SLOVENSKI STANDARD
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Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) - Naprave kratkega dosega (SRD) - Radijska oprema, ki deluje v frekvenčnem območju od 315 kHz do 600 kHz - 1. del: Tehnične karakteristike in preskusne metode

Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short Range Devices (SRD) - Radio equipment in the frequency range 315 kHz to 600 kHz - Part 1: Technical characteristics and test methods

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

For non-EU countries the present document may be used for regulatory (Type Approval) purposes.

The present document is part 1 of a multi-part deliverable covering Radio Equipment in the frequency range 315 kHz to 600 kHz for Ultra Low Power Animal Implant Devices and accessory peripheral systems including devices that are intended to be outside the body but in very close proximity to it in normal operation, as identified below:

Part 1: "Technical characteristics and test methods";

Part 2: "Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".

National transposition dates	
Date of adoption of this EN:	19 October 2007
Date of latest announcement of this EN (doa):	31 January 2008
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2008
Date of withdrawal of any conflicting National Standard (dow):	31 July 2008

1 Scope

The present document applies to transmitters and receivers of Ultra Low Power Animal Implant Devices (ULP-AID) operating in any part or all of the band from 315 kHz to 600 kHz and any associated radio apparatus transmitting in the frequency range of 315 kHz to 600 kHz including external programmers and related telecommunication devices using digital modulation techniques such as, but not limited to, FSK or pulse position modulation. The present document contains the technical characteristics and test methods for radio equipment and is referenced in CEPT/ERC Recommendation 70-03, annex 12 band(c).

The present document does not necessarily include all the characteristics which may be required by a user, nor does it necessarily represent the optimum performance achievable. It is a product standard which may be completely or partially superseded by specific standards covering specific applications.

The present document applies to ULP-AID transceivers conforming to the following:

- inductive loop systems;
- with an antenna connection and/or with an integral antenna;
- for use as telecommunications and telecommand transmission to/from implanted animal systems.

All types of digital modulation for radio devices are covered by 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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version 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.

[1] ITU-T Recommendation O.153: "Basic parameters for the measurement of error performance at bit rates below the primary rate".

[2] ETSI TR 100 028 (V1.4.1) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Animal Implant Device: active implant that includes a transmitter, with or without an integral receiver, that operates in the ULP-AID band that is placed inside the body for the purpose of performing diagnostic functions and/or delivery of therapeutic treatment

artificial antenna: tuned reduced-radiating dummy load equal to the nominal impedance specified by the provider

body worn device: physiologic sensor, holter type device, or other physiological data transfer device containing a transmitter or transceiver intended to be operated in close proximity to the animal body, which has its radio antenna external to the body, and is used to sense and/or transfer, via means of radio frequency transmission, physiological parameters or system programming information

conducted measurements: measurements which are made using a direct connection to the equipment under test

dedicated antenna: removable antenna supplied and tested with the radio equipment that is designed as an indispensable part of the equipment

H-field test antenna: electrically screened loop or equivalent antenna, with which the magnetic component of the radio frequency field can be measured

integral antenna: permanent fixed antenna, which may be built-in, that is designed as an indispensable part of the equipment

magnetic dipole moment: product of (Number of coil turns) × (coil area) × (coil current)

NOTE: Air coils only.

mobile station: equipment external to the animal body intended to provide communication capability to an active implant device placed within the body

programmer/controller: ULP-AID equipment used to communicate with an active implant device

radiated measurements: measurements which involve the absolute measurement of a radiated field

telecommand: use of radio communication for the transmission of signals to initiate, modify or terminate functions of equipment at a distance

telemetry: use of radio communication for transferring data at a distance

Ultra Low Power-Animal Implant Device (ULP-AID): ultra low power animal implant transmitter operating in accordance with the provisions of annex 12, band (c), to CEPT/ERC Recommendation 70-03

3.2 Symbols

For the purposes of the present document, the following symbols apply:

E	Electrical field strength
f	frequency
H	Magnetic field strength
H_{ef}	Electric filed strength limit converted from H_f
H_f	H field strength limit
m	magnetic dipole moment
P	Power
R	Distance
t	time

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AID	Animal Implant Device
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
FSK	Frequency Shift Keying
RF	Radio Frequency
R&TTE	Radio and Telecommunications Terminal Equipment
SRD	Short Range Device
ULP-AID	Ultra Low Power - Animal Implant Device

4 Essential requirements and specifications

4.1 General requirements

4.1.1 Transmitter requirements

See clause 8 for requirements including measurement procedures.

4.1.2 Receiver requirements

See clause 9 for requirements including measurement procedures.

4.2 Presentation of equipment for testing purposes

Each equipment submitted for testing shall fulfil the requirements of the present document on all frequencies over which it is intended to operate. Compliance with this requirement shall be shown by testing on the frequency of operation in the band 315 kHz to 600 kHz.

If equipment is designed to operate with different carrier powers, measurement of each transmitter parameter shall be performed at the highest power level at which the transmitter is intended to operate. Additionally, the spurious emissions shall be measured at each lower power level setting or at the low, middle, and high power settings for multilevel power control systems.

For third party testing the provider shall complete, if necessary, the appropriate application form when submitting the equipment for testing. In addition, the provider shall declare the range of operating conditions and power requirements as applicable, to establish the appropriate test conditions.

Additionally, technical documentation and operating manuals, sufficient to make the test, shall be supplied for all devices operating in the frequency band 315 kHz to 600 kHz.

A torso simulator and tissue substitute material for testing ULP-AID devices operating in the frequency band 315 kHz to 600 kHz may be used (see clause 6.3.1).

Measurements shall be performed, according to the present document, on samples of equipment defined in clauses 4.2 through 4.2.3.3.

4.2.1 Choice of model for testing

One or more samples of each model or type of transmitter operating in the frequency band 315 kHz to 600 kHz, as appropriate for testing. Any ancillary equipment needed for testing shall be provided as requested by the testing laboratory.

If equipment has several optional features, considered not to affect the RF parameters, then the tests need only to be performed on the equipment configured with that combination of features considered to be the most complex or most likely to affect the RF parameters, as proposed by the provider and agreed to by the test laboratory.

4.2.2 Testing of equipment with alternative power levels

If equipment is designed to operate with different carrier powers, measurement of each transmitter parameter shall be performed at the highest power level, according to the present document, on samples of equipment defined in clause 4.2.1. Spurious emissions tests shall be performed at all power levels.

4.2.3 Testing of equipment that does not have an external 50 Ω RF connector (integral antenna equipment)

4.2.3.1 Equipment with an internal permanent or temporary antenna connector

The means to access and/or implement the internal permanent or temporary connector shall be stated by the provider with the aid of a diagram. The fact that use has been made of the internal antenna connection, or of a temporary connection, to facilitate measurements shall be recorded in the test report.

No connection shall be made to any internal permanent or temporary antenna connector during the performance of radiated emissions measurements, unless such action forms an essential part of the normal intended operation of the equipment, as declared by the provider.

4.2.3.2 Equipment with a temporary antenna connector

The provider may submit one set of equipment with the normal antenna connected, to enable the radiated measurements to be made. He shall attend the test laboratory at the conclusion of the radiated measurements, to disconnect the antenna and fit the temporary connector. The testing laboratory staff shall not connect or disconnect any temporary antenna connector.

Alternatively, the provider may submit two sets of equipment to the test laboratory, one fitted with a temporary antenna connector with the antenna disconnected and the other with the antenna connected. Each equipment shall be used for the appropriate tests. The provider shall declare that two sets of equipment are identical in all respects.

4.2.3.3 Equipment intended to be implanted in the body

The provider shall submit the equipment, a torso simulator as described in clause 6.3.1 and annex A if the implant is to be tested in a simulator, and a sufficient quantity of tissue substitute material to fill the test fixture. Tissue substitute material shall have dielectric and conductivity properties equivalent to those of animal tissue for the measurement frequency as applicable. The provider and/or test laboratory shall determine and agree on the arrangement of the equipment antenna and any additional device leads on the ULP-AID holding grid within the fixture as prescribed in annex A.

4.3 Mechanical and electrical design

4.3.1 General

The equipment submitted by the provider should be designed, constructed and manufactured in accordance with sound engineering practice and with the aim of minimizing harmful interference to other equipment and services.

Transmitters and receivers may be individual or combination units.

4.3.2 Controls

Those controls which, if maladjusted, might increase the interfering potentialities of the equipment shall not be easily accessible to the user.

4.3.3 Transmitter shut-off facility

If the transmitter is equipped with an automatic transmitter shut-off facility, it shall be made inoperative for the duration of the test.

4.3.4 Receiver power save capability

If the receiver is equipped with a battery-saving circuit, this circuit shall be made inoperative for the duration of the tests if possible.