



**IMT cellular networks;**  
**Harmonised Standard covering the essential requirements of**  
**article 3.2 of the Radio Equipment Directive 2014/53/EU;**  
**Part 2: CDMA Direct Spread (UTRA FDD)**  
**User Equipment (UE)**

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## Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document has been prepared in reply to the Commission's standardisation request Commission Implementing Decision C(2015) 5376 final of 04.08.2015 to provide a means of conforming to the essential requirements of Directive 2014/53/EU on "the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment" - also known as the Radio Equipment Directive [i.2].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A-1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

The present document is part 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.10].

### Proposed national transposition dates

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## Modal verbs terminology

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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 Radio Equipment Directive [i.2]. The present document is produced following the guidance in ETSI EG 203 336 [i.3] as applicable.



# 1 Scope

The present document applies to the following radio equipment type:

- User Equipment for IMT-2000 CDMA Direct Spread (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
XX	Transmit	832 MHz to 862 MHz
	Receive	791 MHz to 821 MHz
XXII	Transmit	3 410 MHz to 3 490 MHz
	Receive	3 510 MHz to 3 590 MHz

The present document covers requirements for UTRA FDD User Equipment from 3GPP™ Releases 99, 4, 5, 6, 7, 8, 9, 10 and 11 defined in ETSI TS 125 101 [4]. This include the requirements for UE operating bands from 3GPP™ Release 12 defined in ETSI TS 125 101 [4]. In addition, the present document covers requirements for UTRA FDD User Equipment in the operating bands specified in ETSI TS 102 735 [i.4].

NOTE: For Band XX:

- for user equipment designed to be mobile or nomadic, the requirements in the present document measured at the antenna port also show conformity to the corresponding requirement defined as TRP (Total Radiated Power), as described in Commission Decision 2010/267/EU [i.6], ECC Decision (09)03 [i.7] and CEPT Report 30 [i.8];
- for user equipment designed to be fixed or installed, the present document does not address the requirements described in Commission Decision 2010/267/EU [i.6], ECC Decision (09)03 [i.7] and CEPT Report 30 [i.8].

The present document contains requirements to demonstrate that radio equipment both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.

## 2 References

### 2.1 Normative 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 referenced 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>.

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The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 134 121-1 (V12.1.0) (10-2015): "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 12.1.0 Release 12)".
- [2] ETSI TS 134 108 (V12.1.0) (10-2015): "Universal Mobile Telecommunications System (UMTS); LTE; Common test environments for User Equipment (UE); Conformance testing (3GPP TS 34.108 version 12.1.0 Release 12)".
- [3] ETSI TS 134 109 (V12.0.0) (09-2014): "Universal Mobile Telecommunications System (UMTS); Terminal logical test interface; Special conformance testing functions (3GPP TS 34.109 version 12.0.0 Release 12)".
- [4] ETSI TS 125 101 (V11.11.0) (01-2015): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (FDD) (3GPP TS 25.101 version 11.11.0 Release 11)".
- [5] IEC 60068-2-1 (03-2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".
- [6] IEC 60068-2-2 (07-2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".
- [7] ETSI TS 125 214 (V11.12.0) (06-2015): "Universal Mobile Telecommunications System (UMTS); Physical layer procedures (FDD) (3GPP TS 25.214 version 11.12.0 Release 11)".
- [8] ETSI TS 145 004 (V11.0.0) (10-2012): "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 11.0.0 Release 11)".

## 2.2 Informative 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 referenced document (including any amendments) applies.

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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] Void.
- [i.2] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.3] ETSI EG 203 336 (V1.1.1) (06-2015): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".
- [i.4] ETSI TS 102 735 (V7.1.0): "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 100 028 (all parts) (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.6] Commission Decision 2010/267/EU of 6 May 2010 on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union.
- [i.7] ECC Decision (09)03 of 30 October 2009 on harmonised conditions for mobile/fixed communications networks (MFCN) operating in the band 790 - 862 MHz.

- [i.8] CEPT Report 30 of 30 October 2009 to the European Commission in response to the Mandate on "The identification of common and minimal (least restrictive) technical conditions for 790 - 862 MHz for the digital dividend in the European Union".
- [i.9] Void.
- [i.10] ETSI EN 301 908-1: "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 1: Introduction and common requirements".
- [i.11] ETSI TS 125 101 (V12.9.0) (10-2015): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (FDD) (3GPP TS 25.101 version 12.9.0 Release 12)".

## 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 is transmitted over the Air Interface

EXAMPLE: Output rate of the voice codec.

**enhanced performance receiver type 1 for DCH:** receiver with performance requirements which are optional for the UE and utilize receiver diversity during DCH reception

**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

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

NOTE: Operating bands for UTRA are designated with Roman numerals, while the corresponding operating bands for E-UTRA are designated with Arabic numerals.

**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/ $I_{or}$ , Ec/ $I_{or}$ , 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.

$\langle \text{REF} \hat{I}_{\text{or}} \rangle$	Reference $\hat{I}_{\text{or}}$ $I_o$ The total received power spectral density, including signal and interference, as measured at the UE antenna connector
$I_{\text{oc}}$	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
$I_{\text{or}}$	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
$\hat{I}_{\text{or}}$	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 DPCCCH
$\beta_d$	Gain factor for DPDCH
$\beta_{\text{hs}}$	Gain factor for HS-DPCCCH
$\beta_{\text{ec}}$	Gain factor for E-DPCCCH
$\beta_{\text{ed}}$	Gain factor for E-DPDCH

## 3.3 Abbreviations

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

4C-HSDPA	4 Carrier HSDPA
$\langle \text{REFSENS} \rangle$	Reference sensitivity
AC	Access Channel
ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
BER	Bit Error Ratio
CA	Carrier Aggregation
CDMA	Code Division Multiple Access
CLTD	Closed Loop Transmit Diversity
CW	Continuous Wave

NOTE: Unmodulated signal.

DB-DC-HSDPA Dual Band Dual Cell HSUPA

DCH Dedicated Channel

NOTE: Which is mapped into Dedicated Physical Channel.

DC-HSUPA	Dual Cell HSUPA
DL	Downlink
DPCCH	Dedicated Physical Control CHannel
DPCH	Dedicated Physical CHannel
DPDCH	Dedicated Physical Data CHannel
E-DCH	Enhanced Dedicated CHannel
E-DPCCH	Enhanced DPCCH
E-DPDCH	Enhanced DPDCH
E-UTRA	Evolved Universal Terrestrial Radio Access
EMC	ElectroMagnetic Compatibility
ERM	Electromagnetic compatibility and Radio spectrum Matters
EUT	Equipment Under Test
FDD	Frequency Division Duplex
FRC	Fixed Reference Channel
GMSK	Gaussian Minimum Shift Keying
GSM	Global System for Mobile
HSDPA	High Speed Downlink Packet Access
HS-DPCCH	High Speed DPCCH
HSUPA	High Speed Uplink Packet Access
IMT	International Mobile Telecommunications
LTE	Long Term Evolution
MPR	Maximum Power Reduction
MSG	Mobile Standards Group
OCNS	Orthogonal Channel Noise Simulator

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

OLTD	Open Loop Transmit Diversity
PCH	Paging Channel
PN	PseudoNoise
PSD	Power Spectral Density
QPSK	Quadrature Phase Shift Keying
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
RRC	Root Raised Cosine
SS	System Simulator

NOTE: See ETSI TS 134 121-1 [1].

TFES	Task Force for European Standards for IMT
TH	Temperature High
TH/VH	High extreme Temperature/High extreme Voltage
TH/VL	High extreme Temperature/Low extreme Voltage
TL	Temperature Low
TL/VH	Low extreme Temperature/High extreme Voltage
TL/VL	Low extreme Temperature/Low extreme Voltage
TPC	Transmit Power Control
TRP	Total Radiated Power
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment
UL	UpLink
UMTS	Universal Mobile Telecommunications System
UTRA	Universal Terrestrial Radio Access
VH	Higher extreme Voltage
VL	Lower extreme Voltage
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.

### 4.2 Conformance requirements

#### 4.2.0 General

The requirements in the present document are based on the assumption that the operating band (see table 1-1) is shared between systems of the IMT family (for band III and VIII also GSM) or systems having compatible characteristics.

#### 4.2.1 Introduction

To meet the essential requirement under article 3.2 of the Directive 2014/53/EU [i.2] for IMT User Equipment (UE) eight essential parameters in addition to those in ETSI EN 301 908-1 [i.10] have been identified. Table 4.2.1-1 provides a cross reference between these eight essential parameters and the corresponding eleven technical requirements for equipment within the scope of the present document.

**Table 4.2.1-1: Cross references**

Essential parameter	Corresponding technical requirements	Corresponding test suite
Transmitter spectrum mask	4.2.3 Transmitter Spectrum emissions mask	5.3.2
Transmitter unwanted emissions in the out of band domain	4.2.12 Transmitter adjacent channel leakage power ratio	5.3.11
Transmitter unwanted emissions in the spurious domain	4.2.4 Transmitter spurious emissions	5.3.3
Transmitter power limits	4.2.2 Transmitter maximum output power	5.3.1
Transmitter Power Control (TPC)	4.2.5 Transmitter minimum output power	5.3.4
Transmitter power accuracy	4.2.5 Transmitter minimum output power	5.3.4
Receiver unwanted emissions in the spurious domain	4.2.10 Receiver spurious emissions	5.3.9
Receiver blocking	4.2.7 Receiver Blocking characteristics	5.3.6
Receiver desensitization		
Receiver spurious response rejection	4.2.8 Receiver spurious response	5.3.7
Receiver radio-frequency intermodulation	4.2.9 Receiver Intermodulation characteristics	5.3.8
Receiver adjacent signal selectivity	4.2.6 Receiver Adjacent Channel Selectivity (ACS)	5.3.5
Receiver sensitivity	4.2.13 Receiver Reference Sensitivity level	5.3.12
Antenna		
Equipment operating under the control of a network	4.2.11 Out of synchronization handling of output power	5.3.10

The technical requirements in the present document apply for UEs supporting UTRA FDD in declared operating bands. The technical requirements for HSDPA and E-DCH shall apply only to UEs supporting these features. The technical requirements for DC-HSUPA shall apply only to UEs supporting this feature.

Unless otherwise stated, the transmitter and receiver characteristics are specified at the antenna connector(s) of the UE. For UE(s) with an integral antenna only, a reference antenna(s) with a gain of 0 dBi should be assumed for each antenna port(s). A UE with integral antenna(s) may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna.