

# ETSI EN 302 435-2 V1.2.1 (2008-04)

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*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 GHz;  
Part 2: Harmonized EN covering the essential requirements  
of article 3.2 of the R&TTE Directive**

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# Contents

Intellectual Property Rights .....	4
Foreword.....	4
Introduction .....	4
1 Scope .....	5
2 References .....	5
2.1 Normative references .....	6
2.2 Informative references.....	6
3 Definitions, symbols and abbreviations .....	6
3.1 Definitions .....	6
3.2 Symbols.....	6
3.3 Abbreviations .....	6
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 .....	7
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
<b>Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT).....</b>	<b>9</b>
<b>Annex B (informative): The EN title in the official languages .....</b>	<b>11</b>
<b>Annex C (informative): Bibliography.....</b>	<b>13</b>
History .....	14

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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 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 [5] (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 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 [3] are given in annex A.

<b>National transposition dates</b>	
Date of adoption of this EN:	4 April 2008
Date of latest announcement of this EN (doa):	31 July 2008
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2009
Date of withdrawal of any conflicting National Standard (dow):	31 January 2010

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## 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 [2].

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# 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 GHz. Additionally it specifies reduced emissions in the ranges from 0,96 GHz to 2,2 GHz and 8 GHz to 10,6 GHz.

Equipment covered by the present document operates in accordance with ECC Decision ECC/DEC(07)01 [6] on Building Material Analysis (BMA) devices using Ultra WideBand technology in the bands below 8,0 GHz.

**Table 1: Radiocommunications service frequency bands**

	<b>Radiocommunications service frequency bands</b>
Transmit	2 200 MHz to 8 000 MHz
Receive	2 200 MHz to 8 000 MHz

The present 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.

The present document does not apply to:

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

as defined in ITU-R Recommendation SM.1754 [4].

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 (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".

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# 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>.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

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 (V1.2.1): "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".

## 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.

- [2] 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".
- [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
- [4] ITU-R Recommendation SM.1754: "Measurement techniques of ultra-wideband transmissions".
- [5] 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.
- [6] ECC/DEC(07)01 Decision of 30 March 2007 on Building Material Analysis (BMA) devices using UWB technology.

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# 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.

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## 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].

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## 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 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)**

<b>Harmonized Standard EN 302 435-2</b>						
The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
<b>Essential Requirement</b>			<b>Requirement Conditionality</b>		<b>Test Specification</b>	
<b>No</b>	<b>Description</b>	<b>Reference: Clause No</b>	<b>U/C</b>	<b>Condition</b>	<b>E/O</b>	<b>Reference: Clause No</b>
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:

#### Essential Requirement:

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

<b>Description</b>	A textual reference to the requirement.
<b>Clause Number</b>	Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.
<b>Requirement Conditionality:</b>	
<b>U/C</b>	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).
<b>Condition</b>	Explains the conditions when the requirement shall or shall not be applicable for a technical requirement which is classified "conditional".
<b>Test Specification:</b>	
<b>E/O</b>	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).
<b>NOTE:</b>	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.
<b>Clause Number</b>	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

Language	EN title
Bulgarian	Електромагнитна съвместимост и въпроси на радиоспектъра (ERM). Радиосъоръжения с малък обсег на действие (SRD). Технически характеристики на SRD радиосъоръжения, използващи свръхшироколентовата (UWB) технология. Анализ на строителни материали и класификация на приложими съоръжения, работещи в честотния обхват от 2,2 GHz до 8 GHz. Част 2: Хармонизиран европейски стандарт (EN), покриващ съществените изисквания на член 3.2 от Директивата за радиосъоръжения и крайни далекосъобщителни устройства (R&TTEd)
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) – Zařízení krátkého dosahu (SRD) – Technické vlastnosti zařízení SDR používající technologie velmi širokého pásma (UWB) – Aplikace zařízení pro analýzu a klasifikaci stavebních materiálů, pracujících v kmitočtovém pásmu od 2,2 GHz do 8 GHz – Část 2: Harmonizovaná EN pokrývající základní požadavky článku 3.2 Směrnice R&TTE
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 WideBand 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 the essential requirements of article 3.2 of the R&TTE Directive
Estonian	Elektromagnetilise ühilduvuse ja raadiospektri küsimused (ERM); Lähitoimeseadmed (SRD); Ultralairiba (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	Télécommunications - CEM et spectre radioélectrique (ERM) Appareils à courte portée -(SRD) - Caractéristiques techniques pour les équipements courtes portées (SRD) utilisant la technologie à bande ultra-large (UWB) Analyse des matériaux de construction et classifications des applications relatives aux équipements opérant dans la bande de fréquence de 2,2 GHz à 8 GHz- Partie 2 : EN harmonisée couvrant les exigences essentielles de l'article 3.2 de la Directive R&TTE
German	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM) – Funkanlagen mit geringer Reichweite (SRD) – Technische Kennwerte für SRD-Einrichtungen, die Ultraweitbandtechnik (UWB) verwenden – Anwendungen für Geräte zur Baumaterialanalyse und Klassifizierung, die im Frequenzband von 2,2 GHz bis 8 GHz arbeiten – Teil 2: Harmonisierte EN, die wesentliche Anforderungen nach Artikel 3.2 der R&TTE
Greek	Ηλεκτρομαγνητική Συμβατότητα και Θέματα Ραδιοφάσματος (ERM) - Συσκευές μικρής εμβέλειας (SRD) - Τεχνικά χαρακτηριστικά για εξοπλισμό SRD που χρησιμοποιεί υπερευρυζωνική 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 ουσιαστών απαιτήσεων του άρθρου 3.2 της Οδηγίας R&TTE
Hungarian	Elektromágneses összeférhetőségi és rádióspektrumügyek (ERM). Kis hatótávolságú eszközök (SRD). Ultraszéles sávú (UWB) technikát használó kis hatótávolságú eszközök műszaki jellemzői. A 2,2 GHz-től 8 GHz-ig terjedő frekvenciasávban működő, építőanyagokat elemző és osztályozó készülékalkalmazások. 2. rész: Az R&TTE-irányelv 3. cikke (2) bekezdésének alapvető követelményeit tartalmazó, harmonizált európai szabvány
Icelandic	
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

Language	EN title
Latvian	Elektromagnētiskā saderība un radiofrekvenču spektra jautājumi (ERM). Maza darbības attāluma ierīces (SRD). SRD iekārtu tehniskie parametri, kas izmanto ultraplātjoslas 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 būtiskajām prasībām
Lithuanian	Elektromagnetinio suderinamumo ir radijo dažnių spektro dalykai. Trumpojo nuotolio įtaisai. Trumpojo nuotolio įtaisų, naudojančių ultraplačios juostos technologiją, techninės charakteristikos. Statybinių medžiagų tyrimo ir klasifikavimo taikmenys, veikiantys 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	Kompatibilità elettromanjetika u materji relatati ma' spettru radjofoniku (ERM); Apparati ta' Medda Qasira (SRD); Karatteristiċi teknici għal taġġmir 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
Norwegian	Elektromagnetisk kompatibilitet og radiospektrumsaker (ERM); Kortholdsutstyr (SRD); Tekniske karakteristikk for SRD utstyr som bruker ultrabredbnd teknologi (UWB); Utstyr for analyse og klassifisering av bygningsmateriale som opererer i frekvensbnd fra 2,2 GHz til 8 GHz; Del 2: Harmonisert EN som dekker de grunnleggende krav i R&TTE-direktivets artikkel 3.2
Polish	Kompatybilność elektromagnetyczna i zagadnienia widma radiowego (ERM) - Urządzenia bliskiego zasięgu (SRD) - Parametry techniczne urządzeń SRD wykorzystujących technologię ultra szerokopasmową (UWB) - Analiza budowy i klasyfikacja urządzeń pracujących w zakresie częstotliwości od 2,2 GHz do 8 GHz - Część 2: Zharmonizowana EN zapewniająca spełnienie zasadniczych wymagań zgodnie z artykułem 3.2 dyrektywy R&TTE
Portuguese	Assuntos de Espectro Radioelétrico e Compatibilidade Electromagnética (ERM); Equipamentos de Curto Alcance (SRD); Características técnicas de Equipamentos de Curto Alcance (SRD) que utilizem tecnologia de Banda Ultra Larga (UWB); Aplicações para Análise e Classificação de Materiais de Construção operando na faixa de frequências de 2,2 GHz a 8 GHz; Parte 2: EN Harmonizada cobrindo os requisitos essenciais no âmbito do artigo 3.º, n.º 2, da Directiva R
Romanian	
Slovak	Elektromagnetická kompatibilita a záležitosti rádiového spektra (ERM). Zariadenia s krátkym dosahom (SRD). Technické charakteristiky zariadení SRD využívajúcich technológiu 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	Cuestiones de compatibilidad electromagnética y espectro de radiofrecuencia (ERM); Dispositivos de Corto Alcance (SRD) que utilizan tecnología de ultra banda ancha (UWB); aplicaciones para el análisis y la clasificación de material de construcción, equipos que trabajan en la banda de frecuencia de 2,2 GHz a 8 GHz; Parte 2: Norma Europea (EN) armonizada cubriendo los requisitos esenciales según el artículo 3.2 de la Directiva R&TTE
Swedish	Elektromagnetisk kompatibilitet och radiospektrumfrågor (ERM); Kortdistansutrustning (SRD); Tekniska egenskaper för SRD-utrustning som använder teknik med extrem bandbredd (UWB); Utrustning för analys av byggnadsmaterial och klassificering arbetande i frekvensband från 2,2 GHz till 8 GHz; Del 2: Harmoniserad EN omfattande väsentliga krav enligt artikel 3.2 i R&TTE-direktivet

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## 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".

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## History

<b>Document history</b>			
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