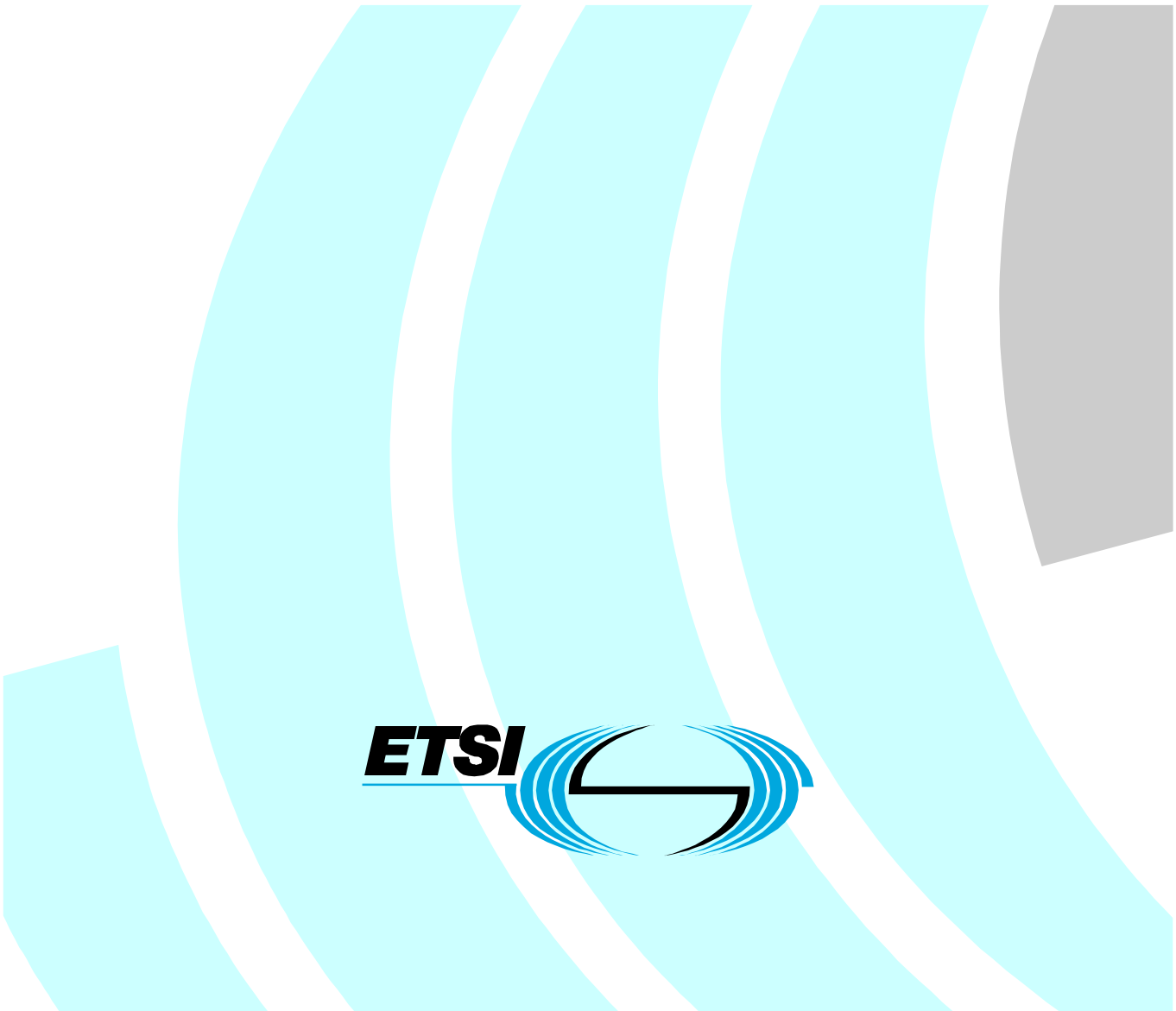
Final draft ETSI EN 302 288-2 V1.2.1 (2005-12)

Candidate Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive



Reference
REN/ERM-TG31B-003-2

Keywords
radar, radio, regulation, RTTT, SRD, testing

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/chaircor/ETSI_support.asp

Copyright Notification

Contents

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 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 ETSI standards One-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 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").

The present document is part 2 of a multi-part deliverable covering Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices, Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range, as identified below:

Part 1: "Technical requirements and methods of measurement";

Part 2: "Harmonized EN covering essential requirements of article 3.2 of 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 [1]. Each standard is a module in the structure. The modular structure is shown in figure 1.

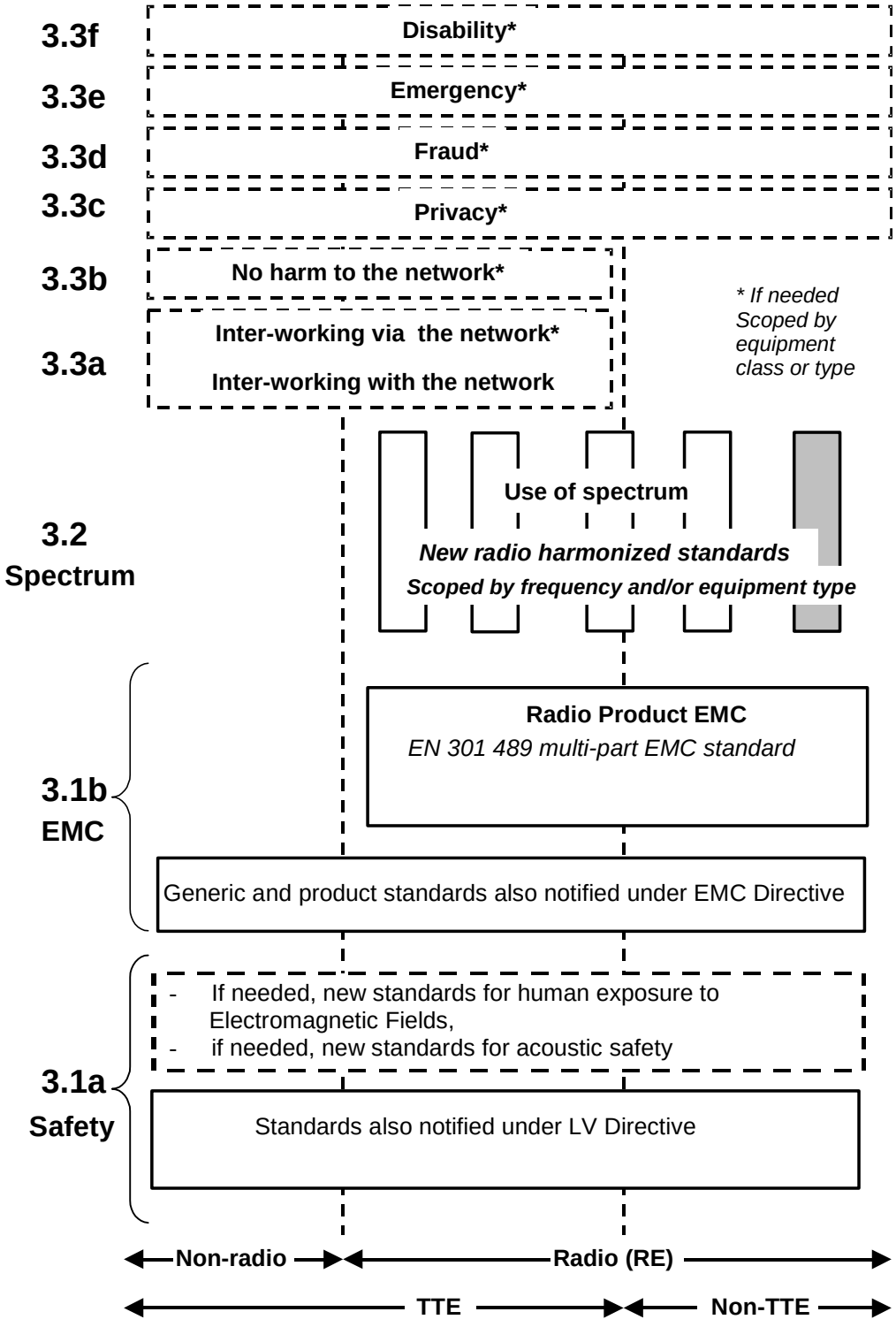


Figure 1: Modular structure for the various standards used under the R&TTE Directive

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

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 [7], 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 [1] 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 [1] 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 decisions

  without 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 applies to Short Range Devices (SRDs) in Road Transport and Traffic Telematics (RTTT) systems as described in the scope of EN 302 288-1 [4]:

- with an integral antenna;
- for ultra low power motion and distance monitoring radars for mobile applications only;
- operating in the 22 GHz to 26,625 GHz frequency range.

The applicability of the present document covers only the 24 GHz Short Range Radar (SRR) for road vehicles. 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.

NOTE: Member States of the European Union are required to prohibit the taking into service of equipment covered by the present document after a date defined in Commission Decision 2005/50/EC (see bibliography).

The present document covers transmitters intended to operate in a temporary frequency designation under the 24 GHz ECC decision ECC/DEC/(04)10) (see bibliography). The application is also subject to the EU Commission decision on 24 GHz SRR EC 2005/50/EC (see bibliography).

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

The present document responds to the EC mandate M/329 [6] for Harmonized Standards covering Ultrawideband (UWB) applications.

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] 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).

[3] 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).

[4] ETSI EN 302 288-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range; Part 1: Technical requirements and methods of measurement".

[5] Void.

[6] M/329: "Harmonised standards covering Ultrawide band (UWB) applications".

NOTE: http://europa.eu.int/comm/enterprise/rtte/harstand.htm.

[7] ETSI EN 301 489 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".

[8] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

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 302 288-1 [4] and the following apply:

environmental profile: range of environmental conditions under which equipment within the scope of EN 302 288-2 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 302 288-1 [4] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations defined in EN 302 288-1 [4] 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.

4.2 Conformance requirements

4.2.1 Transmitter requirements

4.2.1.1 Limits for transmitters in the range from 22,0 GHz to 26,625 GHz

4.2.1.1.1 Permitted range of operating frequencies

The permitted range of operating frequencies shall not exceed the limits specified in clause 7.1.1.3 of EN 302 288-1 [4].

4.2.1.1.2 Maximum radiated average power density (e.i.r.p.)

The maximum radiated average power density (e.i.r.p.) shall not exceed the limits specified in clause 7.1.2.3 of EN 302 288-1 [4].

4.2.1.1.3 Maximum radiated peak power density (e.i.r.p.)

The maximum radiated peak power density (e.i.r.p.) shall not exceed the limits specified in clause 7.1.3.4 of EN 302 288-1 [4].

4.2.1.2 Limits for transmitters in the range from 24,050 GHz to 24,250 GHz

4.2.1.2.1 Permitted range of operating frequencies

The permitted range of operating frequencies shall not exceed the limits specified in clause 7.1.4.2.4 of EN 302 288-1 [4].

4.2.1.2.2 Equivalent isotropically radiated power (e.i.r.p.)

The equivalent isotropically radiated power (e.i.r.p.) shall not exceed the limits specified in clause 7.1.4.1.3 of EN 302 288-1 [4], table 3.

4.2.1.3 Vertical plane emission limits in the range from 23,6 GHz to 24,0 GHz

The vertical emission limits shall not exceed the limits specified in clause 7.1.5.3 of EN 302 288-1 [4].

4.2.1.4 Transmitter spurious and out-of-band emissions

The transmitter unwanted emissions, i.e. spurious and out-of-band emissions, shall not exceed the limits specified in clause 7.2.4 of EN 302 288-1 [4], tables 5 and 6.

4.2.2 Receiver requirements

4.2.2.1 Receiver spurious emissions

The receiver spurious emissions shall not exceed the limits specified in clause 8.1.3 of EN 302 288-1 [4].

4.2.3 Installation requirements

The installation requirements as defined in EN 302 288-1 [4], annex D, shall be applied.

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 Transmitters operating in the 22,0 GHz to 26,625 GHz band

5.2.1.1.1 Permitted range of frequencies

The test defined in clause 7.1.1.2 of EN 302 288-1 [4] shall be carried out.

5.2.1.1.2 Maximum radiated average power density (e.i.r.p.)

The test defined in clause 7.1.2.2 of EN 302 288-1 [4] shall be carried out.

5.2.1.1.3 Maximum radiated peak power density (e.i.r.p.)

The test defined in clause 7.1.3.2 of EN 302 288-1 [4] shall be carried out.

5.2.1.2 Transmitters operating in the 24,050 GHz to 24,250 GHz band

5.2.1.2.1 Permitted range of frequencies

The test defined in clause 7.1.4.2.2 or 7.1.4.2.3 respectively of EN 302 288-1 [4] shall be carried out.

5.2.1.2.2 Equivalent isotropically radiated power (e.i.r.p.)

The test defined in clause 7.1.4.1.2 of EN 302 288-1 [4],

5.2.1.3 Vertical plane transmitter emissions

The test defined in clause 7.1.5.2 of EN 302 288-1 [4] shall be carried out.

5.2.1.4 Transmitter spurious and out-of-band emissions

The tests defined in the clause 7.2.3 of EN 302 288-1 [4] shall be carried out

5.2.2 Receiver test suites

5.2.2.1 Receiver spurious emissions

The receiver spurious emissions shall not exceed the limits specified in clause 8.1.3 of EN 302 288-1 [4].

5.2.3 Installation requirements

The installation requirements as defined in EN 302 288-1 [4], annex D, shall be applied.

5.3 Interpretation of results and measurement uncertainty

Clause 4.4 of EN 302 288-1 [4] shall apply.

The interpretation of the results recorded in a test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether an equipment meets the requirements of the present document;

- the value of the measurement uncertainty for the measurement of each parameter shall be included in the test report;
- the recorded value of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures in table 1.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 [8] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 1 is based on such expansion factors.

Table 1: Maximum Measurement uncertainty

Parameter	Uncertainty
Radio Frequency (out of band)	$\pm 1 \times 10^{-7}$
Radiated Emission (valid to 100 GHz)	±6 dB
Temperature	±1 K
Humidity	±10 %

For the test methods, according to the present document the uncertainty figures shall be calculated according to the methods described in the TR 100 028 [8] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 1 is based on such expansion factors.

The particular expansion factor used for the evaluation of the measurement uncertainty shall be stated.

Annex A (normative): The EN Requirements Table (EN-RT)

The EN Requirements Table (EN-RT)) in Table A1 below 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 A1 it provides a means to assert the 'presumption of conformity' with the HS.

The following technical requirements and test specifications are relevant to the presumption of conformity under Article 3.2 of the R&TTE Directive.

Table A.1: EN Requirements Table (EN-RT)

Harmonized Standard EN 302 288-2							
Technical Requirement reference			Technical Requirement Conditionality		Test Specification		
No.	Description	Reference Clause No	U/C	Condition	E/O	Reference Clause No	Observations
1	Permitted range of operating frequencies	4.2.1.1.1	U		E	5.2.1.1.1	
2	Maximum rated average power density	4.2.1.1.2	U		E	5.2.1.1.2	
3	Maximum rated peak power density	4.2.1.1.3	U		E	5.2.1.1.3	
5	Permitted range of operating frequencies	4.2.1.2.1	U		E	5.2.1.2.1	
6	e.i.r.p.	4.2.1.2.2	U		E	5.2.1.2.2	
9	Vertical plane transmitter emissions	4.2.1.3	U		E	5.2.1.3	
4	Transmitter spurious and out-of-band emissions	4.2.1.4	U		E	5.2.1.4	
7	Receiver spurious emissions	4.2.2.1	U		E	5.2.2.1	
8	Installation requirements	4.2.3	U		E	5.2.3	

Key to columns:

No. Table entry number.

Reference Clause reference number of conformance requirement within the present document.

EN-R Title of conformance requirement within the present document.

Status Status of the entry as follows:

M Mandatory, shall be implemented under all circumstances.

O Optional, may be provided, but if provided shall be implemented in accordance with the requirements.

O.n this status is used for mutually exclusive or selectable options among a set. The integer "n" shall refer to a unique group of options within the EN-RT. A footnote to the EN-RT shall explicitly state what the requirement is for each numbered group. For example, "It is mandatory to support at least one of these options", or, "It is mandatory to support exactly one of these options".

Comments To be completed as required.

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

Language	EN title
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) - Zařízení krátkého dosahu - Telematika v silniční dopravě a provozu (RTTT) - Radarová zařízení krátkého dosahu pracující v pásmu 24 GHz - Část 2: Harmonizovaná EN pokrývající základní požadavky článku 3.2 Směrnice R&TTE
Danish	
Dutch	
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
Estonian	Elektromagnetilise ühilduvuse ja raadiospektri küsimused (ERM); Lähitoimeseadmed; Maanteetranspordi ja liikluse telemaatikaseadmed (RTTT); Sagedusalas 24 GHz töötavad lähitoime radarseadmed; Osa 2: Harmoneeritud EN R&TTE direktiivi artikli 3.2 põhinõuete alusel
Finnish	
French	Compatibilité éléctromagnetique et gestion du spectre radioélectrique; Equipement compte partée, Transport routier et gestion télématique du traffic, Radar courte portée fonctionnant dans la bande 24 GHz ; Partie 2: Norme Européenne harmonisée suivant l'article 3.2 de la directive RTTE
German	Elektromagnetische Verträglichkeit und Funkspektrumsangelegenheiten (ERM); Funkanlagen geringer Reichweite; Strassentransport und Verkehrstelematik (RTTT), Radargeräte mit geringer Reicheite, die im Frequenzbereich von 22,00 bis 26.625 GHz arbeiten Teil 2: Harmonisierte EN, die wesentliche Anforderungen nach Art. 3.2 der R&TTE-Richtlinie enthält.
Greek	
Hungarian	Elektromágneses összeférhetőségi és rádióspektrumügyek (ERM). Rövid hatótávolságú eszközök. Közúti szállítási és forgalmi telematika (RTTT). 24 GHz-es sávban működő rövid hatótávolságú radarberendezés. 2. rész: Az R&TTE-irányelv 3.2. cikkelyének lényegi követelményeit tartalmazó harmonizált európai szabvány
Icelandic	
Italian	Compatibilità elettromagnetica e Questioni relative allo spettro delle radiofrequenze (ERM); Dispositivi a breve portata (SRD); Dispositivi a breve portata (SRD); Sistemi per trasporto stradale e telematica del traffico; Apparecchiatura radar a breve portata da utilizzare nella gamma di frequenza 24 GHz. Parte 2: Norma armonizzata relativa ai requisiti essenziali dell'articolo 3.2 della direttiva R&TTE.
Latvian	
Lithuanian	
Maltese	
Polish	Kompatybilność Elektromagnetyczna i Zagadnienia Widma Radiowego (ERM) - Urządzenia bliskiego zasięgu -Transport drogowy i telematyka transportu drogowego (RTTT) - Urządzenia radarowe bliskiego zasięgu pracujące w zakresie 24 GHz - Część 2: Zharmonizowana EN zapewniająca spełnienie zasadniczych wymagań zgodna z artykułem 3.2 dyrektywy R&TTE
Portuguese	
Slovak	Elektromagnetická kompatibilita a záležitosti rádiového spektra (ERM). Zariadenia s krátkym dosahom. Telematika v cestnej doprave a prevádzke (RTTT). Radarové zariadenia s krátkym dosahom pracujúce v pásme 24 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 - Cestna transportna in prometna telematika (RTTT) - Oprema za radar kratkega dosega, ki deluje v frekvenčnem območju 24 GHz - 2. del: Harmonizirani EN, ki zajema bistvene zahteve člena 3.2 direktive R&TTE
Spanish	
Swedish	

Annex C (informative): Bibliography

Commission Decision 2005/50/EC on the harmonization of the 24 GHZ range radio spectrum for the time-limited use by automotive short-range radar equipment in the Community.

CEPT/ECC/DEC(04)10: "ECC Decision of 12 November 2004 on the frequency bands to be designated for the temporary introduction of Automotive Short Range Radars (SRR)".

CEPT/ERC/REC 70-03: "Relating to the use of Short Range Devices (SRD)".

History

Document history		
V1.1.1	January 2005	Publication
V1.2.1	December 2005	One-step Approval Procedure OAP 20060428: 2005-12-28 to 2006-04-28