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**Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) - Bazne postaje (BS), ponavljalniki (repetitorji) in uporabniška oprema (UE) za celična omrežja tretje generacije IMT-2000 - 15. del: Harmonizirani EN za IMT-2000, razviti prizemni radijski dostop za UMTS (E-UTRA) (ponavljalniki FDD (repetitorji)), ki zajema bistvene zahteve člena 3.2 direktive R&TTE**

Electromagnetic compatibility and Radio spectrum Matters (ERM) - Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks - 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

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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 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**

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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 15 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".

### National transposition dates

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 types:

- Repeaters for Evolved Universal Terrestrial Radio Access (E-UTRA) (FDD).

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

**Table 1-1: E-UTRA Repeater operating bands**

E-UTRA FDD band	Direction of transmission	E-UTRA Repeater operating bands
1	Downlink	2 110 MHz to 2 170 MHz
	Uplink	1 920 MHz to 1 980 MHz
3	Downlink	1 805 MHz to 1 880 MHz
	Uplink	1 710 MHz to 1 785 MHz
7	Downlink	2 620 MHz to 2 690 MHz
	Uplink	2 500 MHz to 2 570 MHz
8	Downlink	925 MHz to 960 MHz
	Uplink	880 MHz to 915 MHz

The present document covers requirements for E-UTRA Repeaters for Release 8.

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.
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  - 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 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".
- [2] ETSI TS 136 143 (V8.2.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater conformance testing (3GPP TS 36.143 version 8.2.0 Release 8)".
- [3] Void.
- [4] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".
- [5] IEC 60068-2-1 (2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".
- [6] IEC 60068-2-2 (2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".
- [7] ETSI EN 301 908-11 (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 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".
- [8] ETSI TS 136 141 (V8.4.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 8.4.0 Release 8)".
- [9] ETSI TS 125 141 (V8.8.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 8.8.0 Release 8)".

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## 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 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.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".

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**carrier:** modulated waveform conveying the E-UTRA or UTRA (WCDMA) physical channels

**channel bandwidth:** RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell

NOTE: The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

**channel edge:** lowest and highest frequency of the E-UTRA carrier, separated by the channel bandwidth

**donor coupling loss:** coupling loss between the repeater and the donor Base Station

**downlink:** signal path where Base Station transmits and mobile receives

**downlink operating band:** part of the operating band designated for downlink

**nominal passband edge:** lowest and highest frequency of the pass band of the repeater

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

NOTE 1: The operating band(s) for an E-UTRA Repeater is declared by the manufacturer according to the designations in clause 1, table 1-1.

NOTE 2: Unless specified, operating band refers to the uplink operating band and downlink operating band.

**output power, P<sub>out</sub>:** mean power of one carrier at maximum repeater gain delivered to a load with resistance equal to the nominal load impedance of the transmitter

**pass band:** repeater can have one or several pass bands

NOTE: The pass band is the frequency range that the repeater operates in with operational configuration. This frequency range can correspond to one or several consecutive nominal channels. If they are not consecutive each subset of channels is considered as an individual pass band.

**rated output power:** rated output power of the repeater is the mean power level per carrier that the manufacturer has declared to be available at the antenna connector

**repeater:** device that receives, amplifies and transmits the radiated or conducted RF carrier both in the downlink direction (from the Base Station to the mobile area) and in the uplink direction (from the mobile to the Base Station)

**transmission bandwidth:** bandwidth of an instantaneous transmission from a UE or BS, measured in Resource Block units

**transmission bandwidth configuration:** highest transmission bandwidth allowed for uplink or downlink in a given channel bandwidth, measured in Resource Block units

**uplink:** signal path where mobile transmits and Base Station receives

**uplink operating band:** part of the operating band designated for uplink

## 3.2 Symbols

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

$\Delta f$	The separation between the nominal pass band edge frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency
$\Delta f_{\max}$	The largest value of $\Delta f$ used for defining the requirement
$BW_{\text{Channel}}$	Channel bandwidth
$BW_{\text{Config}}$	Transmission bandwidth configuration, expressed in MHz, where $BW_{\text{Config}} = N_{\text{RB}} \times 180$ kHz in the uplink and $BW_{\text{Config}} = 15$ kHz + $N_{\text{RB}} \times 180$ kHz in the downlink
$BW_{\text{Meas}}$	Measurement bandwidth
$BW_{\text{Pass band}}$	Bandwidth of the repeater pass band
$f_{\text{offset}_{\max}}$	The largest value of $f_{\text{offset}}$ used for defining the requirement
$F_{\text{DL}_{\text{low}}}$	The lowest frequency of the downlink operating band
$F_{\text{DL}_{\text{high}}}$	The highest frequency of the downlink operating band
$F_{\text{UL}_{\text{low}}}$	The lowest frequency of the uplink operating band
$F_{\text{UL}_{\text{high}}}$	The highest frequency of the uplink operating band
$N_{\text{DL}}$	Downlink EARFCN
$N_{\text{Offs-DL}}$	Offset used for calculating downlink EARFCN
$N_{\text{Offs-UL}}$	Offset used for calculating uplink EARFCN
$N_{\text{RB}}$	Transmission bandwidth configuration, expressed in units of resource blocks
$N_{\text{UL}}$	Uplink EARFCN
$P_{\max}$	Maximum output power
$P_{\text{out}}$	Output power

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## 3.3 Abbreviations

SIST EN 301 908-15 V4.2.1:2010

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

ACLR	Adjacent Channel Leakage Ratio
ACRR	Adjacent Channel Rejection Ratio
BS	Base Station
BW	Bandwidth
CW	Continuous Wave
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
E-TM	E-UTRA Test Model
E-UTRA	Evolved Universal Terrestrial Radio Access
FDD	Frequency Division Duplex
PCCPCH	Primary Common Control Physical Channel
RF	Radio Frequency
RMS	Root Mean Square (value)
RRC	Root Raised Cosine
SCCPCH	Secondary Common Control Physical Channel
TDD	Time Division Duplex
UMB	Ultra Mobile Broadband
UTRA	Universal Terrestrial Radio Access