

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Short Range Devices (SRD);
Technical characteristics for SRD equipment
using Ultra WideBand technology (UWB);
Object Discrimination and Characterization Applications
for power tool devices 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

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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 Vote phase of the ETSI standards Two-step Approval Procedure.

The present document is part 2 a multi-part deliverable covering Ultra WideBand (UWB); Discrimination and Characterization Applications for power tool devices operating in the frequency band from 2,2 GHz to 8,5 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.

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.1].

1 Scope

The present document specifies the requirements for Object Discrimination and Characterization Applications for power tool devices operating in 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] [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:

- a) UWB object discrimination and characterisation equipment for imaging and object detection applications;
- b) equipment fitted with an integral antenna;
- c) Two main categories:
 - 1) Category A: user protection in bentchtop tools / table saws (quasi fixed sawing equipment).
 - 2) Category B: breakthrough protection in drilling devices.

The present document does not apply to:

- UWB communication devices; and
- Ground penetrating radar devices; and
- through-wall radar imaging devices;
- building material devices;

as defined in ITU-R Recommendation SM.1754 [i.3] and EN 302 435-1 [i.6].

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 302 498-1 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Technical characteristics for SRD equipment using Ultra WideBand technology (UWB); Object Discrimination and Characterization Applications for power tool devices operating in the frequency band from 2,2 GHz to 8,5 GHz; Part 1: Technical characteristics and test methods".

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 EG 201 399 (V2.1.1): "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] ECC Decision of 30 March 2007 on specific Material Sensing devices using Ultra-Wideband (UWB) technology (ECC/DEC/(07)01), amended 26 June 2009.
- [i.6] ETSI EN 302 435-1 (V1.2.1): "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 GHz; Part 1: Technical characteristics and test methods".

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 302 498-1 [1] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in clause 3 of EN 302 498-1 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in clause 3 of EN 302 498-1 [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 UWB emissions shall not exceed the limits specified in clause 8.3.1.3 for category A equipment in clause 8.3.1.4 for category B equipment of EN 302 498-1 [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 for category A and category B equipment of EN 302 498-1 [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 for category A equipment of EN 302 498-1 [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 302 498-1 [1]. The declaration of clause 8.4.2 of EN 302 498-1 [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 302 498-1 [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 302 498-1 [1].

4.2.2.3 Duty Cycle Limit

The Duty Cycle requirement for category B equipment shall meet the requirements specified in clause 8.6.3 of EN 302 498-1 [1].

4.2.2.4 Total Power Control (TPC)

The Total Power Control function shall meet the requirements specified in clause 8.7 of EN 302 498-1 [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 UWB Emissions (UE)

The test defined in clause 8.3.1.2 of EN 302 498-1 [1] shall be carried out.

5.2.1.2 Maximum Other Emissions (OE)

The test defined in clause 8.3.2.2 of EN 302 498-1 [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 302 498-1 [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 302 498-1 [1] shall be carried out.

5.3 Interpretation of measurement results

Clause 7 of EN 302 498-1 [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 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 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 dependant 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 302 498-2						
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.	E	
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 [i.6]).	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 *unconditionally* applicable (U) or is *conditional* 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 102 495-2: "Technical characteristics for SRD equipment using Ultra WideBand Sensor technology (UWB); System Reference Document; Part 2: Object Discrimination and Characterization (ODC) applications for power tool devices operating in the frequency band of 2,2 GHz to 8,5 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

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