

**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**

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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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.2] (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.3] 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.3] are given in annex A.

The present document is part 13 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".

| 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. The modular structure is shown in EG 201 399 [i.4].

1 Scope

The present document applies to the following radio equipment types:

- User equipment for Evolved Universal Terrestrial Radio Access (E-UTRA).

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: E-UTRA UE operating bands

| E-UTRA Band | Direction of transmission | E-UTRA operating bands |
|-------------|---------------------------|------------------------|
| 1 | Transmit | 1 920 MHz to 1 980 MHz |
| | Receive | 2 110 MHz to 2 170 MHz |
| 3 | Transmit | 1 710 MHz to 1 785 MHz |
| | Receive | 1 805 MHz to 1 880 MHz |
| 7 | Transmit | 2 500 MHz to 2 570 MHz |
| | Receive | 2 620 MHz to 2 690 MHz |
| 8 | Transmit | 880 MHz to 915 MHz |
| | Receive | 925 MHz to 960 MHz |
| 33 | Transmit and Receive | 1 900 MHz to 1 920 MHz |
| 34 | Transmit and Receive | 2 010 MHz to 2 025 MHz |
| 38 | Transmit and Receive | 2 570 MHz to 2 620 MHz |

The present document is intended to cover the provisions of Directive 1999/5/EC [i.3] (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 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 TS 136 521-1 (V8.0.1): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: conformance testing (3GPP TS 36.521-1 version 8.0.1 Release 8)".
- [2] ETSI TS 136 508 (V8.0.1): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing (3GPP TS 36.508 version 8.0.1 Release 8)".
- [3] ETSI TS 136 509 (V8.0.1): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Special conformance testing function for User Equipment (UE) (3GPP TS 36.509 version 8.0.1 Release 8)".
- [4] ETSI TS 136 101 (V8.4.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 version 8.4.0 Release 8)".
- [5] 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".
- [6] 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".
- [7] ETSI EN 301 908-2 (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 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".
- [8] IEC 60068-2-1 (2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".
- [9] IEC 60068-2-2 (2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".

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] 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.2] 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.3] 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.4] 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.5] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

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 carrier, separated by the channel bandwidth

Maximum Output Power (MOP): mean power level per carrier of UE measured at the antenna connector in a specified reference condition

mean power: when applied to E-UTRA transmission this is the power measured in the operating system bandwidth of the carrier

NOTE: The period of measurement shall be at least one subframe (1ms) unless otherwise stated.

occupied bandwidth: width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage $\beta/2$ of the total mean power of a given emission

output power: mean power of one carrier of the UE, delivered to a load with resistance equal to the nominal load impedance of the transmitter

reference bandwidth: bandwidth in which an emission level is specified

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

transmit diversity: transmit diversity is based on space-frequency block coding techniques complemented with frequency-shift time diversity when four transmit antennas is used

3.2 Symbols

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

| | |
|----------------------------------|---|
| BW_{Channel} | Channel bandwidth |
| E_{RS} | Transmitted energy per RE for reference symbols during the useful part of the symbol, i.e. excluding the cyclic prefix, (average power normalized to the subcarrier spacing) at the eNode B transmit antenna connector |
| \hat{E}_s | The received energy per RE during the useful part of the symbol, i.e. excluding the cyclic prefix, averaged across the allocated RB(s) (average power within the allocated RB(s), divided by the number of RE within this allocation, and normalized to the subcarrier spacing) at the UE antenna connector |
| F | Frequency |
| $F_{\text{Interferer (offset)}}$ | Frequency offset of the interferer |
| $F_{\text{Interferer}}$ | Frequency of the interferer |
| F_C | Frequency of the carrier centre frequency |
| $F_{\text{DL_low}}$ | The lowest frequency of the downlink operating band |
| $F_{\text{DL_high}}$ | The highest frequency of the downlink operating band |
| $F_{\text{UL_low}}$ | The lowest frequency of the uplink operating band |

| | |
|------------------|---|
| F_{UL_high} | The highest frequency of the uplink operating band |
| I_o | The power spectral density of the total input signal (power averaged over the useful part of the symbols within the transmission bandwidth configuration, divided by the total number of RE for this configuration and normalized to the subcarrier spacing) at the UE antenna connector, including the own-cell downlink signal or the power spectral density of the total input signal at the UE antenna connector (power averaged over the useful part of the symbols within a given bandwidth and normalized to the said bandwidth), including the own-cell downlink signal |
| I_{or} | The total transmitted power spectral density of the own-cell downlink signal (power averaged over the useful part of the symbols within the transmission bandwidth configuration, divided by the total number of RE for this configuration and normalized to the subcarrier spacing) at the eNode B transmit antenna connector |
| \hat{I}_{or} | The total received power spectral density of the own-cell downlink signal (power averaged over the useful part of the symbols within the transmission bandwidth configuration, divided by the total number of RE for this configuration and normalized to the subcarrier spacing) at the UE antenna connector |
| I_{ot} | The received power spectral density of the total noise and interference for a certain RE (average power obtained within the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector |
| N_{cp} | Cyclic prefix length |
| N_{DL} | Downlink EARFCN |
| N_{oc} | The power spectral density of a white noise source (average power per RE normalized to the subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as measured at the UE antenna connector |
| $N_{Offs-DL}$ | Offset used for calculating downlink EARFCN |
| $N_{Offs-UL}$ | Offset used for calculating uplink EARFCN |
| N_{RB} | Transmission bandwidth configuration, expressed in units of resource blocks |
| N_{UL} | Uplink EARFCN |
| P | Number of cell-specific antenna ports |
| p | Antenna port number |
| R_{av} | Minimum average throughput per RB |
| $P_{Interferer}$ | Modulated mean power of the interferer |
| ΔF_{OOB} | Δ Frequency of Out Of Band emission |

3.3 Abbreviations

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

| | |
|---------|--|
| ACLR | Adjacent Channel Leakage Ratio |
| ACS | Adjacent Channel Selectivity |
| BS | Base Station |
| CW | Continuous Wave |
| DL | DownLink |
| EARFCN | E-UTRA Absolute Radio Frequency Channel Number |
| E-UTRA | Evolved UMTS Terrestrial Radio Access |
| FDD | Frequency Division Duplex |
| PSS | Primary Synchronization Signal |
| RE | Resource Element |
| REFSENS | Reference Sensitivity power level |
| SS | System Simulator |
| TDD | Time Division Duplex |
| TPC | Transmit Power Control |
| UE | User Equipment |
| UL | Uplink |
| UMTS | Universal Mobile Telecommunications System |
| UTRA | UMTS Terrestrial Radio Access |