

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Short Range Devices;  
Road Transport and Traffic Telematics (RTTT);  
Radar equipment operating in the 76 GHz to 77 GHz  
and 24 GHz range;  
Part 2: Harmonized EN covering essential requirements  
of article 3.2 of the R&TTE Directive**

---



---

**Reference**

REN/ERM-RP08-0410-2

---

**Keywords**

radar, radio, regulation, 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://www.etsi.org/tb/status/>

If you find errors in the present document, send your comment to:  
[editor@etsi.fr](mailto:editor@etsi.fr)

---

**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 2001.  
All rights reserved.

# Contents

Intellectual Property Rights .....	4
Foreword .....	4
Introduction .....	5
1 Scope .....	7
2 References .....	8
3 Definitions, symbols and abbreviations .....	8
3.1 Definitions .....	8
3.2 Symbols .....	8
3.3 Abbreviations .....	8
4 Technical requirements specifications .....	9
4.1 Transmitter requirements .....	9
4.1.1 Effective radiated power .....	9
4.1.2 Permitted range of operating frequencies .....	9
4.1.3 Spurious emissions .....	9
5 Testing for compliance with technical requirements .....	9
5.1 Essential radio test suites .....	9
5.1.1 Environmental conditions for testing .....	9
5.1.1.1 Normal and extreme test-conditions .....	9
5.1.1.2 Test power source .....	9
5.1.2 Choice of samples for test suites .....	9
5.1.3 Permitted range of operation frequencies .....	9
5.1.4 Spurious emissions .....	10
6 Interpretation of measurement results .....	10
<b>Annex A (informative): Bibliography .....</b>	<b>11</b>
History .....	12

# 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://www.etsi.org/ipr>).

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 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 (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 [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 the Short Range Devices; Road Transport and Traffic Telematics (RTTT); Radar equipment operating in the 76 GHz to 77 GHz and 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.

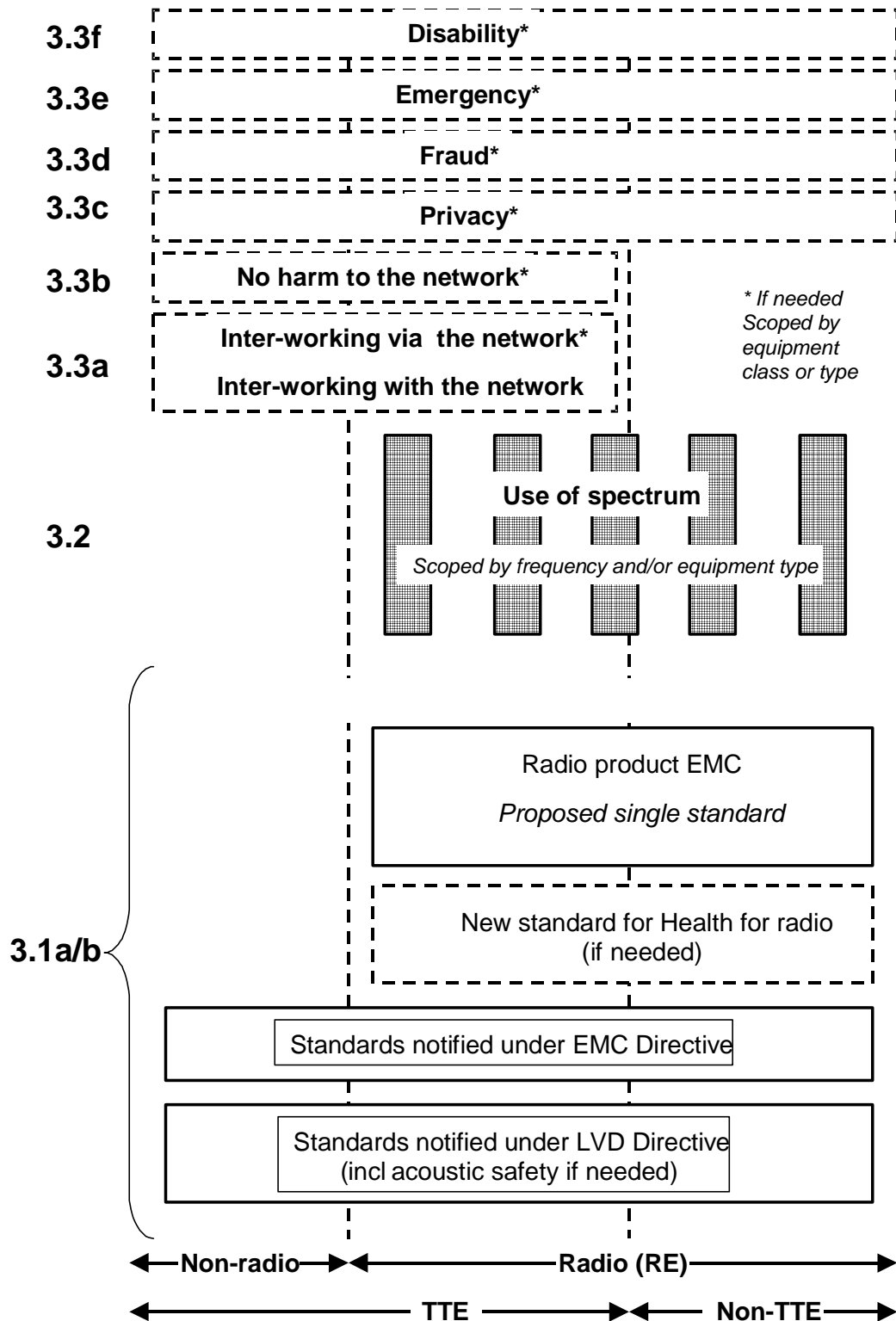


Figure 1: Modular structure for the various standards used under the R&TTE Directive

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

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum. 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 3.3 various horizontal boxes are shown. Their dotted lines indicate that 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 bottom of figure 1 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. The General Standard will always apply to it, and 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 is adopted by the Commission and if the equipment in question lies within the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the Directive may be covered in just the General Standard or in a set of standards that includes the General Standard.

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 under articles 3.2 and 3.3 to be added when new frequency bands are agreed or when the Commission takes decisions under article 3 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) transmitters and receivers for RTTT applications:

- a) transmitters operating in range from 76 GHz to 77 GHz with peak power levels ranging up to 55 dBm;
- b) receivers operating in the range from 76 GHz to 77 GHz;
- c) transmitters operating in range from 24,050 GHz to 24,250 GHz with peak power levels ranging up to 20 dBm;
- d) transmitters operating in range from 22,625 GHz to 24,050 GHz and 24,250 GHz to 25,625 GHz with power levels ranging up to -30 dBm;
- e) receivers operating in the range from 22,625 GHz to 25,625 GHz.

The present document contains the technical characteristics for radio equipment and is referencing to CEPT/ERC Recommendation for SRDs CEPT/ERC Recommendation 70-03 [4] and ERC Decisions.

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 applies to:

- low power motion and distance monitoring radars for mobile and fixed applications; operating on radio frequencies in the 76 GHz to 77 GHz band, with mean power densities of up to  $0,9 \text{ W/m}^2$  at 3 m (50 dBm EIRP), and up to  $3 \text{ W/m}^2$  peak at 3 m (55 dBm EIRP) for class 1, and mean power densities of up to  $0,002 \text{ W/m}^2$  at 3 m (23,5 dBm EIRP), and up to  $3 \text{ W/m}^2$  peak at 3 m (55 dBm EIRP) for class 2.
- ultralow power motion and distance monitoring radars for mobile applications; operating on radio frequencies in the 22,625 GHz to 25,625 GHz band with a maximum spatial mean/peak power density of up to  $0,9 \text{ mW/m}^2$  at 3 m (20 dBm EIRP) in the 24 GHz SRD band. and with spectral and spatial mean power densities of up to  $9 \text{ nW/m}^2$  at 3 m (-30 dBm EIRP @ 100 kHz RBW , PSD < -80 dBm/Hz) within a range of  $2 \times 2,5 \text{ GHz}$  outside the 24 GHz SRD band.

The present document is based upon ERC/DEC/(92)02 [5] It is a product standard covering various RTTT applications.

The present document is essential in realization of the ITS program of the European Commission Information Society DG, "The EU Approach for Road Safety and Intelligent Transport Systems(ITS)", [6].

The present document covers radars for mobile applications. It covers integrated transceivers and separate transmit/receive modules.

The present document includes standards for methods of measurement for equipment fitted with integral antennas.

**Table 1: Limits for transmitted power (fixed antenna) at 76 GHz to 77 GHz**

	<b>Class 1</b>	<b>Class 2</b>
Mean Power(EIRP)	50 dBm	23,5 dBm
Peak Power(EIRP)	55 dBm	55 dBm

The radio equipment, covered by the classification SRD is divided into several power classes based on maximum output power (see table 1). The power class designation is based on CEPT/ERC Recommendation 70-03 [4] or ERC Decisions.

**Table 2: Limits for transmitted power (integrated antenna) at 24,05 GHz to 24,250 GHz**

	<b>Class 1 *</b> (pulsed/time gated, Carrier in SRD band)	<b>Class 2</b> (CW, Carrier in SRD band)	<b>Class 3</b> (pulsed/time gated, Carrier in wideband)
Mean Power (EIRP)	0 dBm	0 dBm	0 dBm
Peak Power (EIRP)	20 dBm	0 dBm	20 dBm
Time gating/Duty Cycle	< 10 % (D < -10 dB)	No limit (D < 0 dB)	< 1 % (D < -20 dB)

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

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] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site <http://www.newapproach.org/>.

---

## 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.

- [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".
- [2] ETSI EN 301 091-1 (V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Radar equipment operating in the 76 GHz to 77 GHz band; Part 1: Technical Requirements and methods of measurement".
- [3] ETSI ETR 028 (1994): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [4] CEPT/ERC Recommendation 70-03 (1997): "Relating to the use of Short Range Devices (SRD)".
- [5] ERC/DEC/(92)02: "ERC Decision of 22 October 1992 on the frequency bands to be designated for the coordinated introduction of Road Transport Telematic Systems".
- [6] Fotis Karamitsos: "The EU approach to Road Safety and Intelligent Transport Systems (ITS), [www.cordis@cec.eu.int](mailto:www.cordis@cec.eu.int)".

---

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions in the R&TTE Directive [1], and EN 301 091-1 [2] apply.

### 3.2 Symbols

For the purposes of the present document, the symbols defined in EN 301 091-1 [2] apply.

### 3.3 Abbreviations

For the purposes of the present document, the abbreviations defined in EN 301 091-1 [2] apply.

---

## 4 Technical requirements specifications

### 4.1 Transmitter requirements

#### 4.1.1 Effective radiated power

The effective radiated power, as defined in EN 301 091-1 [2], clause 7.2 shall not exceed the limits in EN 301 091-1 [2], clause 7.2.3 tables 1a, 1b, 2a, 2b and 3a.

This requirement applies to transmitters with an integral.

#### 4.1.2 Permitted range of operating frequencies

The permitted range of operation frequencies, as defined in EN 301 091-1 [2], clause 7.1, shall not exceed the limits in EN 301 091-1 [2], clause 7.1.3.

#### 4.1.3 Spurious emissions

The spurious emissions, as defined in EN 301 091-1 [2], clause 7.5.1, shall not exceed the limits in EN 301 091-1 [2], clause 7.5.4, table 7.

This requirement applies to all transmitters.

---

## 5 Testing for compliance with technical requirements

### 5.1 Essential radio test suites

#### 5.1.1 Environmental conditions for testing

##### 5.1.1.1 Normal and extreme test-conditions

The test conditions shall be as declared by the manufacturer.

The test procedures shall be as specified in EN 301 091-1 [2] clauses 5.3, 5.4.1.1 and 5.4.2

##### 5.1.1.2 Test power source

The test power source shall meet the requirements of EN 301 091-1 [2], clause 5.3.2

#### 5.1.2 Choice of samples for test suites

Measurement shall be performed, according to the present document, on samples of equipment defined in EN 301 091-1 [2], clause 4.1.1.

#### 5.1.3 Permitted range of operation frequencies

The test specified in EN 301 091-1 [2], clause 7.1.2 shall be carried out.

This test suite applies to all transmitters.

### 5.1.4 Spurious emissions

The tests specified in EN 301 091-1 [2], clause 7.5.3 shall be carried out.

This test suite applies to all transmitters.

---

## 6 Interpretation of measurement results

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

- the measured value related to the corresponding limit shall 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 separately included in the test report;
- the value of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures in table 3.

**Table 3: Measurement uncertainty**

RF frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 4$ dB
Adjacent channel power	$\pm 3$ dB
Conducted emission of transmitter, valid up to 12,75 GHz	$\pm 4$ dB
Conducted emission of receivers	$\pm 3$ dB
Radiated emission of transmitter, valid up to 12,75 GHz	$\pm 6$ dB
Radiated emission of receiver, valid up to 12,75 GHz	$\pm 6$ dB

For the test methods, according to the present document the uncertainty figures shall be calculated according to the methods described in the ETR 028 [3] 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 3 is based on such expansion factors.

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

---

## Annex A (informative): Bibliography

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.

---

## History

Document history		
V1.1.1	July 2001	Public Enquiry PE 20011123: 2001-07-25 to 2001-11-23