

Draft **ETSI EN 302 066-2** V1.2.1 (2007-05)

Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Short Range Devices (SRD);
Ground- and Wall- Probing Radar applications;
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 2007.
All rights reserved.

DECT™, **PLUGTESTS™** and **UMTS™** are Trade Marks of ETSI registered for the benefit of its Members.
TIPHON™ and the **TIPHON logo** are Trade Marks currently being registered by ETSI 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	5
1 Scope	6
2 References	7
3 Definitions, symbols and abbreviations	7
3.1 Definitions	7
3.2 Symbols.....	7
3.3 Abbreviations	7
4 Technical requirements specifications	8
4.1 Environmental conditions.....	8
4.1.1 Environmental profile	8
4.1.2 Power supply	8
4.2 Conformance requirements	8
4.2.1 Frequency band of operation	8
4.2.2 Emissions.....	8
4.2.3 Calculation of the maximum mean e.i.r.p. spectral density	8
4.2.4 Maximum mean power spectral density (e.i.r.p.) in the frequency bands from 1 164 MHz to 1 215 MHz and 1 559 MHz to 1 610 MHz	8
4.2.5 Deactivation mechanism requirements	8
5 Testing for compliance with technical requirements.....	8
5.1 Environmental conditions for testing	8
5.2 Essential radio test suites.....	9
5.2.1 Frequency band of operation	9
5.2.2 Emissions.....	9
5.2.3 Maximum mean spectral density (e.i.r.p.) in the frequency bands from 1 164 MHz to 1 215 MHz and 1 559 MHz to 1 610 MHz	9
5.3 Interpretation of results and measurement uncertainty.....	9
Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT).....	10
Annex B (informative): The EN title in the official languages	12
Annex C (informative): Bibliography	13
History	14

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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [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 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") [1].

The document responds to the EC mandate M/329 for Harmonized Standards covering Ultra-WideBand applications [3].

Technical specifications relevant to Directive 1999/5/EC [1] 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); Short Range Devices (SRD); 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".

The present document also contains additional technical requirements as a result of ECC Decision ECC/DEC(06)08 [5]. These requirements are set out in normative annex D of EN 302 066-1 [2].

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 [1]. 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 applications operating in all or part of the frequency band from 30 MHz to 12,4 GHz.

Ground Probing Radars (GPR) and Wall Probing Radars (WPR) are used in survey and detection applications.

The scope is limited to radars operated as short range devices (because of their usage and design), in which the system is in close proximity to the materials being investigated. It does not include radars operated from aircraft or spacecraft.

The radar applications in the present document are not intended for communications purposes. Their intended usage excludes radiation into the free space and means shall be taken to keep it to a minimum.

NOTE 1: Equipment using the frequencies typically below 100 MHz may use higher output power for geophysical applications and therefore, may not fulfil the emission requirements set out in the present document.

NOTE 2: Equipment covered by the present document is used by competent professional personnel.

The present document applies to:

- 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.
- 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.
- Equipment fitted with integral antennas and without antenna connector.
- Equipment which uses different imaging heads (antennas) with an antenna connector, to allow operation at different frequencies.

EN 302 066-1 [2] 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 the technical characteristics and test methods for Ground- and Wall- Probing Radar applications.

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

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 [1] will apply to equipment within the scope of the present document.

The document responds to the EC mandate M/329 for Harmonized Standards covering Ultra-WideBand (UWB) applications [3].

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>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

- [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 302 066-1 (V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ground- and Wall- Probing Radar applications; Part 1: Technical characteristics and test methods".
- [3] EC Mandate M/329, Standardisation 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/rtte/harstand.htm>.

- [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.
- [5] 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".

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], EN 302 066-1 [2] 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 [2] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in EN 302 066-1 [2] 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 [2].

4.2.2 Emissions

The undesired emissions shall not exceed the limits specified in clause 8.2.3 of EN 302 066-1 [2].

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 [2] (see clause 8.2.2) is calculated as defined in annex D of EN 302 066-1 [2].

4.2.4 Maximum mean power spectral density (e.i.r.p.) in the frequency bands from 1 164 MHz to 1 215 MHz and 1 559 MHz to 1 610 MHz

The maximum mean power spectral density (e.i.r.p.) shall not exceed the limits specified in clause 8.3.3 and annex D of EN 302 066-1 [2].

4.2.5 Deactivation mechanism requirements

The deactivation mechanism requirements are defined in EN 302 066-1 [2], 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 [2] shall be carried out.

5.2.2 Emissions

The test defined in clause 8.2.2 of EN 302 066-1 [2] shall be carried out.

5.2.3 Maximum mean spectral density (e.i.r.p.) in the frequency bands from 1 164 MHz to 1 215 MHz and 1 559 MHz to 1 610 MHz

The test defined in 8.3.2 of EN 302 066-1 [2] shall be carried out.

5.3 Interpretation of results and measurement uncertainty

Clause 4.5 of EN 302 066-1 [2] 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;
- it provides a statement of all the test procedure 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 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;

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	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	Maximum mean spectral density	4.2.4	C	Depends on the different frequency ranges. Frequency ranges are from 1 164 MHz to 1 215 MHz and 1 559 MHz to 1 610 MHz.	E	5.2.3
5	Deactivation mechanism requirements	4.2.5	U		X	

Key to columns:**Essential Requirement:**

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

Description A textual reference to the Essential Requirement.

Reference: Clause Number

Identification of clause(s) defining the essential 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 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 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.

Reference: 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	
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) – Zařízení krátkého dosahu (SRD) – Aplikace radarového sondování země a zdi – Část 2: Harmonizovaná EN podle článku 3.2 Směrnice R&TTE
Danish	Elektromagnetisk kompatibilitet og spektrumanliggender (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); Radartoepassingen voor bodem en wand-sondering; Deel 2: Geharmoniseerde EN onder artikel 3.2 van de R&TTE Directive
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ground- and Wall- Probing Radar applications; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
Estonian	Elektromagnetilise ühilduvuse ja raadiospektri küsimused (ERM); Lähitoimeseadmed; Pinnase ja seinä sondeerimisradarid; Osa 2: Harnoneeritud EN R&TTE direktiivi artikli 3.2 alusel
Finnish	Sähkömagneettinen yhteensopivuus ja radiospektriasiat (ERM); Lyhyen kantaman laitteet; Maa- ja pintatutkasovellukset; Osa 2: R&TTE-direktiivin artiklaan 3.2 perustuva yhdenmukaistettu standardi
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 geringer Reichweite; Boden- und Wandradaranwendungen; Teil 2: Harmonisierte Europäische Norm gemäß Artikel 3.2 der R&TTE- Richtlinie
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 του Άρθρου 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 3.2. cikkelye alá tartozó, harmonizált európai szabvány
Icelandic	
Italian	Compatibilità elettromagnetica e problematiche di Spettro Radio (ERM); Dispositivi a breve portata (SRD); Applicazioni radar per le indagini del sottosuolo e per le indagini verticali; Parte 2: Norma armonizzata relativa ai requisiti essenziali dell'articolo 3.2 della direttiva R & TTE
Latvian	
Lithuanian	Elektromagnetinio suderinamumo ir radijo dažnių spektro dalykai. Trumpojo nuotolio įtaisai. Žemės ir sienų zondavimo radarų taikymas. 2 dalis. Darnusis Europos standartas pagal 1999/5/EC* direktyvos 3.2 straipsnį
Maltese	Kompatibilità elettromanjetika u materji relatati ma' spettru radjofoniku (ERM); Apparati ta' Medda Qasira (SRD); Applikazzjonijiet għal Radar dirett lejn l-Art u lejn Strutturi solidi; Parti 2: EN armonizzata taħt l-artiklu 3.2 tad-Direttiva R&TTE
Norwegian	Elektromagnetisk kompatibilitet og radiospektrums spørsmål (ERM); Kortdistanseutstyr (SRD); Radaranvendelser for utforsking av grunn og vegger; Del 2: Harmonisert EN under artikkel 3.2 i R&TTE-direktivet
Polish	Kompatybilność Elektromagnetyczna i Zagadnienia Widma Radiowego (ERM) - Urządzenia bliskiego zasięgu (SRD); Zastosowania radaru do próbkowania gruntu i ścian - Część 2: Zharmonizowana EN zgodna z wymaganiami artykułu 3.2 dyrektywy R&TTE
Portuguese	
Romanian	
Slovak	Elektromagnetická kompatibilita a závislosti rádiového spektra (ERM). Zariadenia s krátkym dosahom (SRD). Aplikácie radarového sondovania zeme a stien. Časť 2: Harmonizovaná EN podľa článku 3.2 smernice R&TTE
Slovenian	Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) – Naprave kratkega dosega (SRD) – Radarji za sondiranje tal in zidov – 2. del: Harmonizirani EN v skladu s členom 3.2 direktive R&TTE
Spanish	Cuestiones de Compatibilidad Electromagnética y Espectro Radioeléctrico (ERM). Dispositivos de corto alcance (SDR). Aplicaciones de radar penetrante de tierra y pared. Parte 2: EN Armonizada que cubre los requisitos esenciales bajo el artículo 3.2 de la Directiva RTTE
Swedish	Elektromagnetisk kompatibilitet och radiospektrumfrågor (ERM); Kortdistansutrustningar (SRD); 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).

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