement is assumed to be at least one timeslot unless otherwise stated.

**node B:** logical node responsible for radio transmission/reception in one or more cells to/from the User Equipment

**nominal maximum output power:** nominal power defined by the UE power class

**power spectral density:** function of power versus frequency and when integrated across a given bandwidth, the function represents the mean power in such a bandwidth

NOTE 1: When the mean power is normalized to (divided by) the chip-rate it represents the mean energy per chip. Some signals are directly defined in terms of energy per chip, (DPCH\_Ec, Ec, OCNS\_Ec and S-CCPCH\_Ec) and others defined in terms of PSD ( $I_o$ ,  $I_{oc}$ ,  $I_{or}$  and  $\hat{I}_{or}$ ). There also exist quantities that are a ratio of energy per chip to PSD (DPCH\_Ec/ $I_{or}$ ,  $E_c/I_{or}$ , etc.). This is the common practice of relating energy magnitudes in communication systems.

NOTE 2: It can be seen that if both energy magnitudes in the ratio are divided by time, the ratio is converted from an energy ratio to a power ratio, which is more useful from a measurement point of view. It follows that an energy per chip of X dBm/3,84 MHz can be expressed as a mean power per chip of X dBm. Similarly, a signal PSD of Y dBm/3,84 MHz can be expressed as a signal power of Y dBm.

NOTE 3: The units of Power Spectral Density (PSD) are extensively used in the present document.

**RRC filtered mean power:** mean power as measured through a root raised cosine filter with roll-off factor  $\alpha$  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.

## 3.2 Symbols

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

$\alpha$	Roll-off factor of the root raised cosine filter, $\alpha = 0,22$
DPCH_Ec	Average energy per PN chip for DPCH
$E_c$	Average energy per PN chip
$F_{uw}$	Frequency of unwanted signal

NOTE: This is specified in bracket in terms of an absolute frequency(s) or a frequency offset from the assigned channel frequency.

$I_o$	The total received power spectral density, including signal and interference, as measured at the UE antenna connector
$I_{oc}$	Power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited white noise source (simulating interference from cells, which are not defined in a test procedure) as measured at the UE antenna connector
$I_{or}$	Total transmit power spectral density (integrated in a bandwidth of $(1 + \alpha)$ times the chip rate and normalized to the chip rate) of the downlink signal at the Node B antenna connector
$\hat{I}_{or}$	Received power spectral density (integrated in a bandwidth of $(1 + \alpha)$ times the chip rate and normalized to the chip rate) of the downlink signal as measured at the UE antenna connector
$\beta_c$	Gain factor for DPCCH
$\beta_d$	Gain factor for DPDCH
$\beta_{hs}$	Gain factor for HS-DPCCH
$\beta_{ec}$	Gain factor for E-DPCCH
$\beta_{ed}$	Gain factor for E-DPDCH

## 3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
BER	Bit Error Ratio
CW	Continuous Wave

NOTE: Unmodulated signal.

DCH	Dedicated Channel, which is mapped into Dedicated Physical Channel
DPCCH	Dedicated Physical Control CHannel
DPDCH	Dedicated Physical Data CHannel
E-DCH	Enhanced Dedicated CHannel
E-UTRA	Evolved Universal Terrestrial Radio Access
EMC	ElectroMagnetic Compatibility
FDD	Frequency Division Duplex
HSDPA	High Speed Downlink Packet Access
IMT-2000	International Mobile Telecommunications 2000
OCNS	Orthogonal Channel Noise Simulator

NOTE: A mechanism used to simulate the users or control signals on the other orthogonal channels of a downlink.