

9`Y_hfca U[bYfbUnXfi y`fj cghfA7L]b`nUXYj Y`j`nj Ynj`n`fUX]`g_`ja`gdY_hfca`fAFA`!
GHUbXUfX`Y`Y_hfca U[bYfbY`nXfi y`fj cgh]`fA7L`nUfUX]`g_c`cdfYa c`]b`ghcf]`h Y!`-`"
XY.`DcgYVb]`dc[c`]`nUVfYnY] bYa`_`fcZbY]b`dcXcVbc`cdfYa c`nUnj c`cj bY
dcj YnUj YbUdcXfc`1`fUX]`g_`]`ZY`j YbWfF: L

ElectroMagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 9: Specific conditions for wireless microphones and similar Radio Frequency (RF) audio link equipment

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**ElectroMagnetic compatibility
and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC) standard
for radio equipment and services;
Part 9: Specific conditions for wireless microphones and
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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 the Council Directive 98/34/EC [4] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulation.

The present document, together with EN 301 489-1 [1], is intended to become a Harmonized EMC Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility (the "EMC Directive" 89/336/EEC [3] as amended), and the Council Directive on the approximation of the laws of the Member States relating to radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (the "R&TTE Directive" 1999/5/EC [2]).

The present document is part 9 of a multi-part EN covering the ElectroMagnetic Compatibility (EMC) standard for radio equipment and services, as identified below:

- Part 1: "Common technical requirements";
- Part 2: "Specific conditions for radio paging equipment";
- Part 3: "Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz";
- Part 4: "Specific conditions for fixed radio links and ancillary equipment and services";
- Part 5: "Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech)";
- Part 6: "Specific conditions for Digital Enhanced Cordless Telecommunications (DECT) equipment";
- Part 7: "Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)";
- Part 8: "Specific conditions for GSM base stations";
- Part 9: "Specific conditions for wireless microphones and similar Radio Frequency (RF) audio link equipment";**
- Part 10: "Specific conditions for First (CT1 and CT1+) and Second Generation Cordless Telephone (CT2) equipment";
- Part 11: "Specific conditions for FM broadcasting transmitters";
- Part 12: "Specific conditions for Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)";
- Part 13: "Specific conditions for Citizens' Band (CB) radio and ancillary equipment (speech and non-speech)";

- Part 15: "Specific conditions for commercially available amateur radio equipment";
- Part 16: "Specific conditions for analogue cellular radio communications equipment, mobile and portable";
- Part 17: "Specific conditions for Wideband data and HIPERLAN equipment";
- Part 18: "Specific conditions for Terrestrial Trunked Radio (TETRA) equipment";
- Part 19: "Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications";
- Part 20: "Specific conditions for Mobile Earth Stations (MES) used in the Mobile Satellite Services (MSS)";
- Part 22: "Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment".

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1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of wireless microphones and similar RF audio link equipment, intended for the transmission of music and speech, and associated ancillary equipment, in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of wireless microphones and similar RF audio link equipment are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

The present document specifies the applicable EMC tests, the test methods, the limits and the performance criteria for wireless microphones, similar RF audio link equipment, wideband cordless audio devices and associated ancillary equipment.

Examples of equipment types covered by the present document are given in annex A.

Other types of transmitters or receivers, which are intended for combined use, with either wireless radio microphones, RF audio link equipment or wideband cordless audio devices shall be tested to their appropriate EMC standard.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and EN 301 489-1 [1], the provisions of the present document take precedence.

The environmental classification and the emission and immunity requirements used in the present document are as stated in EN 301 489-1 [1], except for any special conditions included in 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] ETSI EN 301 489-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".
- [2] 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.
- [3] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.
- [4] 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.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions of EN 301 489-1 [1], clause 3 and the following apply as appropriate. The following definitions apply in addition or take precedence:

companding: method of audio processing that compresses the audio dynamic range before transmission and then provides matching expansion of the signal in the receiver. The method is used to improve the audio performance in the RF link.

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

switching range: maximum frequency range over which the receiver or transmitter can be operated without reprogramming or realignment.

vehicle battery: battery used for the primary operation of the vehicle, i.e. the ignition or starting of the vehicle.

3.2 Abbreviations

For the purpose of the present document the following abbreviations apply:

EMC	Electromagnetic Compatibility
EUT	Equipment Under Test
RF	Radio Frequency
SINAD	Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)

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4 Test conditions

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For the purposes of the present document, the test conditions of EN 301 489-1 [1], clause 4 shall apply as appropriate. Further product related test conditions for wireless microphones, similar RF audio link equipment, wideband cordless audio and ancillary equipment are specified in the present document.

4.1 General

For emission and immunity tests the test modulation, test arrangements, etc., as specified in the present document, clauses 4.1 to 4.5, shall apply.

For the purpose of EMC tests, body worn or hand held transmitters shall be mounted on a non-conductive stand at least 0,8 m from any conducting surface. The EUT and any other equipment required for the performance assessment before, during, and after the conclusion of the tests, shall be connected in a manner typical of normal intended use.

Whenever the EUT is provided with a detachable antenna, it shall be tested with the antenna fitted in a manner typical of normal intended use.

For immunity tests, if the equipment is of a category which permits it, a communications link shall be established at the start of the test and maintained during the test.

The test conditions shall be as follows:

- the transmitter shall be operated at its normal maximum RF output power modulated with a suitable modulation signal (see clause 4.5.1);
- for stand alone receivers or receivers of transceivers operating in simplex mode, the wanted RF input signal, coupled to the receiver, shall be modulated with a suitable modulation signal (see clause 4.5.2);
- for duplex transceivers, the wanted RF input signal, coupled to the receiver, shall be modulated with a suitable modulation signal (see clause 4.5.2). The transmitter shall be operated at its normal maximum output power,

modulated with the test modulation signal, coupled to the transmitter from the output of the receiver (repeater mode).

4.2 Arrangements for test signals

The provisions of EN 301 489-1 [1], clause 4.2 shall apply.

4.2.1 Arrangements for test signals at the input of transmitters

The provisions of EN 301 489-1 [1], clause 4.2.1 shall apply with the following modifications.

For transmitters designed to operate from an integral or dedicated microphone (see figure 2) it shall be permissible to use an acoustic coupling device to inject the normal test modulation signal (see figure 3). The acoustic coupling device may be provided by the manufacturer.

For equipment which can use a variety of audio capsules, the manufacturer shall declare the type of capsule, e.g. dynamic, electret, or condenser, to be provided with the system. Only one type of capsule shall be tested. All other capsules shall be deemed as compliant. The transmitter shall be tested at its most sensitive input with the test capsule.

For equipment not designed to use an integral or dedicated microphone, the test signal shall be fed in electrical form to the most sensitive input socket (see figure 1) using maximum length cables as normally supplied by the manufacturer with the equipment.

The modulation signal used for the tests shall be a 1 kHz sine wave tone at a level declared by the manufacturer to obtain 100 % audio modulation.

The manufacturer may provide a suitable companion receiver that can be used to set up a communications link. In this case a suitable attenuator in the companion receiver input may be necessary, see annex B for further details.

4.2.2 Arrangements for test signals at the output of transmitters

The provisions of EN 301 489-1 [1], clause 4.2.2 shall apply.

4.2.3 Arrangements for test signals at the input of receivers

The provisions of EN 301 489-1 [1], clause 4.2.3 shall apply with the following modifications.

The wanted RF input signal to the receiver should be modulated with a suitable signal corresponding to 100 % audio modulation (maximum channel loading). If it is not appropriate to provide a modulated RF signal to the receiver, the test may be performed using an unmodulated wanted RF input signal.

The level and make up of the wanted RF input signal shall be declared by the manufacturer. The level chosen shall be set to a value 60 dB above the threshold sensitivity of the receiver. The level used shall be recorded in the test report.

The manufacturer may provide a suitable companion transmitter that can be used to set up a communications link. In this case a suitable attenuator in the EUT input may be necessary.