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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 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**

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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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

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 6 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>Proposed national transposition dates</b>	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

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## 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 TDD (UTRA TDD and E-UTRA TDD).

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: IMT-2000 CDMA TDD service frequency bands**

UTRA TDD Band	Direction of transmission	IMT-2000 CDMA TDD service operating bands
a	Transmit and Receive	1 900 MHz to 1 920 MHz
	Transmit and Receive	2 010 MHz to 2 025 MHz
d	Transmit and Receive	2 570 MHz to 2 620 MHz

The UTRA TDD component of IMT-2000 CDMA TDD supports three options of the TDD mode with the chip rates of 3,84 Mcps, 7,68 Mcps and 1,28 Mcps. These three options are called the 3,84 Mcps TDD option, the 1,28 Mcps TDD option and the 7,68 Mcps TDD option respectively. The requirements are listed in different clauses only if the parameters deviate. The present document covers requirements for:

- 3,84 Mcps UTRA TDD option user equipment for Release 99, 4, 5, 6, 7 and 8;
- 1,28 Mcps UTRA TDD option user equipment for Release 4, 5, 6, 7 and 8;
- 7,68 Mcps UTRA TDD option user equipment for Release 7 and 8;
- E-UTRA TDD user equipment for Release 8.

The present document covers 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] ETSI TR 100 028 (V1.4.1) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [2] ETSI TS 125 102 (V8.0.0): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (TDD) (3GPP TS 25.102 version 8.0.0 Release 8)".
- [3] ETSI TS 134 108 (V8.2.0): "Universal Mobile Telecommunications System (UMTS); Common test environments for User Equipment (UE) conformance testing (3GPP TS 34.108 version 8.2.0 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 134 122 (V8.0.0): "Universal Mobile Telecommunications System (UMTS); LTE; Terminal conformance specification, Radio transmission and reception (TDD) (3GPP TS 34.122 version 8.0.0 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 EN 301 908-1 (V4.1.1): "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".
- [9] ETSI EN 301 908-13 (V4.1.1): "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".

## 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

**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 the 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 supported by the UE (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 shall be a transmit timeslot excluding the guard period unless otherwise stated.

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

NOTE: The period of measurement shall be a transmit timeslot excluding the guard period 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

**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

### 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
$\frac{\text{DPCH\_Ec}}{I_{\text{or}}}$	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
$\frac{\sum \text{DPCH\_Ec}}{I_{\text{or}}}$	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
$F_{\text{uw}}$	Frequency of unwanted signal

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

$I_{\text{oac}}$	the power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of the adjacent frequency channel as measured at the UE antenna connector
$I_{\text{or}}$	the 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 BS antenna connector
$\hat{I}_{\text{or}}$	the received power spectral density of the downlink signal as measured at the UE antenna connector

### 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
BS	Base Station
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Check
CW	Continuous Wave (unmodulated signal)
DCH	Dedicated CHannel
DL	Down Link (forward link)
DPCH	Dedicated Physical CHannel
EMC	Electro-Magnetic Compatibility
EUT	Equipment Under Test
E-UTRA	Evolved Universal Terrestrial Radio Access
FDD	Frequency Division Duplexing
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
RRC	Root-Raised Cosine
SS	System Simulator
TH	Temperature High
TDD	Time Division Duplexing
TS	Time Slot
TL	Temperature Low
TTE	Telecommunications Terminal Equipment
TX	Transmitter
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment
UL	Uplink (reverse link)
UTRA	Universal Terrestrial Radio Access
VH	Voltage High
VL	Voltage Low

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## 4 Technical requirements specifications

### 4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the user 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 details on how a supplier declares the environmental profile see annex B.

### 4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band, band (a) and (d), are shared between systems of the IMT-2000 family or systems having compatible characteristics. Requirements for E-UTRA TDD User Equipment are given in EN 301 908-13 [9].

## 4.2.1 Introduction

To meet the essential requirement under article 3.2 of the R&TTE Directive for IMT-2000 User Equipment eight essential parameters in addition to those in EN 301 908-1 [8] have been identified. Table 4.2.1.1 provides a cross reference between these eight essential parameters and the corresponding eleven technical requirements within the scope of the present document.

To fulfil an essential parameter the compliance with all the corresponding technical requirements in table 4.2.1.1 must be verified.

**Table 4.2.1.1: Cross reference**

Essential parameter	Corresponding technical requirement
Spectrum emissions mask	4.2.2 Spectrum emissions mask
	4.2.12 Transmitter adjacent channel leakage power ratio
Conducted spurious emissions in active mode	4.2.3 Transmitter spurious emissions
Accuracy of maximum output power	4.2.4 Maximum output power
Prevention of harmful interference through control of power	4.2.5 Minimum transmit output power
Conducted spurious emissions in idle mode	4.2.6 Receiver spurious emissions
Impact of interference on receiver performance	4.2.7 Receiver blocking characteristics
	4.2.8 Receiver intermodulation characteristics
	4.2.9 Receiver spurious response
Receiver adjacent channel selectivity	4.2.10 Receiver adjacent channel selectivity
Control and Monitoring functions	4.2.11 Out-of-synchronization handling of output power

The technical requirements in the present document apply for UEs supporting UTRA TDD in declared operating bands. UEs supporting E-UTRA TDD shall fulfil requirements in EN 301 908-13 [9].

## 4.2.2 Spectrum emission mask

### 4.2.2.1 Definition

The spectrum emission mask establishes out-of-band emission power limits of the user equipment transmitter. Out-of-band emissions are defined as unwanted emissions outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions.

#### 4.2.2.1.1 3,84 Mcps TDD option

The spectrum emission mask of the UE applies to frequency offsets between 2,5 MHz and 12,5 MHz on both sides of the UE centre carrier frequency. The out-of-channel emission is specified as a power level relative to the RRC-filtered mean power of the UE carrier.

#### 4.2.2.1.2 1,28 Mcps TDD option

The spectrum emission mask of the UE applies to frequency offsets between 0,8 MHz and 4 MHz on both sides of the UE centre carrier frequency. The out-of-channel emission is specified as a power level relative to the RRC-filtered mean power of the UE carrier.

#### 4.2.2.1.3 7,68 Mcps TDD option

The spectrum emission mask of the UE applies to frequency offsets between 5 MHz and 25 MHz on both sides of the UE centre carrier frequency. The out-of-channel emission is specified as a power level relative to the RRC-filtered mean power of the UE carrier.