SLOVENSKI STANDARD
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Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) - Radiotelefonski oddajniki in sprejemniki za pomorske mobilne storitve, ki delujejo v pasovih VHF - Tehnične karakteristike in merilne metode

Electromagnetic compatibility and Radio spectrum Matters (ERM) - Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands - Technical characteristics and methods of measurement

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Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands; Technical characteristics and methods of measurement

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Foreword

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

National transposition dates	
Date of adoption of this EN:	9 May 2013
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1 Scope

The present document specifies the minimum requirements for shipborne radio transmitters and receivers for fixed installations operating in the VHF frequency bands between 156 MHz and 174 MHz allocated to the maritime mobile service, using both 25 kHz and 12,5 kHz channels and capable of Radiotelephony and Digital Selective Calling communications within the Global Maritime Distress and Safety System. The present document incorporates the requirements of the relevant resolutions of the International Maritime Organization (IMO) and is primarily intended to specify equipment suitable for fitting to ships subject to the SOLAS Convention [1] and complying with the Council Directive 96/98/EC [i.11] of 20 December 1996 on marine equipment as amended (the European Marine Equipment Directive).

The present document does not address the testing of ancillary equipment on a stand-alone basis, i.e. separately from the radio equipment with which it is to be used.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] IMO SOLAS 1974: "International Convention for the Safety of Life at Sea" as amended.

[2] Void.

[3] IMO Resolution A.803(19) (as amended by MSC.68(68)): "Performance Standards for Shipborne VHF Radio Installations capable of Voice Communications and Digital Selective Calling".

[4] ITU Radio Regulations (2008).

[5] Recommendation ITU-R M.493-13: "Digital selective-calling system for use in the maritime mobile service".

[6] Recommendation ITU-R M.541-9 (2004): "Operational procedures for the use of digital selective-calling equipment in the maritime mobile service".

[7] Recommendation ITU-T O.41 (1994): "Psophometer for use on telephone-type circuits".

[8] ETSI TR 100 028-1 (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".

[9] ETSI EN 300 338-2 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for equipment for generation, transmission and reception of Digital Selective Calling (DSC) in the maritime MF, MF/HF and/or VHF mobile service; Part 2: Class A/B DSC".

[10] CENELEC EN 61162-1 (2011): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners".

[11] IEC 60489-3 Second edition (1988) appendix F: "Methods of measurement for radio equipment used in the mobile services. Part 3: Receivers for A3E or F3E emissions".

[12] ETSI TR 102 273 (all parts) (2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties".

[13] ANSI C63.5-2006: "American National Standard for Calibration of Antennas Used for Radiated Emission Measurements in Electro Magnetic Interference".

[14] Recommendation ITU-R M.1084-5 (2012): "Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service".

[15] Void.

[16] IEC 61000-4-11 (Ed.2.0) (2004): "Electromagnetic compatibility (EMC) - Part 4-11: Testing and measuring techniques - Voltage dips, short interruptions and voltage variations immunity tests".

[17] ETSI EN 301 033: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for shipborne watchkeeping receivers for reception of Digital Selective Calling (DSC) in the maritime MF, MF/HF and VHF bands".

[18] Recommendation ITU-R M.489-2 (1995): "Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz".

[19] Recommendation ITU-R SM.329-12 (2012): "Unwanted emissions in the spurious domain".

[20] Recommendation ITU-R SM.332-4 (1978): "Selectivity of receivers".

[21] Recommendation ITU-T E.161 (2001): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] IMO Resolution A.524(13): "Performance Standards for VHF Multiple Watch Facilities".

[i.2] Void.

[i.3] Void.

[i.4] Void.

[i.5] ETSI TS 101 570-2 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Interoperability Testing for Maritime Digital Selective Calling (DSC) Radios; Part 2: Class A/B Test Descriptions".

[i.6] CENELEC EN 60945 (2002): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".

[i.7] Void.

[i.8] ETSI EN 301 843-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM);ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Part 2: Specific conditions for VHF radiotelephone transmitters and receivers".

[i.9] Void.

[i.10] Recommendation ITU-R M.689-2 (1994): "International maritime VHF radiotelephone system with automatic facilities based on DSC signalling format".

[i.11] Council Directive 96/98/EC of 20 December 1996 on marine equipment.

3 Definitions, symbols and abbreviations

3.1 Definitions

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

ancillary equipment: equipment (apparatus) used in connection with a transmitter or receiver is considered to be an ancillary equipment if:

- the equipment is intended for use in conjunction with a transmitter or receiver to provide additional operational 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 standalone basis to provide user functions independently of the radio equipment; and
- the radio equipment to which it is connected is capable of providing some intended operation, such as transmitting or receiving, without the ancillary equipment (i.e. it is not a sub-unit of the radio equipment essential to the basic functions of the radio equipment).

continuous phenomena (continuous disturbance): electromagnetic disturbance, the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects

duplex operation: operating method in which transmission is possible simultaneously in both directions of a telecommunications channel

effective radiated power: product of the power supplied to the antenna and its gain relative to a half-wave dipole (see ITU Radio Regulations [4])

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

NOTE: In the case of integral antenna equipment, this port is inseparable from the antenna port.

G2B: phase-modulation (frequency modulation with a pre-emphasis of 6 dB/octave) for Digital Selective Calling (DSC) operation

NOTE: The carrier is modulated by a sub-carrier which is FSK modulated by digital data.

G3E: phase-modulation (frequency modulation with a pre-emphasis of 6 dB/octave) for speech operation

integral antenna: antenna designed to be connected directly to the equipment with or without the use of an external connector and considered to be part of the equipment

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

mobile equipment: marine receiver, transmitter or transmitter/receiver (transceiver) intended for installation and use onboard ships, and powered by the ship's supply

modulation index: ratio between the frequency deviation and the frequency of the modulating audio signal

operating frequency range: range(s) of continuous radio frequencies covered by the Equipment Under Test without any change of units

performance check: check of the transmitter frequency error, carrier power, audio frequency harmonic distortion of emission; and receiver sensitivity

port: particular interface of the specified equipment (apparatus), with the electromagnetic environment

EXAMPLE: Any connection point on an equipment intended for connection of cables to or from that equipment is considered as a port (see Figure 1).

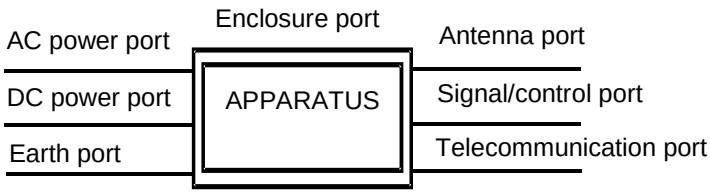

Figure 1: EUT Ports for EMC purposes

Q ratio: ratio of an observed magnitude of acceleration at the equipment to the magnitude of acceleration at the base of the vibration table

radio communications equipment: marine communications equipment which includes one or more radio transmitters or receivers or parts thereof, for use in a mobile application onboard ship

NOTE: Such equipment may be operated with ancillary equipment but, if so, is not dependent upon it for basic functionality.

semi-duplex operation: operating method in which simplex operation is used at one end of the circuit and duplex operation at the other

simplex: operating method in which transmission is made possible alternately in each direction of a telecommunications channel, for example, by means of manual control

spurious emission: emission on a frequency, or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information

NOTE: Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions (see ITU Radio Regulations [4]).

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

transient phenomena: pertaining to or designating a phenomena or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest

3.2 Symbols

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

dBA	sound pressure relative to 2×10^{-5} Pa
dBd	antenna gain relative to a half-wave dipole
f_{IF}	Intermediate Frequency
f_{lo}	frequency of the local oscillator signal
λ	lambda (wavelength)
Q	mechanical resonance

3.3 Abbreviations

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

AC	Alternating Current
ad	amplitude difference
AIS	Automatic Identification System
ARQ	Automatic Response reQuest
CSP	Channel SPacing
DC	Direct Current
DSC	Digital Selective Calling
EMC	ElectroMagnetic Compatibility
emf	electromotive force
EUT	Equipment Under Test