

ETSI EN 302 435-2 V1.3.1 (2009-12)

Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Short Range Devices (SRD);
Technical characteristics for SRD equipment using
Ultra WideBand technology (UWB);
Building Material Analysis and Classification equipment applications
operating in the frequency band from 2,2 GHz to 8,5 GHz;
Part 2: Harmonized EN covering the essential requirements
of article 3.2 of the R&TTE Directive**



Reference

REN/ERM-TGUWB-006-2

Keywords

radio, SRD, UWB, testing, regulation**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
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chairecor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2009.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

LTE™ is a Trade Mark of ETSI currently being registered for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

| | |
|--|-----------|
| Intellectual Property Rights | 4 |
| Foreword..... | 4 |
| Introduction | 4 |
| 1 Scope | 5 |
| 2 References | 6 |
| 2.1 Normative references | 6 |
| 2.2 Informative references | 6 |
| 3 Definitions, symbols and abbreviations | 7 |
| 3.1 Definitions | 7 |
| 3.2 Symbols | 7 |
| 3.3 Abbreviations | 7 |
| 4 Technical requirements specifications | 7 |
| 4.1 Environmental profile..... | 7 |
| 4.2 Conformance requirements | 7 |
| 4.2.1 Transmitter requirements | 7 |
| 4.2.1.1 Maximum Undesired UWB Emissions (UE) | 7 |
| 4.2.1.2 Maximum Other Emissions (OE)..... | 7 |
| 4.2.1.3 Total Power spectral density (UE-TP) | 7 |
| 4.2.1.4 Minimum pulse repetition frequency | 7 |
| 4.2.2 Other equipment requirements..... | 7 |
| 4.2.2.1 Design requirements..... | 7 |
| 4.2.2.2 Listen before Talk | 8 |
| 5 Testing for compliance with technical requirements..... | 8 |
| 5.1 Environmental conditions for testing | 8 |
| 5.2 Essential radio test suites..... | 8 |
| 5.2.1 Transmitter test suites | 8 |
| 5.2.1.1 Maximum Undesired UWB Emissions (UE) | 8 |
| 5.2.1.2 Maximum Other Emissions (OE)..... | 8 |
| 5.2.1.3 Total Power spectral density (UE-TP) | 8 |
| 5.2.2 Other test suites..... | 8 |
| 5.2.2.1 Listen before Talk | 8 |
| 5.3 Interpretation of measurement results | 8 |
| Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT) | 9 |
| Annex B (informative): The EN title in the official languages | 11 |
| Annex C (informative): Bibliography | 12 |
| History | 13 |

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document is part 2 of a multi-part deliverable covering Ultra WideBand (UWB) Building Material Analysis (BMA) and Classification equipment applications operating in the frequency band from 2,2 GHz to 8 GHz, as identified below:

Part 1: "Technical characteristics and test methods";

Part 2: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

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.4] (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.

| National transposition dates | |
|--|-------------------|
| Date of adoption of this EN: | 7 December 2009 |
| Date of latest announcement of this EN (doa): | 31 March 2010 |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 30 September 2010 |
| Date of withdrawal of any conflicting National Standard (dow): | 30 September 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. The modular structure is shown in EG 201 399 [i.1].

1 Scope

The present document specifies the requirements for Building Material Analysis and Classification (BMA) applications using UWB technology operating in all or part of the frequency band from 2,2 GHz to 8,5 GHz. Additionally it specifies reduced emissions in the ranges from 0,96 GHz to 2,2 GHz and 8,5 GHz to 10,6 GHz.

Equipment covered by the present document operates in accordance with amended ECC Decision ECC/DEC(07)01 on specific Material Sensing devices using Ultra-Wideband (UWB) technology (amended 26 June 2009) [3] and Commission Decision of 21 April 2009 [i.5] amending Decision 2007/131/EC [2] on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonized manner in the Community (notified under document number C(2009) 2787) (2009/343/EC) [i.5].

Table 1: Radiocommunications service frequency bands

| | Radiocommunications service frequency bands |
|----------|--|
| Transmit | 2 200 MHz to 8 500 MHz |
| Receive | 2 200 MHz to 8 500 MHz |

The present document applies to:

- UWB building material analysis and classification equipment for imaging and object detection applications;
- equipment fitted with an integral antenna;
- handheld devices.

The present document does not apply to:

- UWB communication devices;
- Ground penetrating radar devices; nor
- Through-wall radar imaging devices;

as defined in ITU-R Recommendation SM.1754 [i.3].

The present document specifies the equipment which is designed to not radiate into the free space. It is designed to function only when positioned such that it radiates directly into the absorptive material such as walls and other building materials which absorb emissions.

The present document does not necessarily include all the characteristics which may be required by a user, nor does it necessarily represent the optimum performance achievable.

The present document is intended to cover the provisions of article 3.2 of Directive 1999/5/EC [i.2] (R&TTE Directive), which states that "... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radiocommunications and orbital resources so as to avoid harmful interference".

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 EN 302 435-1 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Technical characteristics for SRD equipment using Ultra WideBand technology (UWB); Building Material Analysis and Classification equipment applications operating in the frequency band from 2,2 GHz to 8,5 GHz; Part 1: Technical characteristics and test methods".
- [2] Commission Decision 2007/131/EC of 21 February 2007 on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonized manner in the Community (notified under document number C(2007) 522) (Text with EEA relevance).
- [3] ECC/DEC/(07)01: "ECC Decision of 30 March 2007 on specific Material Sensing devices using Ultra-Wideband (UWB) technology" (amended 26 June 2009).

2.2 Informative references

The following referenced documents are not essential to the use of the ETSI deliverable 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 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.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] ITU-R Recommendation SM.1754: "Measurement techniques of ultra-wideband transmissions".
- [i.4] 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.5] Commission Decision 2009/343/EC of 21 April 2009 amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonized manner in the Community (notified under document number C(2009) 2787) (Text with EEA relevance).

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in clause 3 of EN 302 435-1 [1] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in clause 3 of EN 302 435-1 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in clause 3 of EN 302 435-1 [1] apply.

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 provider. 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

4.2.1 Transmitter requirements

4.2.1.1 Maximum Undesired UWB Emissions (UE)

The maximum undesired UWB emissions shall not exceed the limits specified in clause 8.3.1.3 of EN 302 435-1 [1].

4.2.1.2 Maximum Other Emissions (OE)

The maximum other emissions shall not exceed the values given in clause 8.3.2.3 of EN 302 435-1 [1].

4.2.1.3 Total Power spectral density (UE-TP)

The total power spectral density shall not exceed the values given in clause 8.3.3.3 of EN 302 435-1 [1].

4.2.1.4 Minimum pulse repetition frequency

The pulse repetition frequency shall not exceed the limits specified in clause 8.4.3 of EN 302 435-1 [1]. The declaration of clause 8.4.2 of EN 302 435-1 [1] shall be made.

4.2.2 Other equipment requirements

4.2.2.1 Design requirements

The equipment shall comply with the design requirements as defined in annex B of the EN 302 435-1 [1].

4.2.2.2 Listen before Talk

The Listen before Talk receiver thresholds shall meet the requirements specified in clause 8.5.4 of EN 302 435-1 [1].

5 Testing for compliance with technical requirements

5.1 Environmental conditions for testing

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

5.2 Essential radio test suites

5.2.1 Transmitter test suites

5.2.1.1 Maximum Undesired UWB Emissions (UE)

The test defined in clause 8.3.1.2 of EN 302 435-1 [1] shall be carried out.

5.2.1.2 Maximum Other Emissions (OE)

The test defined in clause 8.3.2.2 of EN 302 435-1 [1] shall be carried out.

5.2.1.3 Total Power spectral density (UE-TP)

The test defined in clause 8.3.3.2 of EN 302 435-1 [1] shall be carried out.

5.2.2 Other test suites

5.2.2.1 Listen before Talk

The test defined in clause 8.5.3 of EN 302 435-1 [1] shall be carried out.

5.3 Interpretation of measurement results

Clause 7 of EN 302 435-1 [1] shall apply.

Annex A (normative):

HS Requirements and conformance Test specifications

Table (HS-RTT)

The HS Requirements and conformance Test specifications Table (HS-RTT) in table A.1 serves a number of purposes, as follows:

- it provides a statement of all the essential requirements in words and by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it provides a statement of all the test procedures corresponding to those essential requirements by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it qualifies each requirement to be either:
 - Unconditional: meaning that the requirement applies in all circumstances; or
 - Conditional: meaning that the requirement is dependent on the manufacturer having chosen to support optional functionality defined within the schedule.
- in the case of Conditional requirements, it associates the requirement with the particular optional service or functionality;
- it qualifies each test procedure to be either:
 - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement shall be demonstrated to be met in accordance with the referenced procedures;
 - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.

Table A.1: HS Requirements and conformance Test specifications Table (HS-RTT)

| Harmonized Standard EN 302 435-2 | | | | | | |
|---|--------------------------------------|----------------------|----------------------------|---|--------------------|----------------------|
| The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive | | | | | | |
| Requirement | | | Requirement Conditionality | | Test Specification | |
| No | Description | Reference: Clause No | U/C | Condition | E/O | Reference: Clause No |
| 1 | Maximum Undesired UWB Emissions (UE) | 4.2.1.1 | U | | E | 5.2.1.1 |
| 2 | Maximum Other Emissions (OE) | 4.2.1.2 | U | | E | 5.2.1.2 |
| 3 | Total Power spectral density (UE-TP) | 4.2.1.3 | U | | E | 5.2.1.3 |
| 4 | Minimum Pulse Repetition Frequency | 4.2.1.4 | C | Applies only to equipment using impulsive UWB technology. | X | |
| 5 | Design requirements | 4.2.2.1 | U | | X | |
| 6 | Listen before Talk | 4.2.2.2 | C | Applies only to equipment operating in the frequency bands that require LBT (see clause 8.5.4 of EN 302 435-1 [1]). | E | 5.2.2.1 |

Key to columns:

Requirement:

No A unique identifier for one row of the table which may be used to identify a requirement or its test specification.

| | |
|------------------------------------|---|
| Description | A textual reference to the requirement. |
| Clause Number | Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly. |
| Requirement Conditionality: | |
| U/C | Indicates whether the requirement is to be <i>unconditionally</i> applicable (U) or is <i>conditional</i> upon the manufacturers claimed functionality of the equipment (C). |
| Condition | Explains the conditions when the requirement shall or shall not be applicable for a technical requirement which is classified "conditional". |
| Test Specification: | |
| E/O | Indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O). |
| NOTE: | All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement. The completion of all tests classified "E" as specified with satisfactory outcomes is a necessary condition for a presumption of conformity. Compliance with requirements associated with tests classified "O" or "X" is a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file. |
| Clause Number | Identification of clause(s) defining the test specification in the present document unless another document is referenced explicitly Where no test is specified (that is, where the previous field is "X") this field remains blank. |

Annex B (informative): The EN title in the official languages

The enlargement of the European Union (EU) resulted in a requirement from the EU for a larger number of languages for the translation of the titles of Harmonized Standards and mandated ENs that are to be listed in the Official Journal to support the implementation of this legislation.

For this reason the title translation concerning the present document can be consulted via the [e-approval](#) application.

Annex C (informative): Bibliography

- ETSI TR 102 495-1 (V1.1.1): "Technical characteristics for SRD equipment using Ultra Wide Band Sensor technology (UWB); System Reference Document Part 1: Building material analysis and classification applications operating in the frequency band from 2,2 GHz to 8 GHz".
- 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".

History

| Document history | | |
|------------------|---------------|--|
| V1.2.1 | April 2008 | Publication |
| V1.3.1 | August 2009 | One-step Approval Procedure OAP 20091205: 2009-08-07 to 2009-12-07 |
| V1.3.1 | December 2009 | Publication |
| | | |
| | | |