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Candidate Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 32: Specific conditions for
Ground and Wall Probing Radar applications**



Reference

DEN/ERM-EMC-230-32

Keywords

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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).

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 Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (89/336/EEC [3] as amended) and 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" [2]).

The present document is part 32 of a multi-part deliverable. Full details of the entire series can be found in EN 301 489-1 [1].

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1 Scope

The present document, together with EN 301 489-1 [1] covers the assessment of Ground and Wall-Probing Radar applications (GPR and WPR) and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of GPR and WPR are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

The present document specifies the applicable test conditions, performance assessment, and performance criteria for GPR and WPR and the associated ancillary equipment.

Definitions of the types of GPR and WPR covered by the present document are given in annex A.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and the EN 301 489-1 [1], the provisions of the present document take precedence.

The environmental classification and the emission and immunity requirements used in the present document are as stated in the EN 301 489-1 [1], except for any special conditions included in the present document.

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] ETSI EN 301 489-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".
- [2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [3] 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).
- [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] ETSI EN 302 066-1: "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 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 489-1 [1], clause 3 and the following apply:

Ground Probing Radar (GPR): radar application and equipment, used to probe and examine/analyse sub-surface material and or structure

Wall Probing Radar (WPR): radar applications and equipment used to examine/analyse material in walls

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CR	Continuous phenomena applied to Receivers
CT	Continuous phenomena applied to Transmitters
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
GPR	Ground Probing Radar, Ground Penetrating Radar, Sub-surface Radar or Ground Radar
SRD	Short Range Device
TR	Transient phenomena applied to Receivers
TT	Transient phenomena applied to Transmitters
WPR	Wall Probing Radar

4 Test conditions

For the purposes of the present document, the test conditions of the EN 301 489-1 [1], clause 4, shall apply as appropriate. Further product related test conditions for GPR and WPR are specified in the present document.

4.1 General

For emission and immunity tests the normal test modulation, test arrangements, etc. as specified in the present document, clauses 4.1 to 4.5, shall apply. During the test the Equipment Under Test (EUT) shall be operated as intended and for this type of equipment no test modulation is required.

For equipment which has the capability of using different imaging heads, each one shall be tested independently.

For the appropriate emission and immunity tests on all ports except the enclosure the tests shall be carried out as described in EN 302 066-1 [5], clauses 8.2.2 and annex A.

4.2 Arrangements for test signals

GPR and WPR equipment process signals using transmitters which emit repetitive or random pulses. The equipment presents the received signal as either, an analogue time varying voltage (detector output), which has a much slower time variation than the original signal, or as a digitized version of the time varying detector output. To confirm that the equipment is operational during testing, the manufacturer shall provide means, which allow monitoring of the analogue or digital information.

4.3 Exclusion bands

Not applicable.

4.3.1 Exclusion bands for receivers

Not applicable.

4.3.2 Exclusion band for transmitters

Not applicable.

4.4 Narrow band responses of receivers

Not applicable.

4.5 Normal test modulation

Not Applicable.

5 Performance assessment

5.1 General

The provision of EN 301 489-1 [1], clause 5.1 shall apply.

The manufacturer shall at the time of submission of the equipment for test, supply the necessary general information as requested in EN 301 489-1 [1], clause 5.1. Additionally he shall supply the following product-related information.

For the EUT the performance assessment is based on:

- the maintenance of function(s);
- the way the eventual loss of function(s) can be recovered;
- unintentional behaviour of the EUT.

5.2 Equipment which can provide a continuous communications link

Not applicable.

5.3 Equipment which does not provide a continuous communications link

This type of equipment does not provide a communication link. The equipment normally has an operational duty cycle that is specified by the manufacturer.

5.4 Ancillary equipment

The provisions of EN 301 489-1 [1], clause 5.4 shall apply.

5.5 Equipment classification

The provisions of EN 301 489-1 [1], clause 5.5 shall apply.

6 Performance criteria

6.1 General performance criteria

The performance criteria for GPR and WPR equipment during and after immunity test are specified in this clause:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature.

The equipment shall meet the performance criteria as specified in the following clauses, for GPR and WPR equipment.

GPR and WPR equipment, may not operate fully during immunity tests, but will recover and operate normally after the tests.

6.2 Performance table

Table 1: Performance table

GPR and WPR equipment	
During test	After test
May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions

6.3 Performance criteria for Continuous phenomena applied to Transmitters (CT)

For GPR and WPR which continues operating during the test , this shall be verified by appropriate means supplied by the manufacturer.

The tests shall be repeated with the transmitter of the EUT not switched on (standby mode), to ensure that no unintentional transmission occurs.

6.4 Performance criteria for Transient phenomena applied to Transmitters (TT)

The same conditions as clause 6.3 apply.

6.5 Performance criteria for Continuous phenomena applied to Receivers (CR)

Not applicable.

6.6 Performance criteria for Transient phenomena applied to Receivers (TR)

Not applicable.

6.7 Performance criteria for ancillary equipment tested on a stand alone basis

The provision of EN 301 489-1 [1], clause 6.3 shall apply.

7 Applicability overview

7.1 Emission

7.1.1 General

EN 301 489-1 [1], table 2 contains the applicability of EMC emission measurements to the relevant ports of radar and/or associated ancillary equipment.

7.1.2 Special conditions

Not special conditions applicable.

7.2 Immunity

7.2.1 General

EN 301 489-1 [1], table 3 contains the applicability of EMC immunity measurements to the relevant ports of the GPR and WPR equipment and/or associated ancillary equipment.

7.2.2 Special conditions

No special conditions applicable.

Annex A (informative): Definitions of types of the GPR and WPR in the scope of the present document

The present document applies to Ground Probing and Wall Probing application. Definitions pertaining to this radio equipment are found in the following functional radio standards:

- ETSI EN 302 066-1 [5]: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ground and Wall-Probing Radar applications; Part 1: Technical characteristics and test methods.

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

Language	EN title
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) – Norma pro elektromagnetickou kompatibilitu (EMC) rádiových zařízení a služeb – Část 32: Specifické podmínky pro aplikace radarového sondování země a zdí
Danish	Elektromagnetisk kompatibilitet og spektrumanliggender (ERM); Elektromagnetisk kompatibilitet (EMC) for radioudstyr og tjenester; Del 32 : Særlige krav til radarsystemer til jord og murværk
Dutch	Elektromagnetische compatibiliteit en radiospectrumaangelegenheden (ERM); Elektromagnetische compatibiliteit (EMC) norm voor radioapparatuur en diensten; Deel 32: Specifieke omstandigheden voor radartoepassingen voor bodem en wand sondering
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 32: Specific conditions for Ground and Wall Probing Radar applications
Estonian	Elektromagnetilise ühilduvuse ja raadiospektri küsimused (ERM); Raadioseadmete ja raadiosideteenistuste elektromagnetilise ühilduvuse (EMC) standard; Osa 32: Eritingimused pinnase ja seinä sondeerimisradaritele
Finnish	Sähkömagneettinen yhteensopivuus ja radiospektriasiat (ERM); Sähkömagneettinen yhteensopivuusstandardi (EMC) radiolaitteille ja -järjestelmille; Osa 32: Erityisehdot maa- ja pintatutkasovelluksille
French	Télécommunications - CEM et spectre radioélectrique (ERM) - Norme de compatibilité électromagnétique pour les équipements et les services radio - Partie 32 : conditions spécifiques pour applications terrestres et radars d'inspection et sondage de murs
German	
Greek	Ηλεκτρομαγνητική Συμβατότητα και Θέματα Ραδιοφάσματος (ERM) - Πρότυπο Ηλεκτρομαγνητικής Συμβατότητας (EMC) για ραδιοεξοπλισμό και ραδιοπηρεσίες - Μέρος 32: Είδιες συνθήκες για εφαρμογές ραντάρ ανίχνευσης εδάφους και ραντάρ ανίχνευσης τοίχων
Hungarian	Elektromágneses összeférhetőségi és rádióspektrumügyek (ERM). Rádióberendezések és -szolgáltatások elektromágneses összeférhetőségi (EMC) szabványa. 32. rész: Talaj- és falvizsgáló radaralkalmazásokra vonatkozó sajátos feltételek
Icelandic	
Italian	Compatibilità elettromagnetica e Questioni relative allo spettro delle radiofrequenze (ERM); Norma di Compatibilità elettromagnetica (EMC) per apparecchiature e servizi radio; Parte 32: Condizioni specifiche per applicazioni radar per le indagini del sottosuolo e per le indagini verticali
Latvian	
Lithuanian	Elektromagnetinio suderinamumo ir radijo dažnių spektro dalykai. Radijo ryšio įrangos ir paslaugų elektromagnetinio suderinamumo (EMS) standartas. 32 dalis. Žemės ir sienų zondavimo radarų taikymo specialiosios sąlygos
Maltese	Kompatibilità elettromanjetika u materji relatati ma' spettru radjofoniku (ERM); Standard ta' Kompatibilità Elettromanjetika (EMC) għal tagħmir u servizzi radjofonici; Parti 32: Kondizzjonijiet speċifiċi għal applikazzjonijiet għal Radar dirett lejn l-Art u lejn Strutturi solidi
Norwegian	Elektromagnetisk kompatibilitet og radiospektrumspørsmål (ERM); Standard for elektromagnetisk kompatibilitet (EMC) for radioutstyr og tjenester; Del 32: Spesifikke betingelser for radaranvendelser ved utforsking av grunn og vegger
Polish	Kompatybilność elektromagnetyczna i zagadnienia widma radiowego (ERM) - Norma kompatybilności elektromagnetycznej (EMC) dotycząca urządzeń i systemów radiowych – Część 32: Wymagania szczegółowe dotyczące zastosowań radaru do sondowania gruntu i ścian
Portuguese	
Slovak	Elektromagnetická kompatibilita a závislosti rádiového spektra (ERM). Elektromagnetická kompatibilita (EMC), norma na rádiové zariadenia a služby. Časť 32: Osobitné podmienky na aplikácie radarového sondovania zeme a stien
Slovenian	Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) – Standard elektromagnetne združljivosti (EMC) za radijsko opremo in storitve – 32. del: Posebni pogoji za uporabo radarjev za sondiranje tal in zidov
Spanish	Cuestiones de Compatibilidad Electromagnética y Espectro Radioeléctrico (ERM). Norma de Compatibilidad Electromagnética (CEM) para los equipos y servicios radioeléctricos. Parte 32: Condiciones específicas para aplicaciones de radar penetrante de tierra y pared
Swedish	Elektromagnetisk kompatibilitet och radiospektrumfrågor (ERM); Elektromagnetisk kompatibilitetsstandard (EMC) för radioutrustning och tjänster; Del 32: Specifika villkor för radartillämpningar för mark- och väggundersökningar

History

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