SLOVENSKI STANDARD
SIST I-ETS 300 422:1999

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Radijska oprema in sistemi (RES) - Tehniļne karakteristike in preskuġalne metode za brezģiļne mikrofone v frekvenļnem obmoļju od 25 MHz do 3 GHz

Radio Equipment and Systems (RES); Technical characteristics and test methods for wireless microphones in the 25 MHz to 3 GHz frequency range

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33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
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Radio Equipment and Systems (RES); Technical characteristics and test methods for wireless microphones in the 25 MHz to 3 GHz frequency range

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Foreword

This Interim European Telecommunication Standard (I-ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Every I-ETS prepared by ETSI is a voluntary standard. This I-ETS may contain text concerning conformance testing of the equipment to which it relates. This text should be considered as guidance only and does not make this I-ETS mandatory.

Annex A provides normative specifications concerning radiated measurements.

Annex B describes the test set-up for the measurement of Necessary Bandwidth (BN).

Annex C provides a graphic representation of the equipment and frequencies for the testing of single and multi-frequency equipment.

Annex D provides a Bibliography.

Proposed announcement date	
Date of adoption of this I-ETS:	27 October 1995
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Introduction

This I-ETS is based on the CEPT Recommendation T/R 20-06 [1].

This CEPT Recommendation has been a frame that led to many national prescriptions that differed, sometimes substantially, between European countries. The rapidly increasing quantities of wireless microphones (hereafter referred to as radio microphones) in operation, both legal and illegal, together with the greater mobility of the users, either professional or private, has led to a serious situation with many occurrences of interference and irregular operation. Legal radio microphones, being fundamentally low power devices, are interfered with more than the generators of the interference, and suffer primarily from this situation.

In preparing this I-ETS, much attention has been given to assure a low interference probability, while at the same time allowing a maximum flexibility and service to the end-user.

This I-ETS provides the necessary parameters for equipment to obtain common approval throughout Europe. It also is intended to make it easier for the frequency management authorities to find harmonized frequency allocations. Common technical specifications and harmonized frequency allocations are expected to reduce greatly the present problems of interference and illegal use.

This I-ETS is a type testing standard based on spectrum utilisation parameters and does not include performance characteristics that may be required by the user or requirements for interfacing equipment.

This I-ETS is intended to specify the minimum performance and the methods of measurement of Wireless Microphones as specified in the scope.

Type test measurements should be performed in one of the accredited test laboratories, accepted by the various national regulatory authorities in order to grant type approval, provided the national regulatory requirements are met. This is in compliance with CEPT Recommendation T/R 71-03 [2].

In addition, national administrations may accept a "certificate of conformity" based on a type test report. If equipment available on the market is required to be checked, it should be tested in accordance with the methods of measurement specified in this I-ETS.

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1 Scope

This I-ETS covers the minimum characteristics considered necessary in order to make the best use of the available frequencies. It does not necessarily include all the characteristics that may be required by a user, nor does it necessarily represent the optimum performance achievable.

This I-ETS applies to equipment with modulation systems operating on radio frequencies between 25 MHz and 3 GHz. Although analogue Frequency Modulation (FM) is at present used for the majority of wireless microphones, this specification does not preclude any other constant carrier modulation technique, e.g. Gaussian Filtered Minimum Shift Keying (GMSK) or Generalized Tamed Frequency Modulation (GTFM), provided that the modulation spectrum lies within a standardized spectral mask.

This I-ETS does not apply to wireless microphones employing Time Division Multiple Access (TDMA), frequency hopping and spread spectrum or similar forms of modulation.

EMC requirements are covered by draft prETS 300 445.

Additional standards or specifications may be required for equipment intended to interface to the Public Switched Telephone Network (PSTN). This facility may be submitted to regulatory conditions.

This I-ETS may be used by accredited test laboratories for type testing of the equipment. The performance of the equipment submitted for type testing should be representative of the performance of the corresponding production models.

This I-ETS contains instructions for the presentation of equipment for type testing purposes.

Power limits recommended in this I-ETS have been chosen to allow maximum simultaneous reusage of frequency allocations. National regulations on power output may apply up to the limits quoted below.

NOTE: If higher power limits are required reference should be made to I-ETS 300 454 Wide band audio links, which is currently under preparation.

Equipment	effective radiated power (erp) or conducted	
	Class 1	**Class 2**
Radio microphones	50 mW	2 mW
Tour guide systems	10 mW	2 mW
Aids for the handicapped	10 mW	2 mW

The types of equipment covered by this I-ETS are as follows:

- professional hand held radio microphones;
- professional body worn radio microphones;
- consumer radio microphones;
- tour guide systems;
- aids for the handicapped.

The classes of equipment given in this I-ETS are as follows:

- class 1 equipment would normally be considered as a category requiring an operator licence;

- class 2 equipment would be considered in some countries as not requiring an operator licence.

2 Normative references

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

[1] CEPT Recommendation T/R 20-06 (1977): "Transmitters and receivers for low power cordless microphone systems".

[2] CEPT Recommendation T/R 71-03: "Procedures for type testing and approval for radio equipment intended for non-public systems".

[3] ITU-R Recommendation 559-2: "Objective measurement of radio-frequency protection ratios in LF, MF and HF broadcasting".

[4] IEC 244: "Methods of measurement for radio transmitters".

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

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of this I-ETS, the following definitions apply:

conducted measurements: Measurements that are made using a direct 50 Ω connection to the EUT.

integral antenna: An antenna, with or without a connector, designed as, and declared as by the manufacturer, an indispensable part of the equipment.

integral microphone: A microphone, designed as, and declared as by the manufacturer, an indispensable fixed part of the equipment.

limiter threshold: The audio input or output level at which the transmitter audio limiter action may be said to commence. It is specified with any accessible variable gain controls set according to the manufacturer's instructions, with a sinusoidal input signal of 500 Hz.

radiated measurements: Measurements that involve the absolute measurement of a radiated electro-magnetic field.

carrier grid: Evenly spaced raster in a given frequency band for the allocation of carrier frequencies. The minimum distance of two carriers in use is a multiple of the raster dependent on type and usage of the equipment.

channel bandwidth: A frequency band of defined width (as a multiple of the carrier grid) including safety margin for operation on adjacent channels, located symmetrically around carrier frequency in the carrier grid.

port: Any connection point on or within the Equipment Under Test (EUT) intended for the connection of cables to or from that equipment.

Radio Frequency (RF) port: Any connection point on or within the EUT intended for the connection of RF cables. RF ports are treated as 50 Ω connection points unless otherwise specified by the manufacturer.

3.2 Abbreviations

For the purposes of this I-ETS, the following abbreviations apply:

ac	alternating current
AR1	Alignment Range 1
AR2	Alignment Range 2
B	declared channel Bandwidth (see table 1)
BN	Necessary Bandwidth
dc	direct current
erp	effective radiated power
EUT	Equipment Under Test
GMSK	Gaussian Filtered Minimum Shift Keying
GTFM	Generalized Tamed Frequency Modulation
LF	Low Frequency
PSTN	Public Switched Telephone Network
RBW	Resolution BandWidth
RF	Radio Frequency
Rx	Receiver
SINAD	Signal to Noise and Distortion ratio
TDMA	Time Division Multiple Access
Tx	Transmitter
VBW	Video BandWidth

3.3 Symbols

For the purposes of this I-ETS, the following symbols apply:

λ	wavelength in metres
µF	microFarad
µW	microWatt
dBc	dB relative to the carrier level
dBm	dB relative to 1 mW
E	field strength
Eo	reference field strength, (see annex A)
fc	carrier frequency
fo	operating frequency
GHz	gigaHertz
H	Henry
kHz	kiloHertz
lim	limiting
MHz	megaHertz
mW	milliWatt
nW	nanoWatt
R	distance, (see annex A)
Ro	reference distance, (see annex A)

4 Functional characteristics

4.1 Radio microphone descriptions

Radio microphones normally use wide band frequency modulation to achieve the necessary audio performance for professional use. For the majority of applications the modulated transmitter signal requires a channel bandwidth of 200 kHz.

The radio part of the transmitter and receiver shall be made up exclusively from equipment that has been approved according to this I-ETS.

Other equipment that may be connected to radio microphones shall fulfil the standards applicable to that equipment (if any).