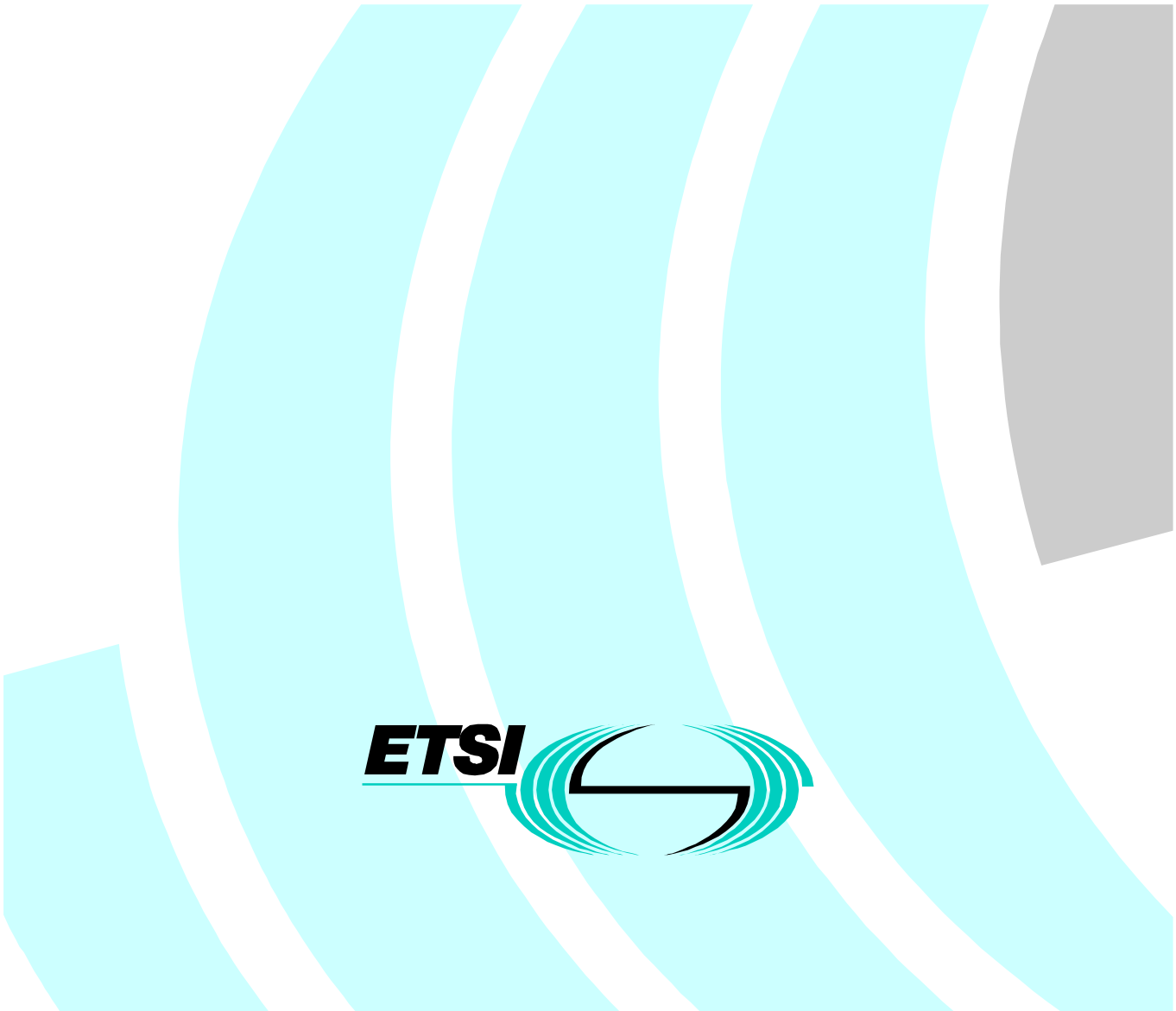
# ETSI EN 300 224-2 V1.1.1 (2001-01)

*Candidate Harmonized European Standard (Telecommunications series)*

**Electromagnetic compatibility and Radio spectrum Matters (ERM); On-site paging service; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive**



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# Contents

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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 (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") [1].

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 on-site paging service, as identified below:

Part 1: "Technical and functional characteristics, including test methods";

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

| **National transposition dates** | |
|---|---|
| Date of adoption of this EN: | 15 December 2000 |
| Date of latest announcement of this EN (doa): | 31 March 2001 |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 30 September 2001 |
| Date of withdrawal of any conflicting National Standard (dow): | 30 September 2002 |

# 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.

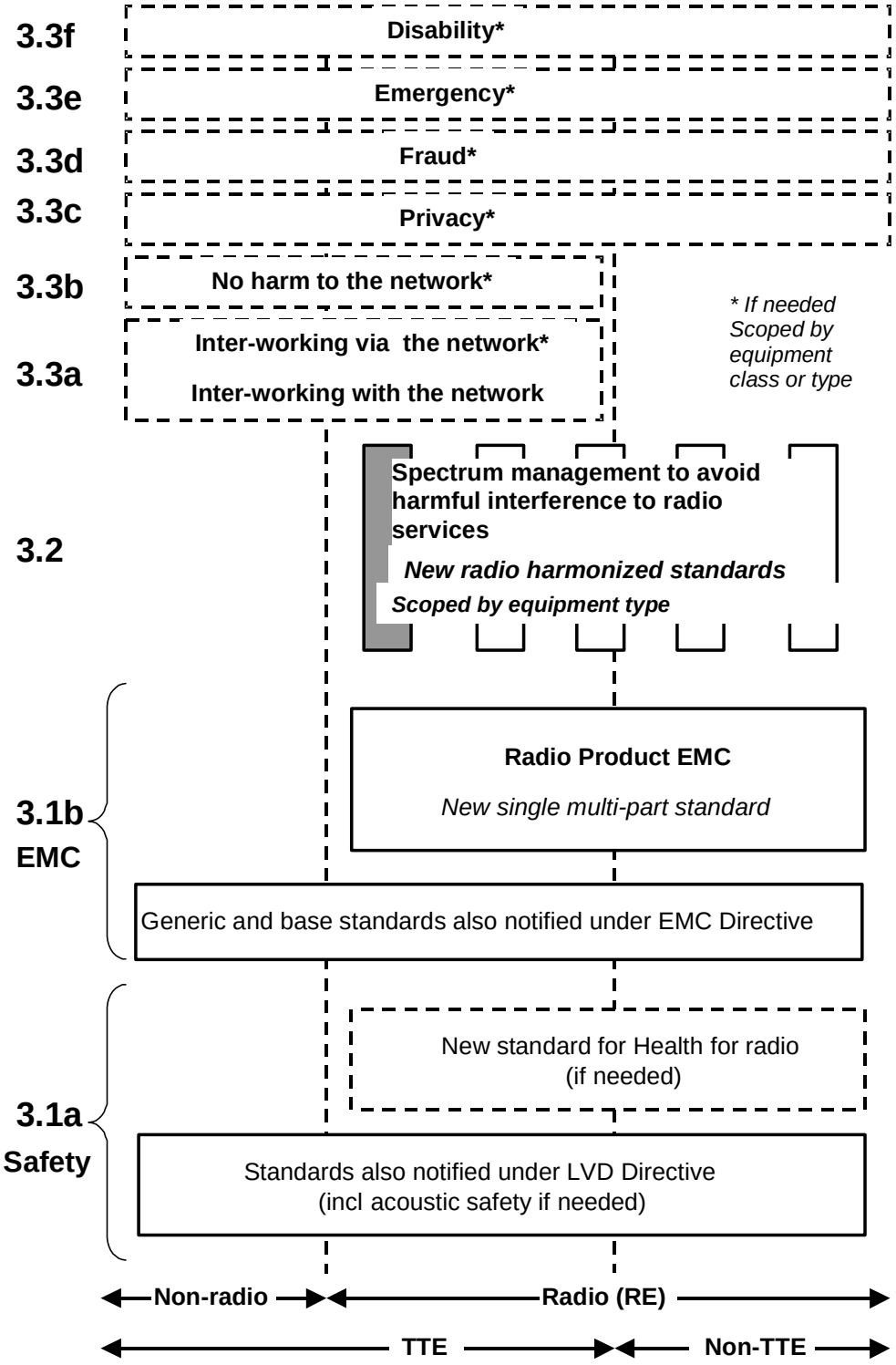


**Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]**

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 this standard 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 2000, 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.

# 1 Scope

The present document applies to the following radio equipment types:

- On-site paging equipment operating in the frequency range of 25 MHz to 470 MHz and loop systems below 146 kHz.

The types of equipment covered by the present document are as follows:

- base station transmitters (radio and loop) and transcoders, with or without an external 50 Ω antenna connector;
- base station receivers, with a permanent 50 Ω connector;
- pocket unit (receiver, transceiver or transmitter), with or without an external 50 Ω antenna connector.

NOTE: The functional characteristics of an On-site paging system are described in ETS 300 224 [4].

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] will 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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.
- 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 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 ETS 300 224 (Ed. 1, 1998): "Electromagnetic compatibility and Radio spectrum Matters (ERM); On-site paging service; Technical and functional characteristics for on-site paging systems, including test methods".

[5] ETSI EN 300 224-1 (V1.3.1, 2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); On-site paging service; Part 1: Technical and functional characteristics, including test methods".

[6] CEPT/ERC Report 25: "Frequency band 29.7 MHz to 105 GHz and associated European table of frequency allocations and utilizations", revision February 1998.

[7] ETSI ETR 028 (1994): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".

# 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 in EN 300 224-1 [5] apply.

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply, in addition to those given in EN 300 224-1 [5]:

| | |
|---|---|
| EMC | Electro-Magnetic Compatibility |
| LV | Low Voltage |
| R&TTE | Radio and Telecommunications Terminal Equipment |

# 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 Transmitter requirements

### 4.2.1 Frequency error

#### 4.2.1.1 Definition

This shall be as defined in EN 300 224-1 [5], subclause 7.1.1.

#### 4.2.1.2 Limit

The frequency error of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.1.3, when measured according to the method specified in EN 300 224-1 [5], subclause 7.1.2.

### 4.2.2 Carrier power

#### 4.2.2.1 Definition

This shall be as defined in EN 300 224-1 [5], subclause 7.2.1.

#### 4.2.2.2 Limit (conducted)

The carrier power (conducted) of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.2.2.2, when measured according to the method specified in EN 300 224-1 [5], subclause 7.2.2.1.

#### 4.2.2.3 Limit (radiated)

The carrier power (radiated) of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.2.3.2, when measured according to the method specified in EN 300 224-1 [5], subclause 7.2.3.1.

### 4.2.3 Adjacent channel power

#### 4.2.3.1 Definition

This shall be as defined in EN 300 224-1 [5], subclause 7.3.1.

#### 4.2.3.2 Limit

The adjacent channel power of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.3.3, when measured according to the method specified in EN 300 224-1 [5], subclause 7.3.2.

### 4.2.4 Frequency deviation

#### 4.2.4.1 Definition

This shall be as defined in EN 300 224-1 [5], subclause 7.4.1.

#### 4.2.4.2 Limit (analogue signals within the audio bandwidth)

The maximum permissible frequency deviation of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.4.3.2, when measured according to the method specified in EN 300 224-1 [5], subclause 7.4.3.1.

#### 4.2.4.3 Limit (analogue signals above the audio bandwidth)

The maximum permissible frequency deviation of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.4.4.2, when measured according to the method specified in EN 300 224-1 [5], subclause 7.4.4.1.

### 4.2.5 Spurious emissions

#### 4.2.5.1 Definition

This shall be as defined in EN 300 224-1 [5], subclause 7.5.1.

#### 4.2.5.2 Limit

The spurious emissions of the transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 7.5.3, when measured according to the appropriate method specified in EN 300 224-1 [5], subclause 7.5.2.

### 4.2.6 Transmitter transient behaviour

#### 4.2.6.1 Definition

The transient behaviour of the transmitter shall be as defined in EN 300 224-1 [5], subclause 7.6.1.

#### 4.2.6.2 Limit

The transient behaviour of the transmitter shall be less than the limits defined in EN 300 224-1 [5], subclause 7.6.3, when measured according to the method specified in EN 300 224-1 [5], subclause 7.6.2.

## 4.3 Receiver requirements (pocket paging receivers)

### 4.3.1 Spurious emissions

#### 4.3.1.1 Definition

The spurious emissions of the pocket paging receiver shall be as defined in EN 300 224-1 [5], subclause 8.1.1.1.

#### 4.3.1.2 Limit

The spurious emissions of the pocket paging receiver shall be less than the limits defined in EN 300 224-1 [5], subclause 8.1.1.3, when measured according to the method specified in EN 300 224-1 [5], subclause 8.1.1.2.

## 4.4 Receiver requirements (base station receivers)

### 4.4.1 Spurious emissions

#### 4.4.1.1 Definition

The spurious emissions of the base station receiver shall be as defined in EN 300 224-1 [5], subclause 8.2.13.1.

#### 4.4.1.2 Limit

The spurious emissions of the base station receiver shall be less than the limits defined in EN 300 224-1 [5], subclause 8.2.13.3, when measured according to the appropriate method specified in EN 300 224-1 [5], subclause 8.2.13.2.

## 4.5 Loop transmitter requirements

### 4.5.1 Transmitter carrier power

#### 4.5.1.1 Definition

The carrier power of the loop transmitter shall be as defined in EN 300 224-1 [5], subclause 9.2.1.1.

#### 4.5.1.2 Limit

The carrier power of the loop transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 9.2.1.3, when measured according to the method specified in EN 300 224-1 [5], subclause 9.2.1.2.

### 4.5.2 Range of operating frequencies

#### 4.5.2.1 Limit

The range of operating frequencies of the loop transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 9.2.2.1.

### 4.5.3 Frequency error

#### 4.5.3.1 Definition

The frequency error of the loop transmitter shall be as defined in EN 300 224-1 [5], subclause 9.2.2.2.1.

#### 4.5.3.2 Limit

The frequency error of the loop transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 9.2.2.2.3, when measured according to the method specified in EN 300 224-1 [5], subclause 9.2.2.2.2.

### 4.5.4 Spurious emissions

#### 4.5.4.1 Definition

The spurious emissions of the loop transmitter shall be as defined in EN 300 224-1 [5], subclause 9.2.3.1.

#### 4.5.4.2 Limit

The spurious emissions of the loop transmitter shall be less than the limit defined in EN 300 224-1 [5], subclause 9.2.3.3, when measured according to the appropriate method specified in EN 300 224-1 [5], subclause 9.2.3.2.

## 4.6 Loop receiver requirements

### 4.6.1 Spurious emissions

#### 4.6.1.1 Definition

The spurious emissions of the loop receiver shall be as defined in EN 300 224-1 [5], subclause 9.3.1.1.

#### 4.6.1.2 Limit

The spurious emissions of the loop receiver shall be less than the limit defined in EN 300 224-1 [5], subclause 9.3.1.3, when measured according to the method specified in EN 300 224-1 [5], subclause 9.3.1.2.

# 5 Testing for compliance with technical requirements

## 5.1 Environmental conditions for testing

The test conditions shall be as specified in EN 300 224-1 [5], clause 5.

## 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 [7] 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 |
|---|---|
| RF frequency | ± $1 \times 10^{-7}$ |
| RF power | ± 2 dB |
| Maximum frequency deviation:<br>- within 300 Hz to 6 kHz of audio frequency<br>- within 6 kHz to 25 kHz of audio frequency | <br>± 5 %<br>± 3 dB |
| Deviation limitation | ± 5 % |
| Sensitivity at 20 dB SINAD | ± 3 dB |
| Radiated emission of transmitter, valid to 4 GHz | ± 6 dB |
| Radiated emission of receiver, valid to 4 GHz | ± 6 dB |
| Transmitter intermodulation | ± 6 dB |

## 5.3 Essential radio test suites

### 5.3.1 Transmitter test suites

#### 5.3.1.1 Frequency error

The test specified in EN 300 224-1 [5], subclause 7.1.2 shall be carried out. The result shall be compared with the limit specified in EN 300 224-1 [5], subclause 7.1.3 in order to demonstrate compliance with the requirement.

#### 5.3.1.2 Carrier power (conducted)

The tests specified in EN 300 224-1 [5], subclause 7.2.2.1 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.2.2.2 in order to demonstrate compliance with the requirement.

#### 5.3.1.3 Carrier power (radiated)

The tests specified in EN 300 224-1 [5], subclause 7.2.3.1 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.2.3.2 in order to demonstrate compliance with the requirement.

#### 5.3.1.4 Adjacent channel power

The test specified in EN 300 224-1 [5], subclause 7.3.2 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.3.3 in order to demonstrate compliance with the requirement.

#### 5.3.1.5 Frequency deviation

##### 5.3.1.5.1 Analogue signals within the audio handwidth

The test specified in EN 300 224-1 [5], subclauses 7.4.2 and 7.4.3.1 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.4.3.2 in order to demonstrate compliance with the requirement.

##### 5.3.1.5.2 Analogue signals above the audio handwidth

The test specified in EN 300 224-1 [5], subclauses 7.4.2 and 7.4.4.1 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.4.4.2 in order to demonstrate compliance with the requirement.

#### 5.3.1.6 Spurious emissions

The tests specified in EN 300 224-1 [5], subclause 7.5.2 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.5.3 in order to demonstrate compliance with the requirement.

#### 5.3.1.7 Transmitter transient behaviour

The tests specified in EN 300 224-1 [5], subclause 7.6.2 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 7.6.3 in order to demonstrate compliance with the requirement.

### 5.3.2 Loop transmitter suites

#### 5.3.2.1 Transmitter carrier power

The tests specified in EN 300 224-1 [5], subclause 9.2.1.2 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 9.2.1.3 in order to demonstrate compliance with the requirement.

#### 5.3.2.2 Frequency error

The tests specified in EN 300 224-1 [5], subclause 9.2.2.2.2 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 9.2.2.2.3 in order to demonstrate compliance with the requirement.

#### 5.3.2.3 Spurious emissions

The tests specified in EN 300 224-1 [5], subclause 9.2.3.2 shall be carried out. The results shall be compared with the limits specified in EN 300 224-1 [5], subclause 9.2.3.3 in order to demonstrate 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 300 224-2** | | | | **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 | Adjacent channel power | M | | | |
| 4 | 4.2.4 | Frequency deviation | M | | | |
| 5 | 4.2.5 | Spurious emissions | M | | | |
| 6 | 4.2.6 | Transmitter transient behaviour | M | | | |
| 7 | 4.3.1 | Spurious emissions | M | | | |
| 8 | 4.4.1 | Spurious emissions | M | | | |
| 9 | 4.5.1 | Transmitter carrier power | M | | | |
| 10 | 4.5.2 | Range of operating frequencies | M | | | |
| 11 | 4.5.3 | Frequency error | M | | | |
| 12 | 4.5.4 | Spurious emissions | M | | | |
| 13 | 4.6.1 | Spurious emissions | M | | | |
| NOTE: These EN-Rs are justified under Article 3.2 of the R&TTE Directive. | | | | | | |

**Key to columns:**

**No** Table entry number;

**Reference** Subclause 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.

# History

| Document history | | |
|---|---|---|
| V1.1.1 | August 2000 | One-step Approval Procedure OAP 20001215: 2000-08-16 to 2000-12-15 |
| V1.1.1 | January 2001 | Publication |
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