



**ElectroMagnetic Compatibility (EMC) standard for radio
equipment and services;
Part 9: Specific conditions for wireless microphones, similar
Radio Frequency (RF) audio link equipment, cordless audio,
in-ear monitoring and assistive listening devices;
Harmonised Standards for ElectroMagnetic Compatibility**

Reference

REN/ERM-EMC-425

Keywords

audio, digital, EMC, harmonised standard, radio,
radio mic, regulation

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Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	6
1 Scope	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	8
3 Definition of terms, symbols and abbreviations.....	9
3.1 Terms.....	9
3.2 Symbols.....	10
3.3 Abbreviations	10
4 Test conditions	11
4.1 Applicability.....	11
4.2 General	11
4.3 Arrangements for test signals	11
4.3.1 General.....	11
4.3.2 Arrangements for test signals at the input of transmitters.....	11
4.3.3 Arrangements for test signals at the output of transmitters.....	12
4.3.4 Arrangements for test signals at the input of receivers	12
4.3.5 Arrangements for test signals at the output of receivers	13
4.3.6 Arrangements for testing transmitter and receiver together (as a system)	13
4.4 Exclusion bands.....	14
4.4.1 General.....	14
4.4.2 Receiver and receivers of transceivers exclusion band.....	14
4.4.3 Transmitter exclusion band.....	14
4.5 Intermediate frequency responses of receivers.....	14
4.6 Normal test modulation	15
4.6.1 Void	15
4.6.2 Transmitters	15
4.6.3 Receivers	15
5 Performance assessment.....	15
5.1 General	15
5.2 Ancillary equipment	15
5.3 Assessment procedures.....	15
6 Performance criteria	16
6.1 Introduction	16
6.1.1 General.....	16
6.1.2 General performance criteria	16
6.2 Performance Requirements	17
6.2.1 Performance criteria for equipment which provides a continuous communication link.....	17
6.2.1.1 General.....	17
6.2.1.2 Performance criteria for Continuous phenomena applied to Transmitters (CT) and Receivers (CR).....	17
6.2.1.3 Performance criteria for Transient phenomena applied to Transmitters (TT) and Receivers (TR).....	18
6.2.2 Performance criteria for equipment which does not provide a continuous communication link	18
7 Technical requirements overview	18
7.0 General requirements	18
7.1 Emission.....	18
7.1.1 General.....	18
7.1.2 Special conditions.....	19
7.2 Immunity	19
7.2.1 General.....	19

7.2.2	Special conditions	21
Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	22
Annex B (normative):	Acoustic stimulation of wireless radio microphones and similar radio communications link equipment, conditions for the test set up and configuration.	24
B.1	General	24
B.2	Audio excitation	24
Annex C:	Void	25
Annex D (informative):	Minimum test report information	26
D.1	Introduction	26
D.2	Information to be provided before testing	26
D.2.1	Test fixture and audio interface description applied for testing	26
D.2.2	Coupling means applied for testing	26
D.2.3	Receiver category applied for testing	26
D.2.4	Switching range of the product	26
D.2.5	Test modulation for communication link	26
D.2.6	Test signal for communication link	26
Annex E (informative):	Cochlear Implants - EMC Requirement Comparison	27
E.1	Introduction	27
E.2	EMC requirement comparison table	27
Annex F (informative):	Bibliography	29
Annex G (informative):	Change history	30
History		31

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Foreword

This final draft Harmonised European Standard (EN) 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 Standardisation Request deliverable Approval Procedure (SRdAP).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.3] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive and associated EFTA regulations.

The present document is part 9 of a multi-part deliverable. Full details of the entire series can be found in part 1 [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
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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).

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1 Scope

The present document specifies technical characteristics and methods of measurements for wireless microphones, similar RF audio link equipment, cordless audio (including low power Band II transmitters), in-ear monitoring, cochlear implant and assistive listening devices, intended for the transmission of music and speech including the associated ancillary equipment in respect of electromagnetic compatibility, as detailed in table 1.

Technical specifications related to the antenna port and emissions from the enclosure port of the radio equipment are out of scope of the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum, see table 1.

The present document specifies the applicable test conditions, performance assessment and performance criteria for wireless microphones, similar RF audio link equipment, cordless audio, in-ear monitoring, ALD and Cochlear Implants and associated ancillary equipment. This equipment can use analogue or digital modulation techniques.

Table 1: Radio Technologies in scope of the present document

Technology	ETSI Standard
Wireless Microphones In-Ear Monitoring Wireless Multichannel Audio Systems	ETSI EN 300 422-1 [2]
Assistive Listening Devices Cochlear Implants Neck loops-T-Coil Personal Sound Amplifiers Hearing Aid Systems	ETSI EN 300 422-4 [i.13]
Cordless Audio Low Power FM Tx Low Power Radio Microphones In-Ear Monitoring	ETSI EN 301 357-1 [i.12]
Audio Links	ETSI EN 300 454-1 [i.11]

For cochlear implants more stringent EMC standards exist and Annex E provides information on its relationship to the present document.

NOTE 1: Technical specifications related to conducted emission EMC requirements below 9 kHz on the AC mains port of radio equipment are out of scope of the present document. Such technical specifications are normally found in the relevant product family standards for AC mains powered equipment (e.g. EN 61000-3-2 [i.6] and EN 61000-3-3 [i.7]).

NOTE 2: The relationship between the present document and essential requirements of article 3.1(b) of Directive 2014/53/EU [i.1] is given in Annex A.

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 referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found in the [ETSI docbox](#).

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

- [1] [ETSI EN 301 489-1 \(V2.2.3\) \(11-2019\)](#): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility".
- [2] [ETSI EN 300 422-1 \(V2.2.1\) \(11-2021\)](#): "Wireless Microphones; Audio PMSE up to 3 GHz; Part 1: Audio PMSE Equipment up to 3 GHz; Harmonised Standard for access to radio spectrum".

2.2 Informative references

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The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

- [i.1] [Directive 2014/53/EU](#) of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.2] [CEPT/ERC/REC 70-03](#): "Relating to the use of Short Range Devices (SRD)".
- [i.3] [Commission Implementing Decision C\(2015\) 5376 final](#) of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.4] Void.
- [i.5] Void.
- [i.6] IEC EN 61000-3-2 (2014): "Electromagnetic compatibility (EMC) - Part 3-2: Limits -Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)".
- [i.7] IEC EN 61000-3-3 (2013): "Electromagnetic compatibility (EMC) - Part 3-3: Limits -Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection".
- [i.8] EN 45502-2-3 (2010): "Active implantable medical devices - Part 2-3: Particular requirements for cochlear and auditory brainstem implant systems" (Produced by CENELEC).
- [i.9] EN 60601-1-2 (2015) + A1(2021): "Medical electrical equipment-General requirements for basic safety and essential performance. Collateral Standard: Electromagnetic disturbances. Requirements and tests" (Produced by CENELEC).
- [i.10] [Regulation \(EU\) 2017/745](#) of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC.
- [i.11] ETSI EN 300 454-1 (V1.1.2) (08-2000): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Wide band audio links; Part 1: Technical characteristics and test methods".
- [i.12] ETSI EN 301 357-1 (V1.4.1) (11-2008): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Cordless audio devices in the range 25 MHz to 2 000 MHz; Part 1: Technical characteristics and test methods".
- [i.13] ETSI EN 300 422-4 (V2.1.1) (05-2017): "Wireless Microphones; Audio PMSE up to 3 GHz; Part 4: Assistive Listening Devices including personal sound amplifiers and inductive systems up to 3 GHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 301 489-1 [1] and the following apply:

Assistive Listening Device (ALD) for hearing impaired: aid for a hearing-impaired person, also known as a hearing aid

Assistive Listening System (ALS) for hearing impaired: systems utilizing electromagnetic, radio or light waves, or a combination of these, to transmit the acoustic signal from the source (e.g. a loudspeaker or a person talking) directly to the hearing-impaired person

NOTE: Both aids for the hearing impaired and Assistive Listening devices would normally be prescribed by a hearing professional.

Audio-Frequency Induction-Loop System (AFILS): system including induction loop amplifier(s), microphones and/or other signal sources, in which magnetic fields are created by the flow of audio-frequency current in a conductor arranged in the form of a loop or coil

Cochlear Implant (CI): surgically implanted neuroprosthetic device intended to provide a person with moderate to profound sensorineural hearing loss a modified sense of sound

NOTE: CI bypasses the normal acoustic hearing process to replace it with electric signals which directly stimulate the auditory nerve.

Cochlear Implants (CI) transformer coils: two transformer windings separated by the human skin

NOTE: For the purpose of the present document the CI transformer coils of a conventional CI are using magnetic induction for providing power and data to the implant from the external sound processor/hearing aid and not to recharge the CI by WPT.

companding: method of audio processing that compresses the audio dynamic range before transmission and then provides matching expansion of the signal in the receiver

NOTE: The method is used to improve the audio performance in the RF link.

hearing aid system: broadcast radio communication system comprising one transmitter (up to 500 mW in the band 169,4 MHz to 169,8125 MHz), which is installed at a fixed location in a large auditorium.

EXAMPLE: In a church or theatre and one or more receivers, where each receiver can have wired or inductive connection to a hearing aid

In Ear Monitor (IEM): body worn miniature receiver with earpieces for personal monitoring of single- or dual-channel sound

integral antenna: antenna designed to be connected to the equipment without the use of a 50 Ω external connector and considered to be part of the equipment

NOTE: An integral antenna may be fitted internally or externally to the equipment.

low power band 2 transmitters: band II LPD (low power devices) up to 200 kHz bandwidth and analogue modulation

mobile equipment: receiver, transmitter or transmitter/receiver (transceiver) intended for installation and use in a vehicle, and powered by the main battery of the vehicle

neck loop: insulated wire loop antenna which goes around the neck connecting to a small unit and communicates with the T-coil receiver contained within a hearing aid, ALD or Cochlear implant