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*Candidate Harmonized European Standard (Telecommunications series)*

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Short range devices;  
Radio equipment to be used  
in the 1 GHz to 40 GHz frequency range;  
Part 2: Harmonized EN under article 3.2 of the R&TTE Directive**

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**Reference**

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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), and is now submitted for the Vote 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 two-part deliverable covering the Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range, as identified below:

Part 1: "Technical characteristics and test methods";

**Part 2: "Harmonized EN under article 3.2 of the R&TTE Directive".**

<b>Proposed national transposition dates</b>	
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.

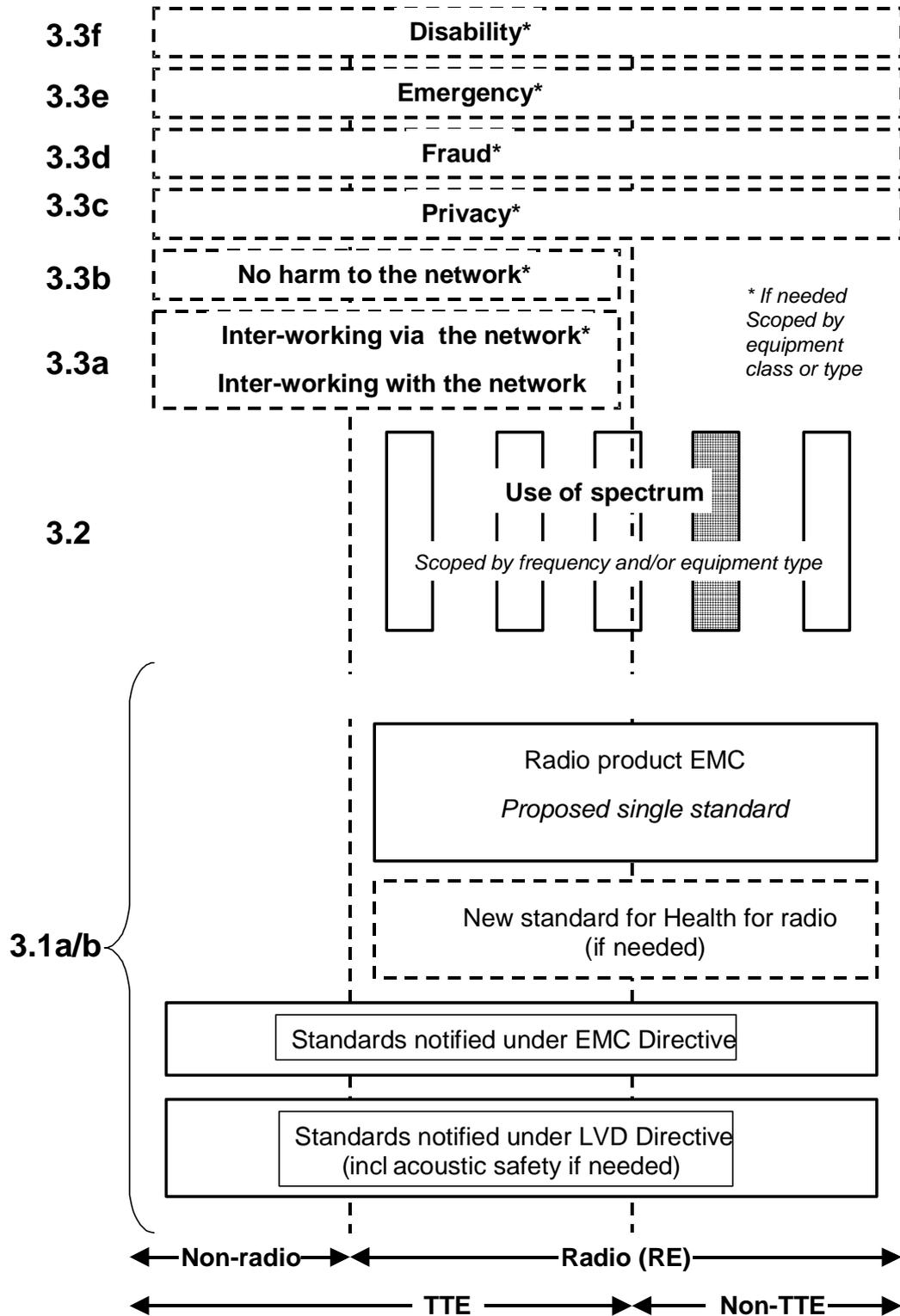


Figure 1: Modular structure for the various standards used under the R&TTE Directive

The left hand edge of the figure shows the different clauses of Article 3 of the 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 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. 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:

- transmitters operating in range from 1 GHz to 40 GHz with power levels ranging up to 4W;
- receivers operating in the range from 1 GHz to 40 GHz.

The present document contains the technical characteristics for radio equipment and is referencing CEPT/ERC Recommendation for SRDs CEPT/ERC Recommendation 70-03 [5].

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. It is a product family standard which may be completely or partially superseded by specific standards covering specific applications.

The present document applies to generic SRDs:

- either with a Radio Frequency (RF) output connection and specified antenna, or with an integral antenna;
- for alarms, identification systems, radio-determination, telecommand, telemetry etc. applications;
- for all types of modulation;
- with or without speech.

The present document covers fixed stations, mobile stations and portable stations. If a system includes transponders, these are measured together with the transmitter.

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the manufacturer. 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.

All types of modulation for radio devices are covered by the present document, provided the requirements of clause 4.1.2 are met.

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 [5].

**Table 1: Maximum radiated peak power (e.i.r.p.)**

Power Class	Power level (conducted or radiated)
8	10 mW
9	25 mW
11	100 mW
12	500 mW (Note 1)
13	1 W
14	2 W
14a	4 W (Note 1)

NOTE 1: For RFID applications, see annex C of Part 1 of this standard.

The present document is intended to cover the provisions of Article 3.2 of Directive 1999/5/EC [1] (R&TTE Directive), see annex E of EN 300 440-1 [3].

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>.

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## 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 (R&TTE Directive).
- [2] 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.
- [3] ETSI EN 300 440-1 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods".
- [4] ETSI ETR 028 (1994): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [5] CEPT/ERC Recommendation 70-03 (1997): "Relating to the use of Short Range Devices (SRD)".

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## 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 300 440-1 [3] apply.

### 3.2 Symbols

For the purposes of the present document, the symbols defined in EN 300 440-1 [3] apply.

### 3.3 Abbreviations

For the purposes of the present document, the abbreviations defined in EN 300 440-1 [3] apply.

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## 4 Technical requirements specifications

### 4.1 Transmitter requirements

#### 4.1.1 Effective radiated power

The effective radiated power, as defined in EN 300 440-1 [3], clause 7.1.1, shall not exceed the limits in EN 300 440-1 [3], clause 7.1.3, table 4.

This requirement applies to transmitters with an integral or dedicated antenna.

## 4.1.2 Permitted range of operating frequencies

The permitted range of operation frequencies, as defined in EN 300 440-1 [3], clause 7.2.1, shall not exceed the limits in EN 300 440-1 [3], clause 7.2.4.

## 4.1.3 Spurious emissions

The spurious emissions, as defined in EN 300 440-1 [3], clause 7.3.1, shall not exceed the limits in EN 300 440-1 [3], clause 7.3.7, table 6.

This requirement applies to all transmitters.

## 4.1.4 Duty cycle

The duty cycle, as defined in EN 300 440-1 [3], clause 7.4.1, shall not exceed the limits in EN 300 440-1 [3], clause 7.4.3, table 7.

This requirement applies to all transmitters.

# 4.2 Receiver requirements

## 4.2.1 Adjacent channel selectivity-in-band

The adjacent channel selectivity-in-band, as defined in EN 300 440-1 [3], clauses 8.1 and 8.1.1, shall not be less than the limits in EN 300 440-1 [3], clause 8.1.3, table 8.

This requirement applies to Equipment Class 1 receivers, when invoked, as defined in EN 300 440-1 [3], clause 4.1.1.

## 4.2.2 Adjacent band selectivity

The adjacent band selectivity, as defined in EN 300 440-1 [3], clause 8.2.1, shall not be less than the limits in EN 300 440-1 [3], table 9.

This requirement applies to Equipment Class 1 receivers, when invoked, as defined in EN 300 440-1 [3], clause 4.1.1.

## 4.2.3 Blocking or desensitization

The blocking or desensitization, as defined in EN 300 440-1 [3], clause 8.3.1, shall not be less than the limits in EN 300 440-1 [3], clause 8.3.3, table 10.

This requirement applies to Equipment Class 1 and Class 2 receivers, when invoked, as defined in EN 300 440-1 [3], clause 4.1.1.

## 4.2.4 Spurious radiations

The spurious radiations, as defined in EN 300 440-1 [3], clause 8.4.1, shall not exceed the limits in EN 300 440-1 [3], clause 8.4.5.

This requirement applies to all receivers.

# 4.3. Power limits for 2,45 GHz RFID systems

2,45 GHz RFID systems as defined in EN 300 440-1 [2], annex C, shall not exceed the limits as defined in EN 300 440 –1 [2], annex C, clauses C1, C.1.1 and C.1.2.

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## 5 Testing for compliance with technical requirements

### 5.1 Essential radio test suites

#### 5.1.1 Environmental conditions for testing

The test conditions shall be as declared by the manufacturer.

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

The test procedures shall be as specified in EN 300 440-1 [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 300 440-1 [3], clause 5.2.

#### 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 300 440-1 [3], clauses 4.2.1 to 4.2.3.2.

#### 5.1.3 Transmitter test suites

##### 5.1.3.1 Equivalent isotropically radiated power

Either:

- the test specified in EN 300 440-1 [3], clauses 7.1.2 and 7.1.2.1 shall be carried out;

or

- the test specified in EN 300 440-1 [3], clauses 7.1.2 and 7.1.2.2 shall be carried out.

This test suite applies to transmitters with an integral or dedicated antenna.

##### 5.1.3.2 Permitted range of operation frequencies

Either:

- the test specified in EN 300 440-1 [3], clause 7.2.2 shall be carried out;

or

- the test specified in EN 300 440-1 [3], clause 7.2.3 as appropriate shall be carried out.

This test suite applies to all transmitters.

##### 5.1.3.3 Spurious emissions

Either:

- the tests specified in EN 300 440-1 [3], clause 7.3.3 and EN 300 440-1 [3], clause 7.3.4 shall be carried out;

or

- the test specified in EN 300 440-1 [3], clause 7.3.5 shall be carried out.

This test suite applies to all transmitters.

## 5.1.4 Receiver test suites

### 5.1.4.1 Spurious radiations

Either:

- the tests specified in EN 300 440-1 [3], clause 8.4.2 and EN 300 440-1 [3], clause 8.4.3 shall be carried out;

or

- the test specified in EN 300 440-1 [3], clause 8.4.4 shall be carried out.

This test suite applies to all receivers.

## 5.2 Other test specifications

The requirements in clause 4.2 have been set on the assumption that the test specifications in table 2 will be used to verify the performance of equipment.

**Table 2: Receiver test specifications**

Subclause	Performance requirement	Clause on EN 300 440-1 [3] containing the test method
4.2.1	Adjacent channel selectivity-in-band	8.1.2
4.2.2	Adjacent band selectivity	8.2.2
4.2.3	Blocking or desensitization	8.3.2
4.2.4	Spurious radiations	8.4.2 and 8.4.3; or 8.4.4

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## 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 [4] 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.

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## History

<b>Document history</b>		
V1.1.1	July 2000	Public Enquiry PE 20001117: 2000-07-19 to 2000-11-17
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