SLOVENSKI STANDARD
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Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) - Izboljšani sistem za radijsko sporočanje (ERMES) - 5. del: Specifikacija skladnosti za sprejemnik

ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Enhanced Radio MEssage System (ERMES); Part 5: Receiver conformance specification

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Foreword

This second edition European Telecommunication Standard (ETS) has been produced by the EMC and Radio spectrum Matters (ERM) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS comprises seven parts with the generic title "Electromagnetic compatibility and Radio spectrum Matters (ERM); Enhanced Radio MEssage System (ERMES)". The title of each part is listed below:

Part 1: "General aspects";

Part 2: "Service aspects";

Part 3: "Network aspects";

Part 4: "Air interface specification";

Part 5: "Receiver conformance specification";

Part 6: "Base station specification";

Part 7: "Operation and maintenance aspects".

This part specifies the receiver performance requirements and the conformance test and measurement methods.

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1 Scope

This European Telecommunication Standard (ETS) defines the receiver conformance specification for the Enhanced Radio MEssage System (ERMES). Essential features which make up the basic version receiver of each paging receiver category and also optional receiver features are covered.

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 the publications are 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] ETS 300 133-4 (1997): "Electromagnetic compatibility and Radio Spectrum Matters (ERM); Enhanced Radio MEssage System (ERMES); Part 4: Air interface specification".

[2] ETS 300 133-2 (1997): "Electromagnetic compatibility and Radio Spectrum Matters (ERM); Enhanced Radio MEssage System (ERMES); Part 2: Service aspects".

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

[4] ITU-T Recommendation E.212: "Identification plan for land mobile stations".

3 Definitions, abbreviations and symbols

3.1 Definitions

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

basic Radio Identity Code (RIC): The prime identity of a paging receiver allocated by the network operator when service is initiated. It can not be changed without safeguards against unauthorized changes.

batch number: The 4 bit number corresponding to a particular batch type. Batch type A corresponds to batch number 0000. Batch type P corresponds to batch number 1111.

channel switching: Receiver is receiving system information on one channel and does not find its initial address in the address partition. It then switches channels and prepares to receive signals in its batch on that channel.

codeword: The standard information unit of 30 bits length.

codeblock: The unit of nine codewords used in the message partition.

country code: Binary representation of the country number defined in ITU-T Recommendation E.212 [4], annex A. The country code consists of 7 bits.

external message: A paging message sent on a network that is not the home network of the addressed pager. In this case the External Bit (EB) and External Traffic Indicator (ETI) bits are set to "1".

external receiver: A receiver operating in a network which is not its home network.

home network: The operator network with which a mobile subscriber has signed a subscription.

home operator: The network operator to which a specific user has subscribed.

initial address: The 18 most significant bits of the local address.

local address: The number used by a network to identify the receivers subscribed to it. It consists of 22 bits. The four least significant bits of the local address denote the batch number of the receiver.

operator code: The number used by the system on the radio path to identify an operator within a country. It consists of 3 bits.

operator identity: The number used by the system on the radio path to identify the home operator of a receiver. It has a total length of 13 bits and consists of three parts, the zone code the country code and the operator code.

paging area: The area controlled by a paging area controller. It is the minimum area to which a mobile subscriber is permitted to subscribe in order to receive his paging messages.

paging message: The tone-only, numeric, alphanumeric or transparent data information sent to a paging receiver.

paging signal: The signal sent on the radio path to a paging receiver.

Radio Identity Code (RIC): The number used by the system on the radio path to identify the receiver(s) for which the paging message is intended. The RIC has a total length of 35 bits and consists of five parts: the zone code (3 bits), the country code (7 bits), the operator code (3 bits), the initial address (18 bits) and the batch number (4 bits).

Table 1

Operator identity			Local address	
Zone code	Country code	Operator code	Initial address	Batch number
3 bits	7 bits	3 bits	18 bits	4 bits

reserved for future definition: The bits indicated are not specified in this edition of the ETS but may be in future editions. The bits should be set to a default value and not used to convey information. The function of any equipment is independent of these bits. No fixed pattern of reserved bits should be assumed and no combination of reserved bits should cause equipment to malfunction.

zone code: Binary representation of the zone number defined in ITU-T Recommendation E.212 [4], annex A. The zone code consists of 3 bits.

3.2 Abbreviations

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

AII	Additional Information Indicator
AIN	Additional Information Number
APT	Address Partition Terminator
BAI	Border Area Indicator
BER	Bit Error Ratio
CTA	Common Temporary Address
CTAP	Common Temporary Address Pointer
EB	External Bit
EOM	End Of Message
ETI	External Traffic Indicator
FM	Frequency Modulation
FSI	Frequency Subset Indicator
FSN	Frequency Subset Number
IA	Initial Address
LCD	Liquid Crystal Display
MD	Message Delimiter
NaCl	Sodium Chloride
OPID	Operator Identity
PAM	Pulse Amplitude Modulation
p.d.	potential difference

PR	Preamble
RF	Radio Frequency
RIC	Radio Identity Code
rms	root mean square
RSVD	reserved
SI	System Information
SSI	Supplementary System Information
SYN	synchronization
UMI	Urgent Message Indicator

3.3 Symbols

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

ENL	Number of LSBs to be compared when operating outside the home network
HNL	Number of LSBs to be compared when operating within the home network

4 General test requirements

4.1 Number of receivers to be submitted for conformance testing

In order to simplify the testing of receiver spurious emissions the manufacturer, may supply one receiver able of being set into a test mode which will enable the receiver to stay in a normal receive mode. This mode is with the receiver continuously receiving and decoding ERMES data.

One receiver shall be provided for testing.

The receiver shall be programmed with RIC number:

010 0000001 010 1100011000111001 00 0000

The frequency subset number of this receiver shall be set to 3 (0011).

4.2 Normal test conditions

The normal test conditions shall be temperature +15°C to +35°C and relative humidity from 20 % to 75 %, non condensing.

The normal test voltage shall be that declared by the manufacturer.

4.3 Extreme test conditions

The temperature range shall be -10°C to +55°C and relative humidity from 20 % to 75 %, non condensing.

The extreme test voltages shall be declared by the manufacturer.

4.4 Test fixture

A test fixture (see clause B.6) shall be used for all tests unless otherwise stated. Test fixtures to enable tests under extreme temperature and voltage conditions shall be provided by the manufacturer if required by the testing laboratory.

4.5 Test paging signal

The transmissions shall be in accordance with ETS 300 133-4 [1].

The batch structure used during testing shall contain one address in the address partition followed by one message in the message partition as shown in subclause 7.1.1 unless otherwise specified.

The test paging message to the receiver under test may be tone only, 10 numeric characters or 55 alphanumeric characters from the basic character set (see ETS 300 133-2 [2] table B.3), according to the feature under test.

For successful calls the receiver shall respond to the transmitted test paging message as stated in the following subclauses.

4.5.1 Successful tone-only call

A successful tone-only call occurs when the receiver presents an alert as declared by the manufacturer. The full error capability of the code may be used.

4.5.2 Successful numeric message

For successful numeric calls the receiver shall present the transmitted test paging message as declared by the manufacturer correctly without error. The full error capability of the code may be used. A character in error is defined as a character that differs from the transmitted character.

4.5.3 Successful alphanumeric message

For successful alphanumeric calls, the receiver shall present the transmitted test paging message as declared by the manufacturer, except as allowed in the average usable sensitivity test defined in clause A.1. The full error capability of the code may be used. A character in error is defined as a character that differs from the transmitted character.

4.6 Interpretation of measurement results

The interpretation of the results recorded in a test report for the measurements described in this ETS shall be as follows:

a) the measured value related to the corresponding limit shall be used to determine whether the receiver meets the requirements of this ETS;

b) the measurement uncertainty value for the measurement of each parameter shall be included in the test report;

c) the recorded values of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures given in clause B.7.

4.7 Intended use

The intended use of the receiver shall be declared by the manufacturer as being body worn or non body worn, according to the class shown in table 2.

Table 2: Intended use

	Body worn	Non body worn
Class	1	2

5 Radio Frequency (RF) characteristics

5.1 Performance requirements

The receiver supplied shall meet or exceed the performance criteria in table 3 when measured in accordance with methods of measurement defined in subclause 5.2.

Table 3

	Requirement	Method of Measurement subclause	Limit value
a)	the average usable sensitivity under normal conditions.	5.2 a)	25 dBµV/m
b)	the maximum degradation in required sensitivity under normal conditions with a transmitter frequency offset of ±200 Hz.	5.2 c)	0 dB
c)	the maximum degradation in required sensitivity (see annex B, clause B.8) under switching channel conditions.	5.2 l)	0 dB
d)	the maximum degradation in required sensitivity (see annex B, clause B.8) under extreme temperature and voltage conditions.	5.2 m)	6 dB
e)	the maximum degradation in required sensitivity (see annex B, clause B.8) under extreme temperature and voltage conditions with a transmitter frequency offset of ±200 Hz.	5.2 c)	6 dB
f)	co-channel rejection under normal conditions.	5.2 e)	-10 dB
g)	adjacent channel selectivity under normal conditions.	5.2 f)	60 dB
h)	adjacent channel selectivity under extreme conditions.	5.2 f)	50 dB
j)	spurious response immunity under normal conditions.	5.2 g)	76 dBµV/m
k)	intermodulation immunity under normal conditions.	5.2 h)	70 dBµV/m
l)	blocking immunity or desensitization under normal conditions.	5.2 j)	84 dBµV/m
m)	maximum usable input level under normal conditions.	5.2 d)	3 V/m
n)	the maximum degradation in sensitivity for combined multi-path and quasi-synchronous transmissions under normal conditions.	5.2 k)	15 dB
o)	spurious emissions under normal conditions: 30 MHz - 1 GHz; 1 GHz - 4 GHz; ERMES channels.	5.2 b)	 2 nW; 20 nW; 2 pW.

5.2 Method of measurement

Measurements shall be conducted on ERMES frequency number 8 (see ETS 300 133-4 [1], subclause 8.2) unless otherwise stated. The measurements shall be conducted according to the following steps: the transmission used for these tests shall be constructed as shown in figure 1 unless (otherwise stated):

NOTE: MESSAGE a message appropriate to receiver under test.
MD Message Delimiter.

Figure 1

For all the measurements in this subclause sufficient time is to be allowed for the receiver to achieve synchronization before the performance criteria are determined. This time and the time during which the receiver remains on channel after loss of signal shall be declared by the manufacturer: