Final draft ETSI EN 301 908-6 V5.2.1 (2011-05)

Harmonized European Standard

IMT cellular networks;
Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive;
Part 6: CDMA TDD (UTRA TDD) User Equipment (UE)

Reference
REN/MSG-TFES-010-6

Keywords
3G, 3GPP, cellular, digital, IMB, IMT, IMT-2000, MBSFN, mobile, radio, regulation, TD-CDMA, TDD, UMTS

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This final draft Harmonized European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to mandate M/284 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 title and reference to the present document are intended to included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.2].

See article 5.1 of Directive 1999/5/EC [i.2] for information on presumption of conformity and Harmonised Standards or parts thereof the references of which have been published in the Official Journal of the European Union.

The requirements relevant to Directive 1999/5/EC [i.2] are summarised in annex A.

The present document is part 6 of a multi-part deliverable covering the essential requirements under article 3.2 of Directive 1999/5/EC [i.2] (R&TTE Directive) for Base Stations (BS), Repeaters and User Equipment (UE) for IMT cellular networks, as identified below:

Part 1: "Introduction and common requirements";

Part 2: "CDMA Direct Spread (UTRA FDD) User Equipment (UE)";

Part 3: "CDMA Direct Spread (UTRA FDD) Base Stations (BS)";

Part 4: "CDMA Multi-Carrier (cdma2000) User Equipment (UE)";

Part 5: "CDMA Multi-Carrier (cdma2000) Base Stations (BS)";

Part 6: "CDMA TDD (UTRA TDD) User Equipment (UE)";

Part 7: "CDMA TDD (UTRA TDD) Base Stations (BS)";

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: "CDMA Direct Spread (UTRA FDD) (Repeaters)";

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: "Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)";

Part 14: "Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)";

Part 15: "Evolved Universal Terrestrial Radio Access (E-UTRA FDD) (Repeaters)";

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";

Part 18: "E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)";

Part 19: "OFDMA TDD WMAN (Mobile WiMAX) TDD User Equipment (UE)";

Part 20: "OFDMA TDD WMAN (Mobile WiMAX) TDD Base Stations (BS)";

Part 21: "OFDMA TDD WMAN (Mobile WiMAX) FDD User Equipment (UE)";

Part 22: "OFDMA TDD WMAN (Mobile WiMAX) FDD Base Stations (BS)".

Proposed national transposition dates	
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

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).

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 Releases 99, 4, 5, 6, 7, 8 and 9;
- 1,28 Mcps UTRA TDD option user equipment for Releases 4, 5, 6, 7, 8 and 9;
- 7,68 Mcps UTRA TDD option user equipment for Releases 7, 8 and 9.

For the case of IMB, only the 3,84 Mcps UTRA TDD option applies.

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 specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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 necessary for the application of the present document.

[1] Void.

[2] ETSI TS 125 102 (V9.4.0): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (TDD) (3GPP TS 25.102 version 9.4.0 Release 9)".

[3] ETSI TS 134 108 (V9.2.0): "Universal Mobile Telecommunications System (UMTS); LTE; Common test environments for User Equipment (UE); Conformance testing (3GPP TS 34.108 version 9.2.0 Release 9)".

[4] ETSI TS 134 109 (V9.2.0): "Universal Mobile Telecommunications System (UMTS); LTE; Terminal logical test interface; Special conformance testing functions (3GPP TS 34.109 version 9.2.0 Release 9)".

[5] ETSI TS 134 122 (V9.2.0): "Universal Mobile Telecommunications System (UMTS); Terminal conformance specification; Radio transmission and reception (TDD) (3GPP TS 34.122 version 9.2.0 Release 9)".

[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 (V5.2.1): "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive Part 1: Introduction and common requirements".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[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 (V2.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".

[i.4] 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".

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 is 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 + α) times the chip rate of the radio access mode, where the period of measurement is a transmit timeslot excluding the guard period unless otherwise stated

MBSFN-only UE: UE operable in receive mode only (for the purpose of MBSFN reception)

mean power: when applied to a CDMA modulated signal this is the power (transmitted or received) in a bandwidth of at least (1 + α) times the chip rate of the radio access mode, where the period of measurement is 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

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

NOTE: The operating band(s) for a UTRA TDD UE is declared by the manufacturer according to the designations in table 1-1. Operating bands for UTRA are designated with Roman numerals, while the corresponding operating bands for E-UTRA are designated with Arabic numerals.

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

3.2 Symbols

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

α	roll-off factor of the root-raised cosine filter, $\alpha = 0{,}22$
Δf	separation between the carrier frequency and the centre of the measuring filter
DPCH_Ec	average energy per PN chip for DPCH
$\frac{DPCH\_Ec}{I_{or}}$	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
$\frac{\Sigma\, DPCH\_Ec}{I_{or}}$	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

NOTE: For UEs supporting only MBSFN reception, the DL reference measurement channel specified in clause A.2.9 [2] is used. For the purposes of clause 4, the term ΣDPCH_Ec refers to the sum of the energy of the physical channels comprising the DL reference measurement channel in use, irrespective of its particular physical channel type (DPCH or not).

F_{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_{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_{oc}	the 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}	the total transmit power spectral density (integrated in a bandwidth of (1 + α) times the chip rate and normalized to the chip rate) of the downlink signal at the BS antenna connector
$\hat{I}_{or}$	the received power spectral density of the downlink signal as measured at the UE antenna connector
I_{ouw}	mean power (modulated)
Q_{out}	quality level threshold

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
ERM	Electro-Magnetic Compatibility and Radio Spectrum Matters
EUT	Equipment Under Test
E-UTRA	Evolved Universal Terrestrial Radio Access
FDD	Frequency Division Duplexing
IMB	Integrated Mobile Broadcast
MBMS	Multimedia Broadcast and Multicast Service
MBSFN	MBMS over a Single Frequency Network
MSG	Mobile Standards Group
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
RRC	Root-Raised Cosine
SS	System Simulator
TDD	Time Division Duplexing
TFCI	Transport Format Combination Indicator
TFES	Task Force for European Standards for IMT
TH	Temperature High
TL	Temperature Low
TS	Time Slot
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

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 family or systems having compatible characteristics.

4.2.1 Introduction

To meet the essential requirement under article 3.2 of the R&TTE Directive for IMT 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. For the case of an MBSFN-only UE the technical requirements in clauses 4.2.6, 4.2.7, 4.2.8, 4.2.9 and 4.2.10 shall apply.

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.

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 emissions immediately 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.