



**SLOVENSKI STANDARD**  
**SIST EN 301 908-21 V5.2.1:2011**  
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**Celična omrežja IMT - Harmonizirani EN, ki zajema bistvene zahteve člena 3.2  
direktive R&TTE - 21. del: Uporabniška oprema FDD OFDMA TDD WMAN (mobilni  
WiMAX)**

IMT cellular networks - Harmonized EN covering the essential requirements of article 3.2  
of the R&TTE Directive - Part 21: OFDMA TDD WMAN (Mobile WiMAX) FDD User  
Equipment (UE)

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**IMT cellular networks;**  
**Harmonized EN covering the essential requirements**  
**of article 3.2 of the R&TTE Directive;**  
**Part 21: OFDMA TDD WMAN (Mobile WiMAX)**  
**FDD User Equipment (UE)**

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## Foreword

This Harmonized European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

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 be 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 21 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 Stations (BS)";
- Part 19: "OFDMA TDD WMAN (Mobile WiMAX) TDD User Equipment (UE)";
- Part 20: "OFDMA TDD WMAN (Mobile WiMAX) TDD Base Station (BS)";
- Part 21: "OFDMA TDD WMAN (Mobile WiMAX) FDD User Equipment (UE)";**
- Part 22: "OFDMA TDD WMAN (Mobile WiMAX) FDD Base Stations (BS)".

<b>National transposition dates</b>	
Date of adoption of this EN:	12 September 2011
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 2012
Date of withdrawal of any conflicting National Standard (dow):	30 June 2013

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## Introduction

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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:

- Mobile WiMAX FDD User Equipment for IMT-OFDMA TDD WMAN.

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: Mobile WiMAX FDD Operating frequency bands**

Mobile WiMAX Band Class Index	Direction of transmission	Mobile WiMAX FDD frequency bands
7G	Transmit	880 MHz to 915 MHz
	Receive	925 MHz to 960 MHz
6C	Transmit	1 710 MHz to 1 785 MHz
	Receive	1 805 MHz to 1 880 MHz

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>.

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# 2 References

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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.

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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] 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] CEPT/ERC/Recommendation 74-01E (Siófok 98, Nice 99, Sesimbra 02, Hradec Kralove 05): "Unwanted emissions in the spurious domain".

## 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: "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 EN 300 019-1-0: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-0: Classification of environmental conditions; Introduction".
- [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 (V1.4.1) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.7] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [i.2] and the following apply:

**burst:** period during which radio waves are intentionally transmitted, preceded and succeeded by periods during which no intentional transmission is made

**environmental profile:** declared range of environmental conditions under which equipment within the scope of the present document is required to be compliant

**Eval\_BW1:** test condition where the pass band of a rectangular filter with a bandwidth of 4,75 MHz for 5 MHz equipment and 9,5 MHz for 10 MHz equipment is used for measurement centred on an operating channel or a victim channel

**Eval\_BW 2:** measurement for EVAL\_BW2 on the operating channel is performed using a rectangular filter with a 4,75 MHz or 9,5 MHz bandwidth and the measurement on the victim channel is performed using an RRC filter with a 3,84 MHz or 7,68 MHz bandwidth (respectively) both with roll-off factor of 0,22 centred on the 1st adjacent victim channel

**integral antenna:** antenna which is declared to be part of the radio equipment by the manufacturer

**NOTE:** Even when equipment with an integral antenna is concerned, it might still be possible to separate the antenna from the equipment using a special tool. In such cases the assessment of the radio equipment and of the antenna against requirements of this multi-part deliverable may be done separately.

**maximum output power:** mean power level per carrier of the base station or user equipment measured at the antenna connector in a specified reference condition

**mean power:** when applied to a modulated signal, this is the power (transmitted or received) in a bandwidth

**NOTE:** The term "mean" here is used to exclude the amplitude fluctuation related to those theoretical variations present in signal for example due to amplitude modulation, pulse shaping, pre-equalization, etc. Time averaging should be applied to estimate mean power with the affect of the theoretical variations. The duty cycle corresponding to burst activity within a frame should be also incorporated for "mean" power estimation.

**nominal maximum output power:** maximum nominal mean power level measured over total allocated channel bandwidth of the user equipment available at the antenna connector declared by the manufacturer; for equipment implementing dynamic change of modulation format, it is intended as the maximum nominal mean power associated to the modulation format delivering the highest power

**operating nominal RF channel width:** nominal amount of spectrum used by a single device operating on an identified centre frequency

**receiver thermal noise power:** equal to  $k \times T \times BW \times F$

**WiMAX:** trademarked name for the OFDMA TDD WMAN IMT technology

## 3.2 Symbols

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

$A_{BS}$	Base Station Interface A
$A_{MS}$	Mobile Station Interface A
$A_{UUT}$	Unit Under Test Interface A
dB	decibel
dBc	decibel relative to $P_{nom}$ carrier power measured in Eval_BW1
dBm	decibel relative to 1 milliwatt
BW	Assigned channel bandwidth
f	Frequency of measurement
$F_c$	centre frequency of the assigned channel
F	Receiver noise figure
k	Boltzmann's constant
GHz	GigaHertz
$M_{BS}$	Base Station Interface M
MHz	MegaHertz
$M_{MS}$	Mobile Station Interface M
N	Maximum number of antennas in a multiple antenna configuration
$N_{th}$	Receiver thermal noise power expressed in dBm
$P_{SENS}$	Receiver sensitivity level at $BER \leq 10^{-6}$ (or equivalent PER) performance corresponding to the most robust modulation and coding rate supported by the technology
$P_{nom}$	declared nominal maximum output Power
$P_{SENS5}$	sensitivity levels at $BER \leq 10^{-6}$ , for a 5 MHz channel, corresponding to the most robust modulation and coding rate supported by the technology
$P_{SENS10}$	sensitivity levels at $BER \leq 10^{-6}$ , for a 10 MHz channel, corresponding to the most robust modulation and coding rate supported by the technology
T	Ambient temperature in Kelvin

## 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
BW	BandWidth
CW	Continuous Wave
ERM	Electromagnetic compatibility and Radio spectrum Matters
FDD	Frequency Division Duplexing
IMT	International Mobile Telecommunications
MSG	Mobile Standards Group
PER	Packet Error Ratio
RMS	Root Mean Square

R&TTE	Radio equipment and Telecommunications Terminal Equipment
RF	Radio Frequency
TFES	Task Force for European Standards for IMT
TPC	Transmit Power Control
UE	User Equipment
UUT	Unit Under Test
WMAN	Wireless Metropolitan Area Network

## 4 Essential requirements specification

With reference to article 3.2 of Directive 1999/5/EC [i.2] the phenomena in this clause have been identified as relevant to the essential requirements.

### 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 manufacturer. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the required operational environmental profile.

### 4.2 Conformance requirements

#### 4.2.1 Introduction

To meet the essential requirement under article 3.2 of the R&TTE Directive [i.2] for IMT User Equipment (UE) six essential parameters in addition to those in EN 301 908-1 [1] have been identified. Table 4.2.1-1 provides a cross reference between these six essential parameters and the corresponding eleven technical requirements for equipment 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 references**

Essential parameter	Corresponding technical requirements
Spectrum emission mask	4.2.2 Transmitter Spectrum emission mask
	4.2.3 Transmitter adjacent channel leakage power ratio
Conducted spurious emissions from the transmitter antenna connector	4.2.4 Transmitter spurious emissions
Accuracy of maximum output power	4.2.5 Transmitter maximum output power
Prevention of harmful interference through control of power	4.2.6 Transmitter minimum power control
Conducted spurious emissions from the receiver antenna connector	4.2.7 Receiver spurious emissions
Impact of interference on receiver performance	4.2.9 Receiver blocking characteristics
	4.2.10 Receiver intermodulation characteristics
	4.2.11 Receiver response rejection
Receiver adjacent channel selectivity	4.2.8 Receiver adjacent channel selectivity (ACS)
Control and Monitoring functions	4.2.4 Control and Monitoring functions

#### 4.2.2 Transmitter spectrum emission mask

##### 4.2.2.1 Definition

Spectrum emission mask defines an out of band emission requirement for the transmitter. These out of band emissions are unwanted emissions outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions.