

Draft ETSI EN 302 435-2 V1.1.1 (2006-05)

Candidate Harmonized European Standard (Telecommunications series)

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



Reference

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radio, SRD, UWB, testing

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Foreword

This Candidate 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 is part 2 of a multi-part deliverable covering Ultra-Wide Band Location Tracking applications operating in the frequency range from 2,2 to 8 GHz, as identified below:

Part 1: "Technical characteristics and test methods";

Part 2: "Harmonized EN covering essential requirements under 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 as amended [3] 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 [1] 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").

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 designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive. Each standard is a module in the structure. The modular structure is shown in figure 1.

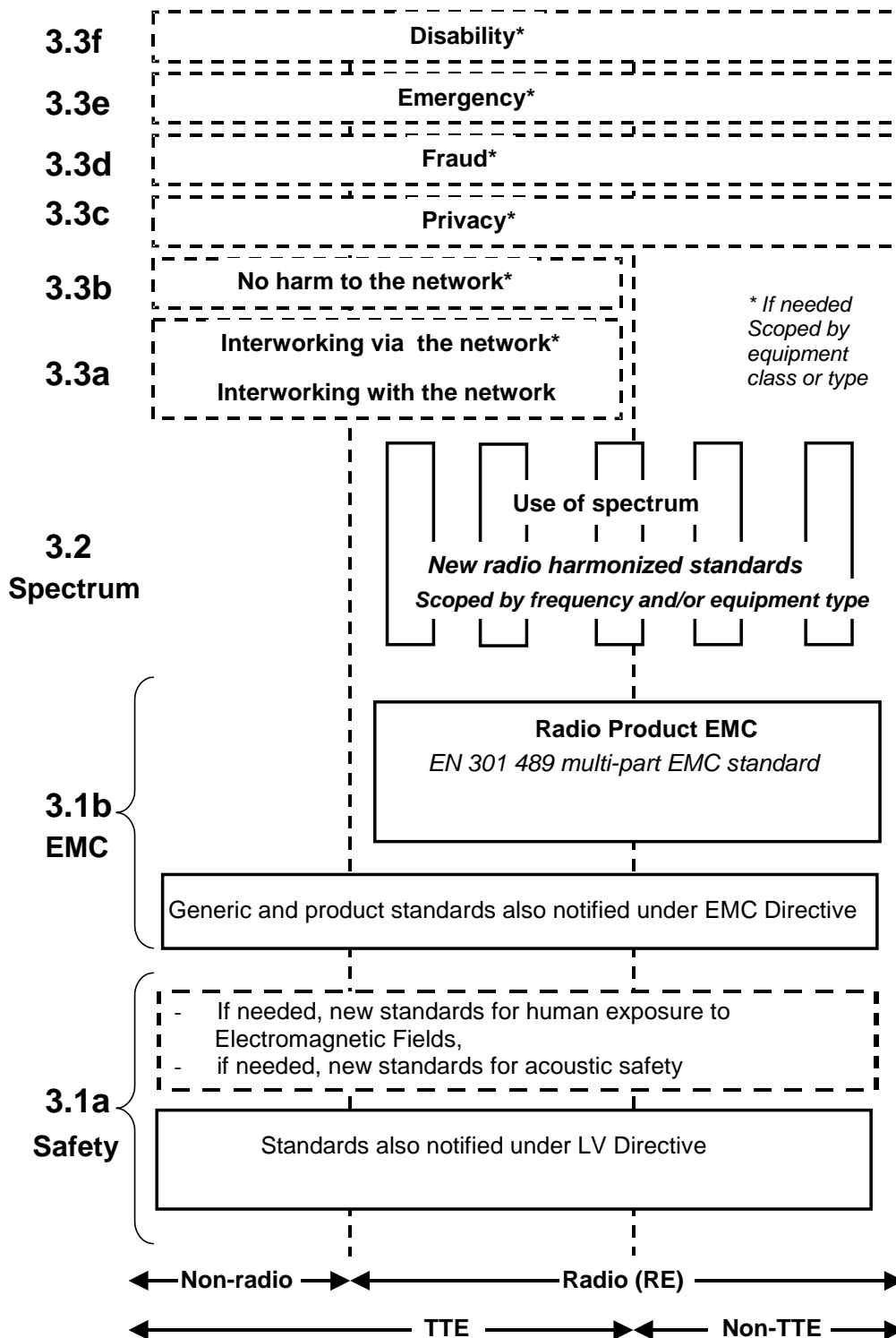


Figure 1: Modular structure for the various standards used under the R&TTE Directive

The left hand edge of the figure 1 shows the different clauses of Article 3 of the R&TTE Directive.

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of the present document essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum by radio equipment. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1b the diagram shows EN 301 489, the multi-part product EMC standard for radio used under the EMC Directive [2].

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive [3] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

The bottom of the figure shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both. A radio spectrum standard will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive may be covered in a set of standards.

The modularity principle has been taken because:

- it minimizes the number of standards needed. Because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment;
- it provides scope for standards to be added:
 - under article 3.2 when new frequency bands are agreed; or
 - under article 3.3 should the Commission take the necessary decisionswithout requiring alteration of standards that are already published;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

1 Scope

The present document specifies the requirements for Building Material Analysis and Classification (BMA&C) Applications operating in all or part of the frequency band from 2.2 GHz to 8 GHz. Reduced emissions in the range from 0,96 GHz to 2,2 GHz and 8 GHz to 10,6 GHz are permitted and defined in clause 4.2.1.1.

The document applies to:

- a) UWB building material analysis and classification equipment for imaging and object detection applications;
- b) equipment fitted with an integral antenna;
- c) handheld devices;
- d) equipment with an activation switch which allows emissions only when the equipment is in direct contact to the material to be investigated.

The document does not apply to:

- UWB communication applications; and
- Ground probing and through-wall equipment.

The present document specifies the equipment which is designed to not radiate into the free air. 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. Any leakage or residual emissions appearing e.g. behind the wall or outside the backwards and sideways screened antenna is defined as undesired emission.

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 contains all technical characteristics and test methods for Building Material Analysis and Classification equipment operated in accordance with the ECC Decision ECC/DEC/(06)xy [4] for imaging devices.

The present document is intended to cover the provisions of article 3.2 of Directive 1999/5/EC [1] (R&TTE Directive), 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".

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- 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.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] 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).
- [2] ETSI EN 302 435-1 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD) using Ultra-WideBand technology, Location Tracking equipment operating in the frequency range from 6 GHz to 9 GHz; Part 1: Technical characteristics and test methods".

- [3] 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.
- [4] ECC/DEC/(06)xy Decision of xx 2006 on the frequency band 2.2 GHz to 8.0 GHz to be designated for the use of UWB Imaging systems.

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 [1] and EN 302 435-1 [2] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in EN 302 435-1 [2] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in EN 302 435-1 [2] 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 Permitted range of operating frequencies

The permitted range of operating frequencies shall not exceed the limits specified in clause 8.1.3 of EN 302 435-1 [2].

4.2.1.2 Total maximum UWB emission of the equipment (UE)

The total maximum peak equivalent isotropic radiated power density shall not exceed the limits specified in clause 8.2.1.3 of EN 302 435-1 [2].

4.2.1.3 Maximum undesired transmitter spurious emissions (USE)

The maximum undesired transmitter spurious emissions shall not exceed the values given in clause 8.2.2.3 of EN 302 435-1 [2].

4.2.1.4 Total Power (UE-TP)

The total power of the average e.i.r.p emissions across the entire spherical surface enclosing the UWB sensor equipment shall not exceed the values given in clause 8.2.2.3 of EN 302 435-1 [2].

4.2.1.5 Minimum pulse repetition frequency

The pulse repetition frequency shall not exceed the limits specified in clause 8.3.3 of EN 302 435-1 [2].

4.2.1.6 Listen-before-Talk

The Listen-before-Talk receiver sensitivity shall meet the requirements specified in clause 8.4.3 of EN 302 435-1 [2].

4.2.1.7 Design requirements

The equipment shall comply with the design requirements as defined in annex B of the EN 302 435-1 [2].

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 Permitted range of operating frequencies

The test defined in clause 8.1.2 of EN 302 435-1 [2] shall be carried out.

5.2.1.2 Total maximum UWB emission of the equipment (UE)

The test defined in clause 8.2.1.2.3 of EN 302 435-1 [2] shall be carried out.

5.2.1.3 Maximum undesired transmitter spurious emissions (USE)

The test defined in clause 8.2.2.2 of EN 302 435-1 [2] shall be carried out.

5.2.1.4 Total Power (UE-TP)

The test defined in clause 8.2.3.2 of EN 302 435-1 [2] shall be carried out.

5.2.1.5 Minimum pulse repetition frequency (PRF)

The declaration of clause 8.3.2 of EN 302 435-1 [2] shall be made.

5.2.1.6 Listen-before-Talk

The test defined in clause 8.4.2 of EN 302 435-1 [2] shall be carried out.

5.3 Interpretation of measurement results

Clause 7 of EN 302 435-1 [2] shall apply.

Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT)

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the HS-RTSS proforma in this annex so that it can be used for its intended purposes and may further publish the completed HS-RTSS

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 in the present document or to a specific clause in a specific referenced document;
- it provides a statement of all the test procedure corresponding to those essential requirements by cross reference to specific clause(s) in the present document or to a specific clause(s) in 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 supplier 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;
- when the schedule is completed in respect of a particular equipment including the testing outcomes, including a completed version of table A.1, it provides a means to assert the "presumption of conformity" with the HS.

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

Harmonized Standard EN 302 435-2							
The following technical requirements and test specifications are relevant to the presumption of conformity under article 3.2 of the R&TTE Directive							
Technical Requirement reference			Technical Conditionality		Test Specification		
No	Description	Reference: Clause No	U/C	Condition	E/O	Reference: Clause No	Observations
1	Permitted range of operating frequencies	4.2.1.1	U		E	5.2.1.1	
2	Total maximum UWB emission	4.2.1.2	U		E	5.2.1.2	
3	Maximum undesired transmitter spurious emissions	4.2.1.3	U		E	5.2.1.3	
4	Total Power (UE-TP)	4.2.1.4	U		E	5.2.1.4	
5	Minimum pulse repetition frequency	4.2.1.5	U		X	5.2.15	
6	Listen Before Talk	4.2.1.6	U		E	5.2.1.6	
7	Design requirements	4.2.1.7	U		E	-	

Key to columns:**Essential Requirement:**

- No:** Table entry number.
- Description:** A textual reference to the Essential Requirement.
- Clause Number:** Identification of clause(s) defining the essential requirement in the present document unless another document is referenced explicitly.

Conditionality:

- U/C:** Indicates whether the requirement is to be *unconditionally* applicable (U) or is *conditional* upon the suppliers claimed functionality of the equipment (C).
- Condition:** Explains the conditions when the requirement shall or shall not be applicable for a 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 essential requirements. Tests designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite. For those requirements for which no test specification applies are designated "X". All tests classified "E" shall be performed as specified with satisfactory outcomes in order to allow a presumption of conformity. Requirements associated with tests classified "O" or "X" must be complied with although the requirement shall be complied with as demonstrated by an equivalent test or by assertion by the supplier and asserted to be complied with to allow presumption of conformity.

- 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.
- Observations:** Remains blank in the HS but is available for use for users of the standard to record the outcome of tests against each requirement.

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

Language	EN title
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) - Zařízení krátkého dosahu (SRD) - Technické vlastnosti zařízení SRD, používající technologii velmi širokého pásma (UWB) - Aplikace pro analýzu a klasifikaci stavebních materiálů, pracující v kmitočtovém pásmu od 2,2 GHz do 8 GHz - Část 2: Harmonizovaná EN, pokrývající základní požadavky článku 3.2 Směrnice R&TT
Danish	Elektromagnetisk kompatibilitet og Radiospektrum Anliggender (ERM); Apparater med kort rækkevidde (SRD); Tekniske egenskaber for SRD radioudstyr, der benytter ultra bredbånd teknisk (UWB); Udstyr, der bruger frekvenser i frekvensområdet 2,2 – 8 GHz til undersøgelse og klassificering af bygningsmaterialer; Del 2: Harmoniseret EN, som dækker de væsentlige krav i R&TTE direktivets artikel 3.2
Dutch	Elektromagnetische compatibiliteit en radiospectrumkwesties (ERM); Apparatuur voor kort bereik (SRD); Technische kenmerken voor SRD apparatuur die gebruik maakt van ultra breedband technologie (UWB); Bouwstofanalyse en classificatie toepassingen werkend in de frequentiebanden van 2,2 GHz tot 8 GHz; Deel 2: Geharmoniseerde EN welke invulling geeft aan de essentiële eisen van artikel 3.2 van de R&TTE richtlijn
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Technical characteristics for SRD equipment using Ultra Wide Band technology (UWB); Building Material Analysis and Classification equipment applications operating in the frequency band from 2,2 GHz to 8 GHz; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
Estonian	Elektromagnetilise ühilduvuse ja raadiospektri küsimused (ERM); Lähitoimeseadmed (SRD); Ultraalairiba (UWB) tehnoloogiat kasutavate lähitoimeseadmete tehnilised näitajad; Sagedusvahemikus 2,2 GHz kuni 8 GHz töötavad ehitusmaterjalide analüüsi ja klassifitseerimise rakendused; Osa 2: Harmoneeritud EN R&TTE direktiivi artikli 3.2 põhinõuete alusel
Finnish	Sähkömagneettinen yhteensopivuus ja radiospektriasiat (ERM); Lyhyen kantaman laitteet (SRD); Tekniset ominaisuudet UWB-teknologiaa käyttäville lyhyen kantaman laitteille; Taajuuskaistalla 2,2 GHz - 8 GHz toimivat rakennusmateriaalien analyysiin ja luokitteluun tarkoitettut sovellukset; Osa 2: Yhdenmukaistettu standardi (EN), joka kattaa R&TTE-direktiivin artiklan 3.2 mukaiset olennaiset vaatimukset.
French	
German	
Greek	Ηλεκτρομαγνητική Συμβατότητα και Θέματα Ραδιοφάσματος (ERM) - Συσκευές μικρής εμβέλειας (SRD) - Τεχνικά χαρακτηριστικά για εξοπλισμό SRD που χρησιμοποιεί υπερερευζωνική τεχνολογία (UWB) - Εφαρμογές ανάλυσης και ταξινόμησης δομικών υλικών οι οποίες λειτουργούν στην περιοχή συχνοτήτων από 2,2 GHz ως 8 GHz - Μέρος 2: Εναρμονισμένο EN για την κάλυψη των ουσιαδών απαιτήσεων του άρθρου 3.2 της Οδηγίας R&TTE
Hungarian	Elektromágneses összeférhetőségi és rádióspektrumügyek (ERM). Kis hatótávolságú eszközök (SRD). Ultraszéles sávú technológiát (UWB) használó kis hatótávolságú eszközök műszaki jellemzői. A 2,2 GHz-től 8 GHz-ig terjedő frekvenciasávban működő alkalmazások építő elemeinek elemzése és osztályozása. Az R&TTE-irányelv 3.2. cikkelyének alapvető követelményeit tartalmazó, harmonizált európai szabvány
Italian	Compatibilità elettromagnetica e Questioni relative allo spettro delle radiofrequenze (ERM); Dispositivi a breve portata (SRD); Caratteristiche tecniche delle apparecchiature SRD che utilizzano la tecnologia a Banda ultra larga (UWB); applicazioni per l'analisi e la classificazione di materiali da costruzione, operanti nella banda di frequenze da 2,2 GHz a 8 GHz; Parte 2: Norma armonizzata relativa ai requisiti essenziali dell'articolo 3.2 della direttiva R & TTE.
Latvian	Elektromagnētiskā saderība un radiofrekvenču spektra jautājumi (ERM). Maza darbības attāluma ierīces (SRD). SRD iekārtu tehniskie parametri, kas izmanto ultraplātnoslas tehnoloģiju (UWB). Ierīces būvmateriālu analīzei un klasificēšanai, kas strādā frekvenču joslā no 2,2 GHz līdz 8 GHz. 2.daļa: Harmonizēts Eiropas standarts (EN), kas atbilst R&TTE Direktīvas 3.2. punkta būtiskām prasībām.
Lithuanian	Elektromagnetinio suderinamumo ir radijo dažnių spektro dalykai. Trumpojo nuotolio įtaisai. Trumpojo nuotolio įtaisų, naudojančių ultraplaučios juostos technologiją, techninės charakteristikos. Statybinių medžiagų tyrimo ir klasifikavimo taikmenys, veikianrys dažnių juostoje nuo 2,2 GHz iki 8 GHz. 2 dalis. Darnusis Europos standartas, apimantis esminius 1999/5/EC* direktyvos 3.2 straipsnio reikalavimus
Maltese	Compatibilità elettromagnetika u materji relatati ma' spettru radjofoniku (ERM); Apparati ta' Medda Qasira (SRD); Karatteristiki teknici għal tagħmir SRD li juża teknoloġija Ultra Wide Band (UWB); applikazzjonijiet għall-Analiżi u Klassifikazzjoni ta' Materjal tal-Bini fil-faxxa ta' frekwenza minn 2,2 GHz sa 8 GHz; Parti 2: EN armonizzata li jkopri rekwiżiti essenzjali taħt l-artiklu 3.2 tad-Direttiva R&TTE
Polish	
Portuguese	

Language	EN title
Slovak	Elektromagnetická kompatibilita a záležitosti rádiového spektra (ERM). Zariadenia s krátkym dosahom (SRD). Technické charakteristiky zariadení SRD využívajúcich technológie ultraširokého pásma (UWB). Aplikácie pre materiálovú analýzu a klasifikáciu budov pracujúce vo frekvenčnom pásme od 2,2 GHz do 8 GHz. Časť 2: Harmonizovaná EN vzťahujúca sa na základné požiadavky podľa článku 3.2 smernice R&TTE
Slovenian	Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) – Naprave kratkega dosega (SRD) – Tehnične karakteristike za opremo SRD, ki uporablja ultra širokopasovno (UWB) tehnologijo – Analiza vgrajenih materialov in klasifikacija aplikacij, ki delujejo v frekvenčnem pasu od 2,2 GHz do 8 GHz – 2. del: Harmonizirani EN, ki zajema bistvene zahteve člena 3.2 direktive R&TTE
Spanish	
Swedish	

Annex C (informative): Bibliography

- 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.

History

Document history			
V1.1.1	May 2006	Public Enquiry	PE 20060922: 2006-05-24 to 2006-09-22