

ETSI EN 302 066-2 V1.2.1 (2008-02)

Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Ground- and Wall- Probing Radar applications (GPR/WPR)
imaging systems;
Part 2: Harmonized EN covering essential requirements
of article 3.2 of the R&TTE Directive**



Reference

REN/ERM-TG31A-0113-2

Keywords

radar, radio, regulation, SRD, testing, UWB

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/chaicor/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 2008.
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.

Contents

Intellectual Property Rights	4
Foreword.....	4
Introduction	4
1 Scope	5
2 References	5
2.1 Normative references	6
3 Definitions, symbols and abbreviations	6
3.1 Definitions	6
3.2 Symbols.....	6
3.3 Abbreviations	6
4 Technical requirements specifications	6
4.1 Environmental conditions.....	6
4.1.1 Environmental profile	6
4.1.2 Power supply	6
4.2 Conformance requirements	6
4.2.1 Frequency band of operation	6
4.2.2 Undesired Emissions.....	7
4.2.3 Calculation of the maximum mean e.i.r.p. spectral density	7
4.2.4 Deactivation mechanism requirements	7
5 Testing for compliance with technical requirements.....	7
5.1 Environmental conditions for testing	7
5.2 Essential radio test suites.....	7
5.2.1 Frequency band of operation	7
5.2.2 Undesired Emissions.....	7
5.3 Interpretation of results and measurement uncertainty.....	7
Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT).....	8
Annex B (informative): The EN title in the official languages	10
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 has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (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").

The document responds to the EC mandate M/329 for Harmonized Standards covering Ultra-WideBand applications.

Technical specifications relevant to Directive 1999/5/EC are given in annex A.

The present document is part 2 of a multi-part deliverable covering the Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall- Probing Radar applications, as identified below:

Part 1: "Technical characteristics and test methods";

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

National transposition dates	
Date of adoption of this EN:	22 February 2008
Date of latest announcement of this EN (doa):	31 May 2008
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2008
Date of withdrawal of any conflicting National Standard (dow):	30 November 2009

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 (see bibliography).

1 Scope

The present document specifies the requirements for Ground- and Wall- Probing Radar imaging systems applications. Ground Probing Radars (GPR) and Wall Probing Radars (WPR) are used in survey and detection applications.

The scope is limited to GPR and WPR radars, in which the system is in close proximity to the materials being investigated. It does not include radars operated from aircraft or spacecraft.

The GPR/WPR applications in the present document are not intended for communications purposes, and the intended signal is not radiated into free space.

NOTE: Equipment covered by the present document is intended to be used by competent professional personnel.

The present document applies to:

- 1) Ground Probing Radars (GPR) operating over approximately one decade in the frequency range 30 MHz to 12,4 GHz radiating directly downwards into the ground. Any horizontal radiation from this equipment is caused by leakage and is considered as undesired emission.
- 2) Wall Probing Radars (WPR) operating in the frequency range 30 MHz to 12,4 GHz radiating directly into a "wall". The "wall" is a building material structure, the side of a bridge, the wall of a mine or another physical structure that absorbs a significant part of the signal transmitted by the radar.
- 3) Equipment fitted with integral antennas and without antenna connector.
- 4) Equipment which uses different imaging heads (antennas) with an antenna connector, to allow operation at different frequencies.

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.

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 will apply to equipment within the scope of the present document.

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 302 066-1 (V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall- Probing Radar applications (GPR/WPR) imaging systems; 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 EN 302 066-1 [1] and the following apply:

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

3.2 Symbols

For the purposes of the present document, the symbols given in EN 302 066-1 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in EN 302 066-1 [1] apply.

4 Technical requirements specifications

4.1 Environmental conditions

4.1.1 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.

4.1.2 Power supply

All the characteristics and essential requirements applying to the equipment shall be fulfilled within the range of all declared operational conditions of the power supply.

Power supply may be e.g. an external battery or a stabilized power supply.

4.2 Conformance requirements

4.2.1 Frequency band of operation

The frequency band of operation shall not exceed the limits specified in clause 8.1.3 of EN 302 066-1 [1].

4.2.2 Undesired Emissions

The undesired emissions shall not exceed the limits specified in clause 8.2.3 of EN 302 066-1 [1].

4.2.3 Calculation of the maximum mean e.i.r.p. spectral density

The maximum mean e.i.r.p. spectral density which is based on the peak values measured according to EN 302 066-1 [1] (see clause 8.2.2) shall be calculated and shall not exceed the limits as defined in annex D of EN 302 066-1 [1].

4.2.4 Deactivation mechanism requirements

The deactivation mechanism requirements are defined in EN 302 066-1 [1], annex B.

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 Frequency band of operation

The test defined in clause 8.1.2 of EN 302 066-1 [1] shall be carried out.

5.2.2 Undesired Emissions

The test defined in clause 8.2.2 of EN 302 066-1 [1] for the measurement of peak power shall be carried out and the mean power shall be calculated as set out in annex D of EN 302 066-1 [1].

5.3 Interpretation of results and measurement uncertainty

Clause 7 of EN 302 066-1 [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 302 066-2						
The following essential requirements and test specifications are relevant to the presumption of conformity under Article 3.2 of the R&TTE Directive						
Essential Requirement			Requirement Conditionality		Test Specification	
No	Description	Reference: Clause No	U/C	Condition	E/O	Reference: Clause No
1	Frequency range of operation	4.2.1	U		E	5.2.1
2	Undesired Emissions	4.2.2	U		E	5.2.2
3	Calculation of the maximum mean e.i.r.p. spectral density	4.2.3	U		X	
4	Deactivation mechanism requirements	4.2.4	U		X	

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.

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

Language	EN title
Bulgarian	Електромагнитна съвместимост и въпроси на радиоспектъра (ERM). Устройства с малък обем на действие (SRD). Приложения за използване на радара за земно и преградно проучване. Част 2: Хармонизиран европейски стандарт (EN) според член 3.2 от Директивата за радиосъоръжения и крайни далекосъобщителни устройства (R&TTE)
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) - Zařízení krátkého dosahu (SRD) - Aplikace radarového sondování země a zdi - Část 2: Harmonizovaná EN pokrývající základní požadavky článku 3.2 Směrnice R&TTE
Danish	Elektromagnetisk kompatibilitet og spektrumanliggende (ERM); Apparater med kort rækkevidde (SRD); Radarsystemer til jord og murværk; Del 2: Harmoniseret EN, der dækker de væsentlige krav i R&TTE direktivets artikel 3.2
Dutch	Elektromagnetische compatibiliteit en radiospectrumaangelegenheden (ERM); Kort bereik apparatuur (SRD); Radartoepassing voor bodem en wand sondering; Deel 2: Geharmoniseerde EN welke invulling geeft aan de essentiële eisen van artikel 3.2 van de R&TTE Directive
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall- Probing Radar applications (GPR/WPR) imaging systems; 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); Pinnase ja seinade sondeerimisradarite rakendused; Osa 2: Harmoneeritud EN R&TTE direktiivi artikli 3.2 põhinõuete alusel
Finnish	Sähkömagneettinen yhteensopivuus ja radiospektriasiat (ERM); Lyhyen kantaman laitteet (SRD); Maa- ja seinätutkasovellukset; 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) Applications terrestres et radars d'inspection et sondage de murs- 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) - Boden- und wandsondierende Radaranwendungen - Teil 2: Harmonisierte EN, die wesentliche Anforderungen nach Artikel 3.2 der R&TTE- Richtlinie enthält
Greek	Ηλεκτρομαγνητική Συμβατότητα και Θέματα Ραδιοφάσματος (ERM) - Συσκευές μικρής εμβέλειας (SRD) - Εφαρμογές ραντάρ ανίχνευσης εδάφους και ραντάρ ανίχνευσης τοίχων - Μέρος 2: Εναρμονισμένο EN για την κάλυψη των ουσιωδών απαιτήσεων του Αρθρου 3.2 της Οδηγίας R&TTE
Hungarian	Elektromágneses összeférhetőségi és rádióspektrumügyek (ERM). Kis hatótávolságú eszközök (SRD). Talaj- és falvizsgáló radaralkalmazások. 2. rész: Az R&TTE-irányelv 3. cikke (2) bekezdésének alapvető követelményeit tartalmazó, harmonizált európai szabvány
Icelandic	
Italian	Compatibilità elettromagnetica e problematiche di spettro radio (ERM); Sistemi di mappatura mediante applicazioni di radar per l'ispezione del suolo (GPR/WPR); Parte2: Norma armonizzata relativa ai requisiti essenziali dell'articolo 3, paragrafo 2, della Direttiva R&TTE
Latvian	Elektromagnetiska saderība un radiofrekvencu spektra jautājumi (ERM). Maza darbības attāluma iekārtas; Pamatu un sienu zondēšanas radari. 2.dala: Harmonizēts Eiropas standarts (EN), kas atbilst R&TTE direktīvas 3.2. punkta būtiskām prasībām
Lithuanian	Elektromagnetinio suderinamumo ir radijo dažnių spektro dalykai. Žemės ir sienų zondavimo radarų vizualizavimo sistemų taikmenys; 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); Applikazzjonijiet għal Radar dirett lejn l-Art u lejn Strutturi solidi (GPR/WPR) sistemi ta' imajini; Parti 2: EN armonizzata taħt l-artiklu 3.2 tad-Direttiva R&TTE
Norwegian	Elektromagnetisk kompatibilitet og radiospektrumsaker (ERM); Kortdistanseutstyr (SRD); Radaranvendelser for undersøking av grunn og vegger; Del 2: Harmonisert EN som dekker de grunnleggende krav i R&TTE-direktivets artikkel 3.2
Polish	Kompatybilność elektromagnetyczna i zagadnienia widma radiowego (ERM) - Systemy zobrazowania radarowego (GPR/WPR) sondazu gruntu i ścian - 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); Aplicações para Radares de Sondagem de Solos e Paredes; Parte 2: EN Harmonizada cobrindo os requisitos essenciais no âmbito do artigo 3.º, n.º 2, da Directiva R&TTE
Romanian	Compatibilitate electromagnetică și probleme ale spectrului radio (ERM); Aplicații ale radarelor de explorare a pământului și explorare de perete. Partea 2: EN armonizat acoperind cerințele esențiale ale articolului 3.2 al Directivei R&TTE
Slovak	Elektromagnetická kompatibilita a záležitosti rádiového spektra (ERM). Zobrazovacie systémy pre aplikácie radarového sondovania zeme a stien (GPR/WPR). Časť 2: Harmonizovaná EN vzťahujúca sa na základné požiadavky podľa článku 3.2 smernice R&TTE

Language	EN title
Slovenian	Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) - Uporaba sistemov za slikanje pri radarjih za sondiranje tal in zidov (GPR/WPR) imaging systems - 2. del: Harmonizirani EN, ki zajema bistvene zahteve člena 3.2 direktive R&TTE
Spanish	Cuestiones de Compatibilidad Electromagnética y Espectro de Radiofrecuencia (ERM); Sistemas de visualización de aplicaciones de Radar penetrante en Suelos y Muros (GPR/WPR); Parte 2: Norma Europea (EN) armonizada cubriendo los requisitos esenciales según el artículo 3.2 de la Directiva RTTE
Swedish	Elektromagnetisk kompatibilitet och radiospektrumfrågor (ERM); Kortdistansutrustningar (SRD); Radartillämpningar för mark- och väggundersökning; Del 2: Harmoniserad EN enligt artikel 3.2 i R&TTE-direktivet

Annex C (informative): Bibliography

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".

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

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).

EC Mandate M/329, Standardization Mandate forwarded to CEN/CENELEC/ETSI in the field of Information Technology and Telecommunications: "Harmonized standards covering Ultrawide band (UWB) applications".

NOTE: See <http://europa.eu.int/comm/enterprise/rte/harstand.htm>.

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.

ECC/DEC/(06)08: "ECC Decision of 1 December 2006 on the conditions for use of the radio spectrum by Ground- and Wall- Probing Radar (GPR/WPR) imaging systems".

History

Document history		
V1.1.1	September 2005	Publication
V1.2.1	May 2007	Public Enquiry PE 20070921: 2007-05-23 to 2007-09-21
V1.2.1	December 2007	Vote V 20080222: 2007-12-24 to 2008-02-22
V1.2.1	February 2008	Publication