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Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

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Intellectual Property Rights

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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 Harmonized European Standard (EN) 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 mandate M/284 issued from the European Commission under Council Directive 98/34/EC [i.2] as amended by Directive 98/48/EC.

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.1].

The requirements relevant to Directive 1999/5/EC [i.1] are summarized in annex A.

The present document is part 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National regulations on maximum power output will apply.

National transposition dates	
Date of adoption of this EN:	19 May 2015
Date of latest announcement of this EN (doa):	31 August 2015
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	29 February 2016
Date of withdrawal of any conflicting National Standard (dow):	28 February 2017

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.1]. The modular structure is shown in ETSI EG 201 399 [i.3].

1 Scope

The present document applies to equipment operating on radio frequencies between 25 MHz and 3 GHz, using analogue, digital and hybrid (using both analogue and digital modulation) modulation.

The present document applies to the following radio equipment types:

- Professional Wireless Microphone Systems (PWMS);
- in ear monitoring systems;
- consumer radio microphones;
- tour guide systems; and
- Assistive Listening Devices (Aids for the handicapped) comprising personal and public hearing aid systems.

The maximum power recommended for equipment covered by the present document is 250 mW for radio microphones and 500 mW for public hearing aids in the 169,4 MHz to 169,8125 MHz band (erp below 1 GHz and eirp above 1 GHz).

The present document also covers radio microphones used in the 863 MHz to 865 MHz band, with a maximum power of 10 mW.

The present document is intended to cover the provisions of Directive 1999/5/EC [i.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 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

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI EN 300 422-1 (V1.4.2) (08-2011): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.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).

[i.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.

[i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".

[i.4] ETSI TR 100 028: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[i.5] ETSI TR 102 215: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Recommended approach, and possible limits for measurement uncertainty for the measurement of radiated electromagnetic fields above 1 GHz".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 300 422-1 [1] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI EN 300 422-1 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 300 422-1 [1] apply.

4 Technical requirements specifications for Radio microphones

4.1 Environmental profile

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

4.2 Conformance requirements

4.2.1 Frequency stability

4.2.1.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

4.2.1.2 Limit

The transmitter frequency error limit shall be as stated in ETSI EN 300 422-1 [1], clause 8.1.3.

4.2.1.3 Conformance

Conformance tests as defined in clause 5.3.1.1 shall be carried out.

4.2.2 Rated Output Power

4.2.2.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

4.2.2.2 Limit

The rated output power shall be as stated in ETSI EN 300 422-1 [1], clause 8.2.3.

4.2.2.3 Conformance

Conformance tests as defined in clause 8.2.1 for equipment without integral antenna or clause 8.2.2 for equipment with integral antenna shall be carried out.

4.2.3 Necessary bandwidth

4.2.3.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

4.2.3.2 Limit

The necessary bandwidth limit shall be as stated in ETSI EN 300 422-1 [1], clause 8.3.1 for analogue systems and clause 8.3.2 for digital systems.

4.2.3.3 Conformance

Conformance tests as defined in clause 8.3 shall be carried out.

4.2.4 Spurious emissions

4.2.4.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

4.2.4.2 Limit

The spurious emissions limit shall be as stated in ETSI EN 300 422-1 [1], clause 8.4.3.

4.2.4.3 Conformance

Conformance tests as defined in clause 8.4.2 shall be carried out.

4.3 Receiver requirements

4.3.1 Spurious emissions

4.3.1.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 9.1.1.

4.3.1.2 Limit

The spurious emissions limit shall be as stated in ETSI EN 300 422-1 [1], clause 9.1.5.

4.3.1.3 Conformance

Conformance tests as defined in ETSI EN 300 422-1 [1], clauses 9.1.2, 9.1.3 and 9.1.4 shall be carried out.

5 Testing for compliance with technical requirements

5.1 Environmental conditions for testing

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

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 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 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 the principles contained within ETSI TR 100 028 [i.4] or ETSI TR 102 215 [i.5] as appropriate 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 x 10^{-7}
Audio Output power	< ±0,5 dB
Radiated RF power	< ±6 dB
Conducted RF power variations using a test fixture	< ±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
Deviation limitation	< ±5 %
Radiated emission of transmitter, valid up to 12,75 GHz	< ±6 dB
Radiated emission of receiver, valid up to 12,75 GHz	< ±6 dB

5.3 Essential radio test suites

5.3.1 Transmitter test suites

5.3.1.1 Frequency stability

The test specified in ETSI EN 300 422-1 [1], clause 8.1.1 shall be carried out for analogue systems and clause 8.1.2 for digital systems. The results obtained shall be compared to the limits in clause 8.1.3 in order to prove compliance with the requirement.

5.3.1.2 Rated Output Power

The test specified in ETSI EN 300 422-1 [1], clauses 8.2.1 and 8.2.2 shall be carried out. The results obtained shall be compared to the limits in clause 8.2.3 in order to prove compliance with the requirement.

5.3.1.3 Necessary bandwidth

The test specified in ETSI EN 300 422-1 [1], clause 8.3.1 shall be carried out for analogue systems and clause 8.3.2 for digital systems. The results obtained shall be compared to the limits in clauses 8.3.1.2 and 8.3.2.2 in order to prove compliance with the requirement.

5.3.1.4 Spurious emissions

The test specified in ETSI EN 300 422-1 [1], clause 8.4.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance with the requirement.

5.3.2 Receiver test suites

5.3.2.1 Spurious emissions

The test specified in ETSI EN 300 422-1 [1], clauses 9.1.2, 9.1.3 and 9.1.4 shall be carried out. The results obtained shall be compared to the limits in clause 8.4.3 in order to prove compliance with the requirement.

6 Technical requirements specifications for Assistive listening devices

6.1 Environmental profile

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

6.2 Conformance requirements

6.2.1 Frequency stability

6.2.1.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

6.2.1.2 Limit

The transmitter frequency error limit shall be as stated in ETSI EN 300 422-1 [1], clause 14.1.3.

6.2.1.3 Conformance

Conformance tests as defined in clause 7.3.1.1 shall be carried out.

6.2.2 Rated Output Power

6.2.2.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

6.2.2.2 Limit

The rated output power shall be as stated in ETSI EN 300 422-1 [1], clause 14.2.3.

6.2.2.3 Conformance

Conformance tests as defined in clause 7.3.1.2 shall be carried out.

6.2.3 Necessary bandwidth

6.2.3.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

6.2.3.2 Limit

The necessary bandwidth limit shall be as stated in ETSI EN 300 422-1 [1], clause 14.3.1.2 for analogue systems and clause 14.3.2.2 for digital systems.

6.2.3.3 Conformance

Conformance tests as defined in clause 7.3.1.3 shall be carried out.

6.2.4 Spurious emissions

6.2.4.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 3.1.

6.2.4.2 Limit

The spurious emissions limit shall be as stated in ETSI EN 300 422-1 [1], clause 14.4.3.

6.2.4.3 Conformance

Conformance tests as defined in clause 7.3.1.4 shall be carried out.

6.3 Receiver requirements

6.3.1 Spurious emissions

6.3.1.1 Definition

This shall be as defined in ETSI EN 300 422-1 [1], clause 15.1.1.

6.3.1.2 Limit

The spurious emissions limit shall be as stated in ETSI EN 300 422-1 [1], clause 15.1.5.

6.3.1.3 Conformance

Conformance tests as defined in clause 7.3.2.1 shall be carried out.

7 Testing for compliance with technical requirements

7.1 Environmental conditions for testing

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

7.2 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 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 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.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with the principles contained within ETSI TR 100 028 [i.4] or ETSI TR 102 215 [i.5] as appropriate 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 2 is based on such expansion factors.

Table 2: Maximum measurement uncertainty

Parameter	Uncertainty
RF frequency	< ±1 x 10^{-7}
Audio Output power	< ±0,5 dB
Radiated RF power	< ±6 dB
Conducted RF power variations using a test fixture	< ±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
Deviation limitation	< ±5 %
Radiated emission of transmitter, valid up to 12,75 GHz	< ±6 dB
Radiated emission of receiver, valid up to 12,75 GHz	< ±6 dB

7.3 Essential radio test suites

7.3.1 Transmitter test suites

7.3.1.1 Frequency stability

The test specified in ETSI EN 300 422-1 [1], clause 14.1.1 shall be carried out for analogue systems and clause 14.1.2 for digital systems. The results obtained shall be compared to the limits in clause 6.2.1.2 in order to prove compliance with the requirement.

7.3.1.2 Rated Output Power

The test specified in ETSI EN 300 422-1 [1], clauses 14.2.1 and 14.2.2 shall be carried out. The results obtained shall be compared to the limits in clause 6.2.2.2 in order to prove compliance with the requirement.

7.3.1.3 Necessary bandwidth

The test specified in ETSI EN 300 422-1 [1], clause 14.3.1 shall be carried out for analogue systems and clause 14.3.2 for digital systems. The results obtained shall be compared to the limits in clause 6.2.3.2 in order to prove compliance with the requirement.

7.3.1.4 Spurious emissions

The test specified in ETSI EN 300 422-1 [1], clause 14.4.2 shall be carried out. The results obtained shall be compared to the limits in clause 6.2.4.2 in order to prove compliance with the requirement.

7.3.2 Receiver test suites

7.3.2.1 Spurious emissions

The test specified in ETSI EN 300 422-1 [1], clauses 15.1.2, 15.1.3 and 15.1.4 shall be carried out. The results obtained shall be compared to the limits in clause 6.3.1.2 in order to prove compliance with the requirement.

Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT)

The HS Requirements and conformance Test specifications Table (HS-RTT) in table A.1 serves a number of purposes, as follows:

- it provides a statement of all the requirements in words and by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it provides a statement of all the test procedures corresponding to those requirements by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it qualifies each requirement to be either:
  - Unconditional: meaning that the requirement applies in all circumstances; or
  - Conditional: meaning that the requirement is dependent on the manufacturer having chosen to support optional functionality defined within the schedule.
- in the case of Conditional requirements, it associates the requirement with the particular optional service or functionality;
- it qualifies each test procedure to be either:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement shall be demonstrated to be met in accordance with the referenced procedures;
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.

Table A.1: HS Requirements and conformance Test specifications Table (HS-RTT)

Harmonized Standard ETSI EN 300 422-2 The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive [i.1]							
	Requirement			**Requirement Conditionality**		**Test Specification**	
Radio microphones	**No**	**Description**	**Reference: Clause No**	**U/C**	**Condition**	**E/O**	**Reference: Clause No**
	1	Frequency error	4.2.1	U		E	5.3.1.1
	2	Rated Output Power	4.2.2	U		E	5.3.1.2
	3	Necessary bandwidth	4.2.3	U		E	5.3.1.3
	4	Spurious emissions (Transmitter)	4.2.4	U		E	5.3.1.4
	5	Spurious emissions (Receiver)	4.3.1	U		E	5.3.2.1
Assistive listening devices	**No**	**Description**	**Reference: Clause No**	**U/C**	**Condition**	**E/O**	**Reference: Clause No**
	1	Frequency error	6.2.1	U		E	7.3.1.1
	2	Rated Output Power	6.2.2	U		E	7.3.1.2
	3	Necessary bandwidth	6.2.3	U		E	7.3.1.3
	4	Spurious emissions (Transmitter)	6.2.4	U		E	7.3.1.4
	5	Spurious emissions (Receiver)	6.3.1	U		E	7.3.2.1

Key to columns:

Requirement:

No A unique identifier for one row of the table which may be used to identify a requirement or its test specification.

Description A textual reference to the requirement.

Clause Number Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

Requirement Conditionality:

U/C Indicates whether the requirement is to be *unconditionally* applicable (U) or is *conditional* upon the manufacturers claimed functionality of the equipment (C).

Condition Explains the conditions when the requirement shall or shall not be applicable for a requirement which is classified "conditional".

Test Specification:

E/O Indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O).

NOTE: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement. The completion of all tests classified "E" as specified with satisfactory outcomes is a necessary condition for a presumption of conformity. Compliance with requirements associated with tests classified "O" or "X" is a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

Clause Number Identification of clause(s) defining the test specification in the present document unless another document is referenced explicitly Where no test is specified (that is, where the previous field is "X") this field remains blank.

History

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