SLOVENSKI STANDARD
SIST ETS 300 445:1998

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Radijska oprema in sistemi (RES) - Standard elektromagnetne združljivosti (EMC) brezžičnih mikrofonov in podobne opreme za zvokovne povezave na področju radijskih frekvenc (RF)

Radio Equipment and Systems (RES); ElectroMagnetic Compatibility (EMC) standard for wireless microphones and similar Radio Frequency (RF) audio link equipment

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Radio Equipment and Systems (RES); Electro-Magnetic Compatibility (EMC) standard for wireless microphones and similar Radio Frequency (RF) audio link equipment

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Foreword

This European Telecommunication Standard (ETS) was produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

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Introduction

Wireless radio microphone equipment operates with a continuous RF output signal and will normally be in continuous operation for a number of hours. The transmitter typically operates at a maximum radio frequency output power of 50 mW. Wireless radio microphones may be distinguished from other voice communication equipment (e.g. PMR) by the following operational characteristics:

1) wider audio bandwidth;

2) higher audio signal to noise ratio;

3) lower audio frequency distortion.

Aids for the handicapped, tour guides systems and similar constant RF devices operate in a similar manner to wireless microphones, but with variations of bandwidth and reduced RF output power.

RF audio link equipment conform to the same parameters as a wireless radio microphone but with a higher RF carrier power. RF audio link equipment is generally used for longer distance transmission, e.g. outside broadcast applications.

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1 Scope

This ETS covers the assessment of radio communication and ancillary equipment in respect of electromagnetic compatibility. Technical specifications related to the antenna port are not included in this standard. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

This ETS specifies the applicable EMC tests, the measurement methods, the limits and the minimum performance criteria for wireless microphones and similar RF audio link equipment operating in the frequency range 25 MHz to 4 GHz, and any associated ancillary equipment.

The environment classification used in this ETS refers to the environment classification used in the Generic Standards EN 50081-1 [2], EN 50082-1 [3], except the vehicular environment class which refers to ISO 7637 [4].

The EMC technical specifications have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial, light industrial and vehicular environments. The levels however do not cover extreme cases which may occur in any location but with a low probability of occurrence.

This ETS may not cover those cases where a potential source of interference, which is producing individually repeated transient phenomena or a continuous phenomena, is permanently present, e.g. a radar or broadcast site in the near vicinity. In such a case it may be necessary to use special mitigation measures applied to either the source of the interference or to the interfered part of both.

If other transmitters or receivers are combined with either wireless radio microphones or RF audio link equipment, they shall be tested to their appropriate EMC standard.

Compliance of radio equipment to the technical specifications of this ETS does not signify compliance to any requirements related to the use of the equipment (licensing requirements).

Compliance to this ETS does not signify compliance to any safety requirement. However, it is the responsibility of the assessor of the equipment that an observation regarding the equipment becoming dangerous or unsafe as a result of the application of the tests defined in this ETS should be recorded in the test report.

2 Normative references

This ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and relate to the publications listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1] 89/336/EEC: "Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility".

[2] EN 50081-1 (1992): "Electromagnetic compatibility - Generic emission standard. Part 1: Residential, commercial and light industry".

[3] EN 50082-1 (1992): "Electromagnetic compatibility - Generic immunity standard. Part 1: Residential, commercial and light industry".

[4] ISO 7637 (1990): "Road vehicles, Electrical disturbance by conducting and coupling" Part 1: "Passenger cars and light commercial vehicles with nominal 12 V supply voltage".

ISO 7637 (1990): "Road vehicles, Electrical disturbance by conduction and coupling". Part 2: "Commercial vehicles with nominal 24 V supply voltage, Electrical transient conduction along supply lines only".

[5] EN 55022: (1987): "Limits and methods of measurement of radio interference characteristics of information technology equipment".

[6] CISPR Publication No. 16-1: "Specification for radio disturbance and immunity measuring apparatus and methods".

[7] ENV 50140: "Basic immunity standard - Radiated, radio-frequency, electromagnetic fields".

[8] IEC 1000-4-2 : (1995) Part 4: "Testing and measurement techniques".Section 2: Electrostatic discharge immunity test".

[9] IEC 1000-4-4: (1995) Part 4: "Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test".

[10] ENV 50141: "Basic immunity standard - Conducted disturbances induced by radio-frequency fields."

[11] IEC 1000-4-11 (1994): Part 4: "Testing and measurement techniques - Section 11: Voltage dips, short interruptions and voltage variations immunity tests".

[12] ENV 50142: "Electromagnetic compatibility - Basic immunity standard - Surge immunity tests".

[13] prETS 300 339: "Radio Equipment and Systems (RES); General Electro-Magnetic Compatibility (EMC) for radio equipment".

[14] ETS 300 422: "Radio Equipment and Systems (RES); Technical characteristics and test methods for wireless microphones in the 25 MHz to 3 GHz frequency range".

[15] ETS 300 454: "Radio Equipment and Systems (RES); Technical characteristics and test methods in the 25 MHz - 3 GHz frequency range for wide band audio links".

3 Definitions and Abbreviations

3.1 Definitions

For the purpose of this ETS, the following definitions apply:

vehicle battery: The battery used for the principle operation of the vehicle, i.e. the starting of the vehicle.

ancillary equipment: Equipment (apparatus), used in connection with a receiver, transmitter or transceiver is considered as an ancillary equipment (apparatus):

- the equipment is intended for use in conjunction with a receiver, transmitter or transceiver to provide additional operational and/or control features to the radio equipment (e.g. to extend control to another position or location); and

- the equipment cannot be used on a stand alone basis to provide user functions independently of a receiver, transmitter or transceiver; and

- the receiver, transmitter or transceiver to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub unit of the main equipment essential to the main equipment basic functions).

integral antenna: An 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.

port: A particular interface of the specified apparatus with the external electromagnetic environment (see figure 1).

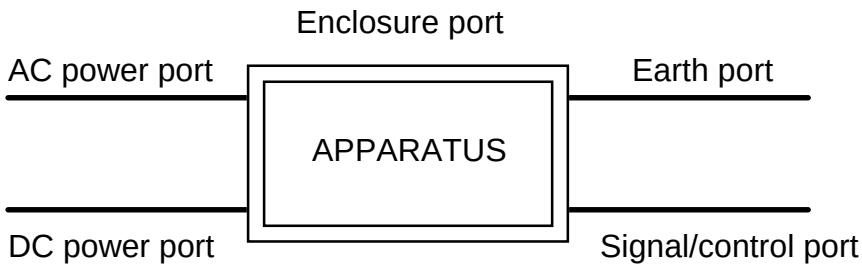

Figure 1: Examples of ports

A cable port is any connection point to an equipment intended for connection of cables to or from that equipment.

enclosure port: The physical boundary of the apparatus through which electromagnetic fields may radiate or impinge.

manufacturer: The legal entity responsible under the terms of the Council Directive, 89/336/EEC [1], for placing the product on the market.

radio communications equipment: An apparatus which includes one or more transmitters and/or receivers and/or parts thereof. This type of equipment (apparatus) can be used in a fixed, mobile or a portable application.

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

3.2 Abbreviations

EUT Equipment Under Test.

4 General test conditions

4.1 Test conditions

The equipment shall be tested under normal test conditions contained in the relevant product and basic standards or in the information accompanying the equipment, which are within the manufacturers declared range of humidity, temperature and supply voltage.

The test conditions shall be recorded in the test report.

For the purpose of test, 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 evaluation shall be connected in a manner typical of normal intended use.

Whenever the EUT is provided with a detachable antenna, the EUT 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. Test modulation, test arrangement etc., as specified in this ETS, subclauses 4.2, 4.3, 4.4 and 4.5 shall apply and the conditions shall be as follows:

- the transmitter shall be operated at its normal maximum output power modulated with a suitable test signal (see subclause 4.2);

- for stand alone receivers or receivers of transceivers operating in the simplex mode, the wanted RF input signal, coupled to the receiver, shall be modulated with a suitable test signal (see subclause 4.4);

- for duplex transceivers, the wanted RF input signal, coupled to the receiver, shall be modulated with a suitable test signal (see subclause 4.2). The transmitter shall be operated at its normal maximum output power, modulated with the test signal, coupled to the transmitter from the output of the receiver (repeater mode).

4.2 Arrangements for test signals at the input of the transmitter

The transmitter shall be modulated with a suitable test signal from an internal or external signal source. It shall be possible to verify that a communications link is established and maintained.

In the case of transmitters designed to operate from an integral or dedicated microphone (see figure 3) it shall be permissible to use an acoustic coupling device to inject the test signal. The acoustic coupling device may be provided by the manufacturer (see figure 4).

In the case of 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 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.

In the case of equipment not designed to use integral or dedicated microphone, the test signal shall be fed in electrical form to the most sensitive input socket (see figure 2) using maximum length cables as normally supplied by the manufacturer with the equipment.

The test signal shall be a 1 kHz sine wave 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 A for further details.

4.3 Arrangements for test signals at the output of the transmitter

The measuring equipment used to monitor the output signal of the transmitter shall be located outside of the test environment. Adequate measures shall be taken to protect the measuring equipment from the effect of all interferences (e.g. radiated fields and conducted interferences).

Where the equipment incorporates an external RF antenna connector the output signal of the transmitter may be coupled to the receiving measuring equipment via a shielded transmission line, such as a coaxial cable, to enable a communications link to be established and maintained.

In the case of an integral antenna equipment not provided with an external RF antenna connector, the output signal of the transmitter shall be coupled to another antenna located within the test environment enabling a communications link to be established and maintained. This antenna shall be coupled to the receiving measuring equipment.

4.4 Arrangements for test signals at the input of the receiver

The wanted input signal to the receiver should be modulated with a suitable test signal corresponding to 100 % audio modulation (maximum channel loading). If it is not appropriate to provide a modulated signal to the receiver, the test may be performed using an unmodulated wanted input signal. It shall be possible to verify that a communications link is established and maintained.

The level and make up of the test 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.