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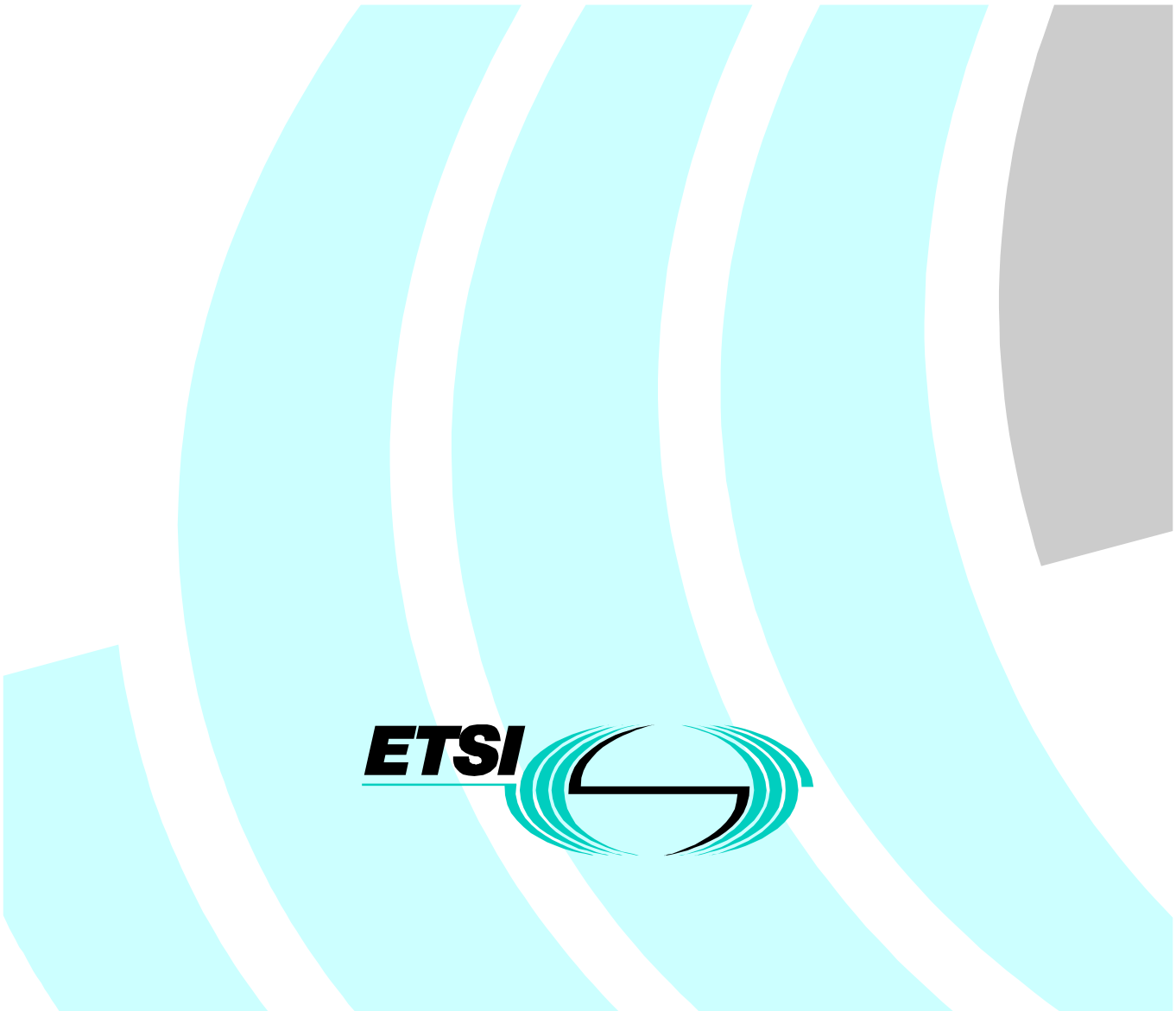
Candidate Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 3: Harmonized EN covering essential requirements 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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The product standard consists of three parts as follows:

Part 1: "Technical characteristics and test methods";

Part 2: "Supplementary parameters not intended for conformity purposes";

Part 3: "Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive".

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [3] 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].

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):	6 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.

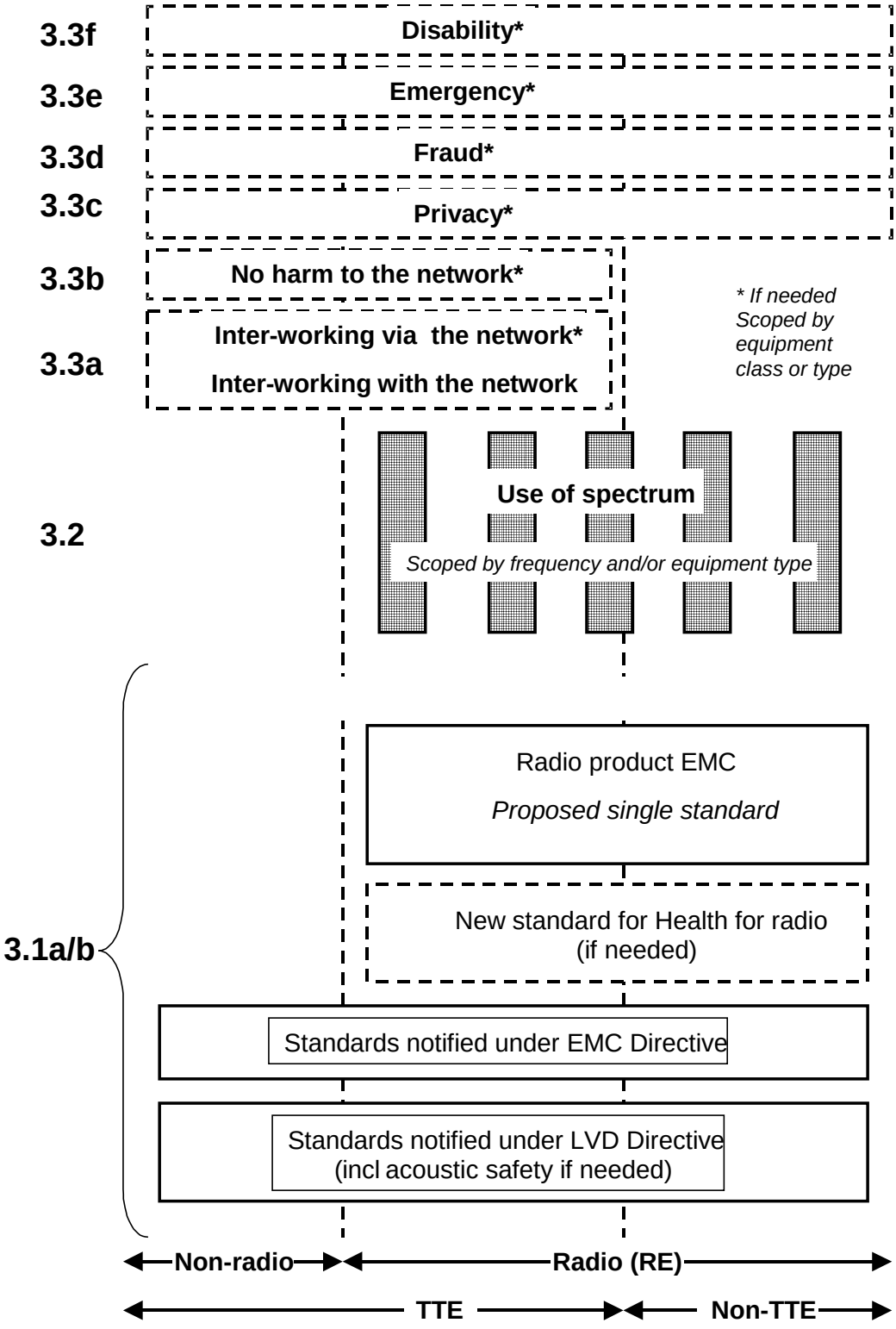

Figure 1: Modular structure for the various standards used under the R&TTE Directive

The left hand edge of the figure shows the different subclauses 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 device radio transmitters and receivers:

1) transmitters operating in the range from 25 to 1 000 MHz and with power levels ranging up to 500 mW;

2) receivers operating in the range from 25 to 1 000 MHz.

The present document applies to short range devices:

- either with a Radio Frequency (RF) output connection and/or with an integral antenna;
- for alarms, identification, telecommand, telemetry, etc., applications;
- with or without speech.

The present document covers fixed stations, mobile stations and portable stations. In the present document requirements are given for the different frequency bands, channel separations etc., where appropriate.

All types of modulation are covered, in the present document, provided the requirements of subclauses 8.5 or 8.6, whichever is applicable, are met.

The radio equipment, covered by the classification SRD is divided into several classes based on maximum output power (see table 1). The class designation is based on CEPT/ERC Recommendation 70-03 [5].

Table 1

Class	Power level (conducted or radiated) mW
5a	0,025
7a	5
8	10
9	25
11	100
12	500

For non-harmonized parameters, national regulatory conditions can apply regarding the type of modulation, channel/frequency separations, maximum transmitter output power/effective radiated power, duty cycle, equipment marking and the inclusion of an automatic transmitter shut-off facility as a condition of the issue of an individual or general licence, or, as a condition of use under licence exemption. The extreme temperature ranges are fixed and are given in subclause 5.4.1.2.

The present document does not require measurements for radiated emissions below 25 MHz.

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

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 equipment and the mutual recognition of their conformity".

[2] EN 300 220-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods".

[3] "Council Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulationsCouncil Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations".

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

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

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 300 220-1 [2] apply.

3.2 Symbols

For the purposes of the present document, the symbols defined in EN 300 220-1 [2] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations defined in EN 300 220-1 [2] apply.

4 Technical requirements specifications

4.1 Transmitter requirements

4.1.1 Frequency error or frequency drift

One of the following shall be met:

- the frequency error or frequency drift, as defined in EN 300 220-1 [2] subclause 8.1.1, shall not exceed the limits in EN 300 220-1 [2] table 7; or
- for narrow band equipment not capable of producing an unmodulated carrier, the adjacent channel power, as defined in EN 300 220-1 [2] subclause 8.5.2, shall not exceed the limits in EN 300 220-1 [2], subclause 8.5.3 under extreme conditions.

This requirement applies to all transmitters.

4.1.2 Carrier power (conducted)

The carrier power (conducted), as defined in EN 300 220-1 [2] subclause 8.2.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.2.3.

This requirement applies to transmitters which may be used without an integral or dedicated antenna.

4.1.3 Effective radiated power

The effective radiated power, as defined in EN 300 220-1 [2] subclause 8.3.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.3.3.

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

4.1.4 Frequency deviation

The frequency deviation, as defined in EN 300 220-1 [2] subclause 8.4.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.4.1.2.2 for analogue signals within the audio bandwidth, and shall not exceed the limits in EN 300 220-1 [2] subclause 8.4.1.3.2 for analogue signals above the audio bandwidth.

This requirement applies to all transmitters employing narrow band frequency or phase modulation for voice applications.

4.1.5 Modulation depth

The modulation depth, as defined in EN 300 220-1 [2] subclause 8.4.2.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.4.2.2.2 for analogue signals within the audio bandwidth, and shall not exceed the limits in EN 300 220-1 [2] subclause 8.4.2.3.2 for analogue signals above the audio bandwidth

This requirement applies to all transmitters employing narrow band amplitude modulation for voice applications.

4.1.6 Adjacent channel power

The adjacent channel power, as defined in EN 300 220-1 [2] subclause 8.5.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.5.3.

This requirement applies to transmitters where a channel plan is used with a channel spacing of 25 kHz or less.

4.1.7 Range of modulation bandwidth for wide band equipment (> 25 kHz)

The range of modulation bandwidth, as defined in EN 300 220-1 [2] subclause 8.6.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.6.3.

This requirement applies to transmitters using wide band as defined in EN 300 220-1 [2], subclause 3.1.

4.1.8 Spurious emissions

The spurious emissions, as defined in EN 300 220-1 [2] subclause 8.7.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.7.5.

This requirement applies to all transmitters.

4.1.9 Frequency stability under low-voltage conditions

The frequency stability under low-voltage conditions, as defined in EN 300 220-1 [2] subclause 8.8.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.8.3.

This requirement applies to all battery-operated transmitters.

4.1.10 Duty cycle

The duty cycle, as defined in EN 300 220-1 [2] subclause 8.9.1, shall not exceed the limits in EN 300 220-1 [2] subclause 8.9.3.

This requirement applies to all transmitters.

4.2 Receiver requirements

4.2.1 Spurious radiations

The spurious radiations, as defined in EN 300 220-1 [2] subclause 9.4.1, shall not exceed the limits in EN 300 220-1 [2] subclause 9.4.5.

This requirement applies to all receivers.

4.2.2 Adjacent channel selectivity - in band

The adjacent channel selectivity in-band, as defined in EN 300 220-1 [2] subclause 9.1.1, shall not exceed the limits in EN 300 220-1 [2] subclause 9.1.3.

This requirement applies to class A and class B receivers, as defined in EN 300 220-1 [2], subclause 4.1.1.

4.2.3 Adjacent band selectivity

The adjacent band selectivity, as defined in EN 300 220-1 [2] subclause 9.2.1, shall not exceed the limits in EN 300 220-1 [2], table 16.

This requirement applies to class A and class B receivers, as defined in EN 300 220-1 [2], subclause 4.1.1.

4.2.4 Blocking or desensitization

The blocking or desensitization, as defined in EN 300 220-1 [2] subclause 9.3.1, shall not exceed the limits in EN 300 220-1 [2], subclause 9.3.3.

This requirement applies to class A and class B receivers, as defined in EN 300 220-1 [2], subclause 4.1.1.

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

Type tests shall be made under normal test conditions, and also, where stated, under extreme test conditions.

The test conditions and procedures shall be as specified in EN 300 220-1 [2] subclauses 5.3 to 5.4.

5.1.1.2 Test power source

The test power source shall meet the requirements of EN 300 220-1 [2] subclause 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 300 220-1 [2], subclauses 4.2.1 to 4.2.12.2.

5.1.3 Transmitter test suites

5.1.3.1 Frequency error or drift

For narrow band equipment, either:

- the test specified in EN 300 220-1 [2], subclause 8.1.2.1 shall be carried out; or
- the test specified in EN 300 220-1 [2], subclause 8.5.2 shall be carried out under extreme test conditions.

The test specified in EN 300 220-1 [2], subclause 8.1.3.1 shall be carried out on wide band equipment.

This test suite applies to all transmitters.

5.1.3.2 Carrier power (conducted)

The test specified in EN 300 220-1 [2], subclause 8.2.2 shall be carried out.

This test suite applies to transmitters which may be used without an integral or dedicated antenna.

5.1.3.3 Effective radiated power

The test specified in EN 300 220-1 [2], subclause 8.3.2 shall be carried out.

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

5.1.3.4 Frequency deviation

The tests specified in EN 300 220-1 [2], subclause 8.4.1.2.1 and EN 300 220-1 [2], subclause 8.4.1.3.1 shall be carried out.

This test suite applies to all transmitters employing narrow band frequency or phase modulation for voice applications.

5.1.3.5 Modulation depth

The tests specified in EN 300 220-1 [2], subclause 8.4.2.2.1 and EN 300 220-1 [2], subclause 8.4.2.3.1 shall be carried out.

This test suite applies to all transmitters employing narrow band amplitude modulation for voice applications.

5.1.3.6 Adjacent channel power

The test specified in EN 300 220-1 [2], subclause 8.5.2 shall be carried out.

This test suite applies to transmitters where a channel plan is used with a channel spacing of 25 kHz or less.

5.1.3.7 Range of modulation bandwidth for wide band equipment (> 25 kHz)

The test specified in EN 300 220-1 [2], subclause 8.6.2 shall be carried out.

This test suite applies to transmitters using wide band as defined in EN 300 220-1 [2], subclause 3.1.

5.1.3.8 Spurious emissions

Either:

- the tests specified in EN 300 220-1 [2], subclause 8.7.2 and EN 300 220-1 [2], subclause 8.7.3 shall be carried out; or
- the test specified in EN 300 220-1 [2], subclause 8.7.4 shall be carried out.

This test suite applies to all transmitters.

5.1.3.9 Frequency stability under low-voltage conditions

The test specified in EN 300 220-1 [2], subclause 8.8.2 shall be carried out.

This test suite applies to all battery-operated transmitters.

5.1.4 Receiver test suites

5.1.4.1 Spurious radiations

Either:

- the tests specified in EN 300 220-1 [2], subclause 9.4.2 and EN 300 220-1 [2], subclause 9.4.3 shall be carried out; or
- the test specified in EN 300 220-1 [2], subclause 9.4.4 shall be carried out.

This test suite applies to all receivers.

5.2 Other test specifications

The requirements in subclause 4.2 have been set on the assumption that the test specifications in table 1a will be used to verify the performance of equipment.

Table 1a: Receiver test specifications

Subclause	Performance requirement	Subclause on EN 300 220-1 [2] containing the test method
4.2.1	Spurious radiations	9.4.2 and 9.4.3; or 9.4.4
4.2.2	Adjacent channel selectivity - in band	9.1.2
4.2.3	Adjacent band selectivity	9.2.2
4.2.4	Blocking or desensitization	9.3.2

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 measurement uncertainty value for the measurement of each parameter shall be separately 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 2.

Table 2: Measurement uncertainty

RF frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	±0,75 dB
Maximum frequency deviation: - within 300 Hz and 6 kHz of audio frequency - within 6 kHz and 25 kHz of audio frequency	 ±5 % ±3 dB
Adjacent channel power	±3 dB
Conducted emission of transmitter, valid up to 12,75 GHz	±4 dB
Conducted emission of receivers	±3 dB
Radiated emission of transmitter, valid up to 12,75 GHz	±6 dB
Radiated emission of receiver, valid up to 12,75 GHz	±6 dB

For the test methods, according to the present document the uncertainty figures are valid to a confidence level of 95 % calculated according to the methods described in the ETR 028 [4].

History

Document history			
V1.1.1	January 2000	Public Enquiry	PE 200020: 2000-01-19 to 2000-05-19