

# ETSI EN 300 162-2 V1.1.2 (2000-12)

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*Candidate Harmonized European Standard (Telecommunications series)*

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Radiotelephone transmitters and receivers for  
the maritime mobile service operating in VHF bands;  
Part 2: Harmonized EN under article 3.2 of the R&TTE Directive**

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**Reference**DEN/ERM-RP01-046-2

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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 [6] 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").

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 Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands, as identified below:

- Part 1: "Technical characteristics and methods of measurement";
- Part 2: "Harmonized EN covering essential requirements for article 3.2 of the R&TTE Directive";**
- Part 3: "Harmonized EN covering essential requirements of article 3.3 (e) of the R&TTE Directive".

<b>National transposition dates</b>	
Date of adoption of this EN:	17 November 2000
Date of latest announcement of this EN (doa):	28 February 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2001
Date of withdrawal of any conflicting National Standard (dow):	31 August 2001

## 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.

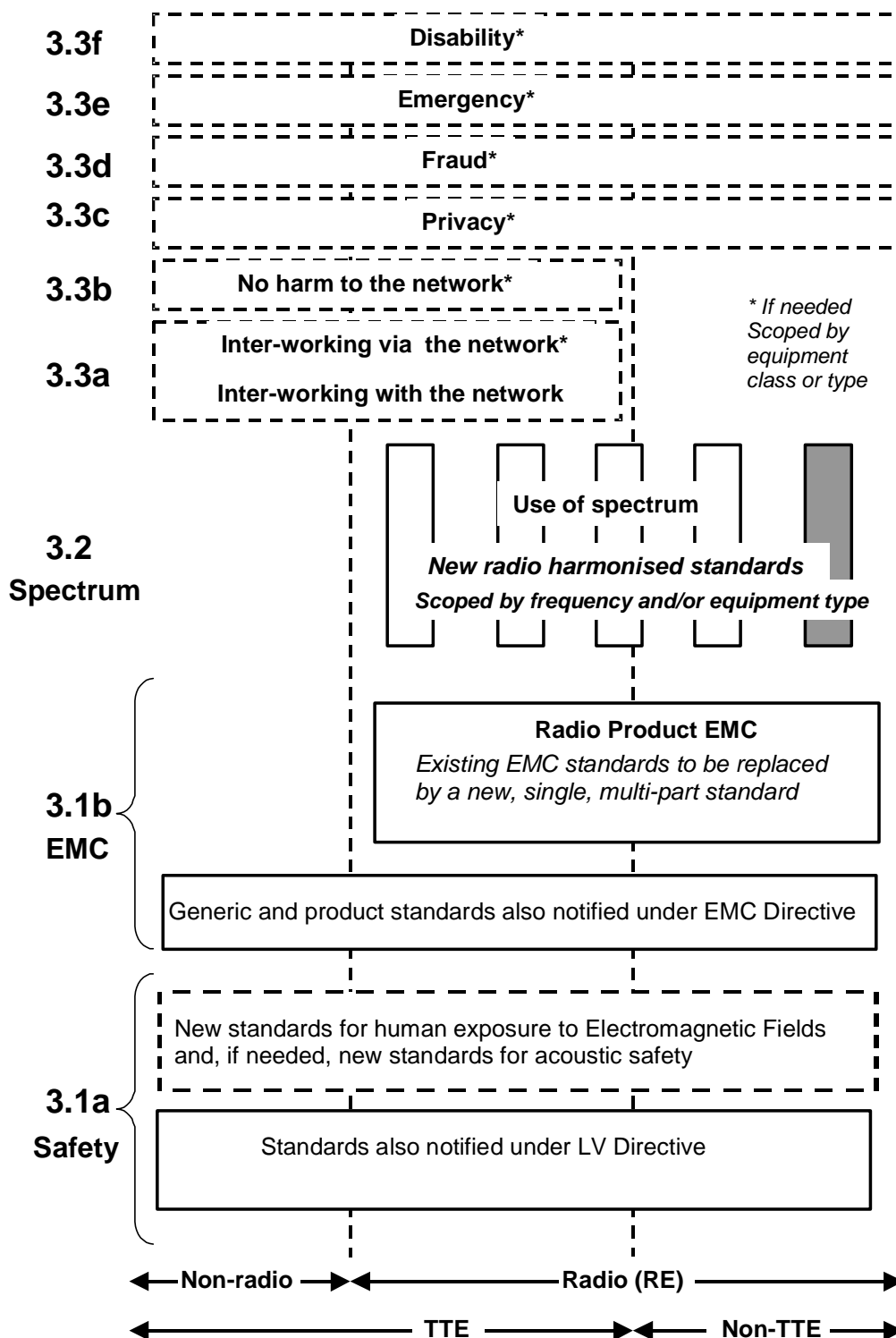


Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]

The left hand edge of the figure 1 shows the different subclauses 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 the new single multi-part product EMC standard for radio, and the existing collection of generic and product standards currently used under the EMC Directive [2]. The parts of this new standard will become available in the second half of 2 000, and the existing separate product EMC standards will be used until it is available.

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.

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# 1 Scope

The present document applies to shipborne Very High Frequency (VHF) transmitters and receivers capable of voice and Digital Selective Calling (DSC), radio equipment.

The present document lays down minimum requirements for VHF radio transmitters and receivers operating in all or any part of the 156,0 MHz to 174,0 MHz frequency band allocated to the maritime mobile service, utilizing class of emission G3E, and possibly G2B.

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] 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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [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 of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC) (EMC Directive).
- [3] Council Directive of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (73/23/EEC) (LV Directive).
- [4] ETSI EN 300 162-1 (V1.2.2) (2000): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands; Part 1: Technical characteristics and methods of measurement".
- [5] ETSI ETR 028 (Ed.2) (1994): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [6] 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.



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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [1], 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

**G3E:** phase-modulation (Frequency modulation with a pre-emphasis of 6 dB/octave) for speech

**G2B:** phase-modulation with digital information, with a sub-carrier for Digital Selective Calling (DSC) operation

### 3.2 Abbreviations

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

DSC	Digital Selective Calling
EMC	Electro-Magnetic Compatibility
LV	Low Voltage
R&TTE	Radio and Telecommunications Terminal Equipment
VHF	Very High Frequency

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## 4 Technical requirements specifications

### 4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be determined by the environmental class of the equipment. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the required operational environmental profile.

### 4.2 Conformance requirements

#### 4.2.1 Frequency error

##### 4.2.1.1 Definition

The frequency error is defined in EN 300 162-1 [4], subclause 8.1.1.

##### 4.2.1.2 Limit

The frequency error limit shall be as stated in EN 300 162-1 [4], subclause 8.1.3.

##### 4.2.1.3 Conformance

Conformance tests as defined in subclause 5.3.1 shall be carried out.

## 4.2.2 Carrier power

### 4.2.2.1 Definition

The carrier power is defined in EN 300 162-1 [4], subclause 8.2.1.

### 4.2.2.2 Limit

The carrier power limit shall be as stated in EN 300 162-1 [4], subclause 8.2.3.

### 4.2.2.3 Conformance

Conformance tests as defined in subclause 5.3.2 shall be carried out.

## 4.2.3 Frequency deviation

### 4.2.3.1 Definition

The frequency deviation is defined in EN 300 162-1 [4], subclause 8.3.1.

### 4.2.3.2 Limit

The frequency deviation limit shall be as stated in EN 300 162-1 [4], subclauses 8.3.2.2 and 8.3.3.2.

### 4.2.3.3 Conformance

Conformance tests as defined in subclause 5.3.3 shall be carried out.

## 4.2.4 Adjacent channel power

### 4.2.4.1 Definition

The adjacent channel power is defined in EN 300 162-1 [4], subclause 8.7.1.

### 4.2.4.2 Limit

The adjacent channel power limit shall be as stated in EN 300 162-1 [4], subclause 8.7.3.

### 4.2.4.3 Conformance

Conformance tests as defined in subclause 5.3.4 shall be carried out.

## 4.2.5 Conducted spurious emissions conveyed to the antenna

### 4.2.5.1 Definition

The conducted spurious emissions conveyed to the antenna is defined in EN 300 162-1 [4], subclause 8.8.1.

### 4.2.5.2 Limit

The conducted spurious emissions conveyed to the antenna limit shall be as stated in EN 300 162-1 [4], subclause 8.8.3.

### 4.2.5.3 Conformance

Conformance tests as defined in subclause 5.3.5 shall be carried out.

## 4.2.6 Cabinet radiation and conducted spurious emissions other than those conveyed to the antenna

### 4.2.6.1 Definition

The cabinet radiation and conducted spurious emissions other than those conveyed to the antenna is defined in EN 300 162-1 [4], subclause 8.9.1.

### 4.2.6.2 Limit

The cabinet radiation and conducted spurious emissions other than those conveyed to the antenna limit shall be as stated in EN 300 162-1 [4], subclause 8.9.3.

### 4.2.6.3 Conformance

Conformance tests as defined in subclause 5.3.6 shall be carried out.

## 4.2.7 Transient frequency behaviour of the transmitter

### 4.2.7.1 Definition

The transient frequency behaviour of the transmitter is defined in EN 300 162-1 [4], subclause 8.14.1.

### 4.2.7.2 Limit

The transient frequency behaviour of the transmitter limit shall be as stated in EN 300 162-1 [4], subclause 8.14.3.

### 4.2.7.3 Conformance

Conformance tests as defined in subclause 5.3.7 shall be carried out.

## 4.2.8 Maximum usable sensitivity

### 4.2.8.1 Definition

The maximum usable sensitivity is defined in EN 300 162-1 [4], subclause 9.3.1.

### 4.2.8.2 Limit

The maximum usable sensitivity limit shall be as stated in EN 300 162-1 [4], subclause 9.3.3.

### 4.2.8.3 Conformance

Conformance tests as defined in subclause 5.4.2 may be carried out.

## 4.2.9 Co-channel rejection

### 4.2.9.1 Definition

The co-channel rejection is defined in EN 300 162-1 [4], subclause 9.4.1.

### 4.2.9.2 Limit

The co-channel rejection limit shall be as stated in EN 300 162-1 [4], subclause 9.4.3.

#### 4.2.9.3 Conformance

Conformance tests as defined in subclause 5.4.3 may be carried out.

### 4.2.10 Adjacent channel selectivity

#### 4.2.10.1 Definition

The adjacent channel selectivity is defined in EN 300 162-1 [4], subclause 9.5.1.

#### 4.2.10.2 Limit

The adjacent channel selectivity limit shall be as stated in EN 300 162-1 [4], subclause 9.5.3.

#### 4.2.10.3 Conformance

Conformance tests as defined in subclause 5.4.4 may be carried out.

### 4.2.11 Spurious response rejection

#### 4.2.11.1 Definition

The spurious response rejection is defined in EN 300 162-1 [4], subclause 9.6.1.

#### 4.2.11.2 Limit

The spurious response rejection limit shall be as stated in EN 300 162-1 [4], subclause 9.6.3.

#### 4.2.11.3 Conformance

Conformance tests as defined in subclause 5.4.5 may be carried out.

### 4.2.12 Intermodulation response

#### 4.2.12.1 Definition

The blocking or desensitization is defined in EN 300 162-1 [4], subclause 9.7.1.

#### 4.2.12.2 Limit

The blocking or desensitization limit shall be as stated in EN 300 162-1 [4], subclause 9.7.3.

#### 4.2.12.3 Conformance

Conformance tests as defined in subclause 5.4.6 may be carried out.

### 4.2.13 Blocking or desensitization

#### 4.2.13.1 Definition

The blocking or desensitization is defined in EN 300 162-1 [4], subclause 9.8.1.

#### 4.2.13.2 Limit

The blocking or desensitization limit shall be as stated in EN 300 162-1 [4], subclause 9.8.3.

#### 4.2.13.3 Conformance

Conformance tests as defined in subclause 5.4.7 may be carried out.

### 4.2.14 Receiver conducted spurious emissions

#### 4.2.14.1 Definition

The receiver conducted spurious emissions is defined in EN 300 162-1 [4], subclause 9.9.1.

#### 4.2.14.2 Limit

The receiver conducted spurious emissions limit shall be as stated in EN 300 162-1 [4], subclause 9.9.3.

#### 4.2.14.3 Conformance

Conformance tests as defined in subclause 5.4.8 may be carried out.

### 4.2.15 Receiver radiated spurious emissions

#### 4.2.15.1 Definition

The receiver radiated spurious emissions is defined in EN 300 162-1 [4], subclause 9.10.1.

#### 4.2.15.2 Limit

The receiver radiated spurious emissions limit shall be as stated in EN 300 162-1 [4], subclause 9.10.3.

#### 4.2.15.3 Conformance

Conformance tests as defined in subclause 5.4.9 may be carried out.

### 4.2.16 Receiver desensitization with simultaneous transmission and reception (Duplex operation)

#### 4.2.16.1 Definition

The receiver desensitization, with simultaneous transmission and reception, is defined in EN 300 162-1 [4], subclause 10.1.1.

#### 4.2.16.2 Limit

The receiver desensitization, with simultaneous transmission and reception, limit shall be as stated in EN 300 162-1 [4], subclause 10.1.3.

#### 4.2.16.3 Conformance

Conformance tests as defined in subclause 5.4.10 may be carried out.

## 5 Testing for compliance with technical requirements

### 5.1 Test conditions, power supply and ambient temperatures

The test conditions and procedures shall be as defined in EN 300 162-1 [4], subclauses 6.1 to 6.6 and 6.8 to 6.11.

### 5.2 Interpretation of the measurement results

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 ETR 028 [5] 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: Absolute measurement uncertainties: maximum values**

Parameter	Maximum uncertainty
RF frequency	$\pm 1 \times 10^{-7}$
RF power	$\pm 0,75$ dB
Maximum frequency deviation: - within 300 Hz to 6 kHz of modulation frequency - within 6 kHz to 25 kHz of modulation frequency	$\pm 5$ % $\pm 3$ dB
Deviation limitation	$\pm 5$ %
Adjacent channel power	$\pm 5$ dB
Conducted spurious emission of transmitter	$\pm 4$ dB
Audio output power	$\pm 0,5$ dB
Sensitivity at 20 dB SINAD	$\pm 3$ dB
Conducted emission of receiver	$\pm 3$ dB
Two-signal measurement	$\pm 4$ dB
Three-signal measurement	$\pm 3$ dB
Radiated emission of transmitter	$\pm 6$ dB
Radiated emission of receiver	$\pm 6$ dB
Transmitter transient time	$\pm 20$ %
Transmitter transient frequency	$\pm 250$ Hz
Receiver desensitization (duplex operation)	$\pm 0,5$ dB

## 5.3 Essential radio test suites

### 5.3.1 Frequency error

The test specified in EN 300 162-1 [4], subclause 8.1.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.1.2 in order to prove compliance with the requirement.

### 5.3.2 Carrier power

The test specified in EN 300 162-1 [4], subclause 8.2.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.2.2 in order to prove compliance with the requirement.

### 5.3.3 Frequency deviation

The test specified in EN 300 162-1 [4], subclauses 8.3.2.1 and 8.3.3.1 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.3.2 in order to prove compliance with the requirement.

### 5.3.4 Adjacent channel power

The test specified in EN 300 162-1 [4], subclause 8.7.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.4.2 in order to prove compliance with the requirement.

### 5.3.5 Conducted spurious emissions conveyed to the antenna

The test specified in EN 300 162-1 [4], subclause 8.8.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.5.2 in order to prove compliance with the requirement.

### 5.3.6 Cabinet radiation and conducted spurious emissions other than those conveyed to the antenna

The test specified in EN 300 162-1 [4], subclause 8.9.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.6.2 in order to prove compliance with the requirement.

### 5.3.7 Transient frequency behaviour of the transmitter

The test specified in EN 300 162-1 [4], subclause 8.14.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.7.2 in order to prove compliance with the requirement.

## 5.4 Other test specifications

### 5.4.1 General

The requirements in subclauses 4.2.8 to 4.2.15 inclusive have been set on the assumption that the test specifications in subclauses 5.4.2 to 5.4.9 will be used to verify the performance of the equipment.

### 5.4.2 Maximum usable sensitivity

The test specified in EN 300 162-1 [4], subclause 9.3.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.8.2 in order to prove compliance with the requirement.

### 5.4.3 Co-channel rejection

The test specified in EN 300 162-1 [4], subclause 9.4.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.9.2 in order to prove compliance with the requirement.

#### 5.4.4 Adjacent channel selectivity

The test specified in EN 300 162-1 [4], subclause 9.5.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.10.2 in order to prove compliance with the requirement.

#### 5.4.5 Spurious response rejection

The test specified in EN 300 162-1 [4], subclause 9.6.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.11.2 in order to prove compliance with the requirement.

#### 5.4.6 Intermodulation response

The test specified in EN 300 162-1 [4], subclause 9.7.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.12.2 in order to prove compliance with the requirement.

#### 5.4.7 Blocking or desensitization

The test specified in EN 300 162-1 [4], subclause 9.8.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.13.2 in order to prove compliance with the requirement.

#### 5.4.8 Receiver conducted spurious emissions

The test specified in EN 300 162-1 [4], subclause 9.9.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.14.2 in order to prove compliance with the requirement.

#### 5.4.9 Receiver radiated spurious emissions

The test specified in EN 300 162-1 [4], subclause 9.10.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.15.2 in order to prove compliance with the requirement.

#### 5.4.10 Receiver desensitization with simultaneous transmission and reception (Duplex operation)

The test specified in EN 300 162-1 [4], subclause 10.1.2 shall be carried out. The results obtained shall be compared to the limits in subclause 4.2.16.2 in order to prove compliance with the requirement.



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

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the EN-RT proforma in this annex so that it can be used for its intended purposes and may further publish the completed EN-RT.

The EN Requirements Table (EN-RT) serves a number of purposes, as follows:

- it provides a tabular summary of all the requirements;
- it shows the status of each EN-R, whether it is essential to implement in all circumstances (Mandatory), or whether the requirement is dependent on the supplier having chosen to support a particular optional service or functionality (Optional). In particular it enables the EN-Rs associated with a particular optional service or functionality to be grouped and identified;
- when completed in respect of a particular equipment it provides a means to undertake the static assessment of conformity with the EN.

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

EN Reference		EN 300 162-2				Comment
No.	Reference	EN-R (note)	Status			
1	4.2.1	Frequency error	M			
2	4.2.2	Carrier power	M			
3	4.2.3	Frequency deviation	M			
4	4.2.4	Adjacent channel power	M			
5	4.2.5	Conducted spurious emissions conveyed to the antenna	M			
6	4.2.6	Cabinet radiation and conducted spurious emissions other than those conveyed to the antenna	M			
7	4.2.7	Transient frequency behaviour of the transmitter	M			
8	4.2.8	Maximum usable sensitivity	M			
9	4.2.9	Co-channel rejection	M			
10	4.2.10	Adjacent channel selectivity	M			
11	4.2.11	Spurious response rejection	M			
12	4.2.12	Intermodulation response	M			
13	4.2.13	Blocking or desensitization	M			
14	4.2.14	Receiver conducted spurious emissions	M			
15	4.2.15	Receiver radiated spurious emissions	M			
16	4.2.16	Receiver desensitization with simultaneous transmission and reception (Duplex operation)	M			

NOTE: These EN-Rs are justified under Article 3.2 of the R&TTE Directive.

**Key to columns:**

<b>No</b>	Table entry number;
<b>Reference</b>	Subclause reference number of conformance requirement within the present document;
<b>EN-R</b>	Title of conformance requirement within the present document;
<b>Status</b>	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".
<b>Comments</b>	To be completed as required.

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## History

<b>Document history</b>		
V1.1.2	July 2000	One-step Approval Procedure OAP 20001117: 2000-07-19 to 2000-11-17
V1.1.2	December 2000	Publication