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Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.10] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.4].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

The present document is part 1 of a multi-part deliverable covering the ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services, as identified below:

Part 1: "Common technical requirements";

Part 2: "Specific conditions for VHF radiotelephone transmitters and receivers";

Part 4: "Specific conditions for Narrow-Band Direct-Printing (NBDP) NAVTEX receivers";

Part 5: "Specific conditions for MF/HF radiotelephone transmitters and receivers";

Part 6: "Specific conditions for Earth Stations on board Vessels operating in frequency bands above 3 GHz".

Part 7: "Specific conditions for Maritime Broadband Radiolink equipment".

National transposition dates	
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document contains the common requirements for marine radio communications equipment and associated ancillary equipment, in respect of ElectroMagnetic Compatibility (EMC).

The provisions of the present document apply to marine radio equipment **not covered** in the scope of the Council Directive on marine equipment (the "Marine Equipment Directive" 96/98/EC [i.5]).

Product dependent arrangements necessary to perform the EMC tests on dedicated types of marine radio communications equipment, and the assessment of test results, are detailed in the appropriate product related parts of the present document.

The present document, together with the product related part, specifies the applicable EMC tests, the methods of measurement, the limits and the performance criteria for marine radio equipment and associated ancillary equipment.

In case of differences (for instance concerning special conditions, definitions, abbreviation) between the present document and the relevant product related part of the present document, the product related part takes precedence.

For the further content of the present document, the expression "radio equipment" is taken to mean marine radio communications equipment, in each individual case.

Technical specifications related to the antenna port of radio equipment and emissions from the enclosure port of radio equipment and combinations of radio and associated ancillary equipment are not included in the present document. Such technical specifications are normally found in the relevant product standards for the effective use of the radio spectrum.

The environment classification used in the present document is maritime, as defined in IEC EN 60945 [1].

Marine radio communications equipment meeting the EMC requirements set out in IEC EN 60945 [1] is deemed to meet also the EMC requirements for the residential, commercial and light industrial environment as defined in IEC EN 61000-6-3 [i.1] and IEC EN 61000-6-1 [i.2].

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus intended to be used in the maritime environment. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

Compliance of radio equipment to the requirements of the present document does not signify compliance to any requirements related to spectrum management or to the use of the equipment (licensing requirements).

Compliance to the requirements of the present document does not signify compliance to any safety requirements. However, it is the responsibility of the assessor of the equipment to record in the test report any observations regarding the test sample becoming dangerous or unsafe as a result of the application of the tests called for in the present document.

NOTE: The relationship between the present document and essential requirements of article 3.1b of Directive 2014/53/EU [i.4] is given in annex A.

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the Radio Equipment Directive [i.4] may apply to equipment within the scope of the present document.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

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

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

[1] IEC EN 60945 (2002) + Corrigendum 1 (2008): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".

[2] CISPR 16-1-1 (2015): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus".

[3] IEC EN 61000-4-2 (2008): "Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test".

[4] IEC EN 61000-4-3 (2006 + Amendment 1:2007 +Amendment 2:2010): "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".

[5] IEC EN 61000-4-4 (2012): "Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test".

[6] IEC EN 61000-4-5 (2014): "Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test".

[7] IEC EN 61000-4-6 (2013): "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields".

2.2 Informative 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.

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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] IEC EN 61000-6-3 (2007) + A1 (2011): "Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments".

[i.2] IEC EN 61000-6-1 (2007): "Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments".

[i.3] Void.

[i.4] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.5] Council Directive 96/98/EC of 20 December 1996 on marine equipment.

[i.6] IEC EN 60050-161 (1990): "International Electrotechnical Vocabulary. Chapter 161: Electromagnetic compatibility".

[i.7] CEPT/ERC Recommendation 74-01 (2011): "Unwanted emissions in the spurious domain".

[i.8] Void.

[i.9] IMO Convention: "International Convention for the Safety of Life at Sea (SOLAS)".

[i.10] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

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 receiver, transmitter or transceiver is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a receiver or transmitter 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 or transmitter; and
- the receiver or transmitter 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).

artificial antenna: non-reactive, non-radiating dummy load equal to the nominal impedance of the antenna port

NOTE: For the purpose of EMC tests, the antenna port(s) of the Equipment Under Test (EUT) are terminated with a non-radiating 50 Ω termination (artificial antenna) unless there is a requirement to apply a Radio Frequency (RF) input signal to the receiver antenna port.

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

NOTE: See IEC EN 60050-161 [i.6].

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.

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. An antenna which may not be removed during the tests, according to the manufacturer's statement.

manufacturer: manufacturer of the equipment, or his authorized representative, or an equipment manufacturer to the European market

mobile equipment: marine receiver, transmitter or transmitter/receiver (transceiver) intended for installation and use onboard ships

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

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

NOTE: For 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).

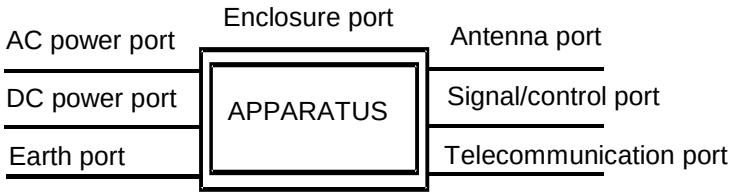

Figure 1: Examples of ports

portable equipment: marine radio and/or ancillary equipment intended for portable (e.g. handheld) operation onboard ships, and powered by its own integral battery

radio communications equipment: marine communications equipment which includes one or more radio transmitters and/or receivers and/or parts thereof for use in a mobile or portable application onboard ships

NOTE: It can be operated with ancillary equipment but if so, is not dependent on it for basic functionality.

removable antenna: antenna which may be removed for the test according to the manufacturer statement

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 (CEPT/ERC Recommendation 74-01 [i.7]).

transient phenomena (transient disturbance): 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

NOTE: See IEC EN 60050-161 [i.6].

3.2 Symbols

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

Bn	Necessary bandwidth of an emission
PX	Maximum PEP

3.3 Abbreviations

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

AC	Alternating Current
AM	Amplitude Modulation
AMN	Artificial Mains Network
B	measurement Bandwidth
DC	Direct Current
EFTA	European Free Trade Association
EM	ElectroMagnetic
EMC	ElectroMagnetic Compatibility
ESD	Electro Static Discharge
EUT	Equipment Under Test
IEC	International Electrotechnical Commission
IMO	International Maritime Organization

MF/HF	Medium Frequency/High Frequency
NAVTEX	Navigational Telex
NBDP	Narrow Band Direct Printing
RF	Radio Frequency
rms	root mean square
VHF	Very High Frequency

4 General and operational requirements

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the manufacturer. The equipment shall comply with all the technical requirements of the present document which are identified as applicable in annex A at all times when operating within the boundary limits of the declared operational environmental profile.

The equipment shall be tested under normal test conditions according to the relevant product and basic standards or to the information accompanying the equipment.

The test shall be carried out at a point within the specified normal operating environmental range of temperature and humidity with the equipment connected to the normal power supply voltage. The normal temperature and humidity conditions shall be a combination of temperature and humidity within the following ranges:

- temperature: +15 °C to +35 °C
- relative humidity: 25 % to 75 %

The normal test voltage for equipment to be connected to the AC mains, shall be the nominal (rated) mains voltage. The frequency of the test voltage shall be 50 Hz ± 1 Hz.

The normal test voltage for equipment to be connected to a battery, shall be the nominal voltage of the battery (12 V, 24 V, etc.). For operation from other power sources, the normal test voltage shall be declared by the manufacturer.

The test conditions, configuration, and mode of operation shall represent the intended use and shall be recorded in the test report.

For emission and immunity tests, specific product type related information on the test modulation, test conditions and tests arrangements, etc., are found in the part of the present document dealing with the particular type of radio equipment.

4.2 Arrangements for test signals

4.2.0 General

Adequate measures shall be taken to avoid the effect of immunity test signals on both the measuring equipment and the signal sources for the wanted signals (the "test system") located outside the test environment.

4.2.1 Arrangements for test signals at the input of transmitters

The signal source providing the transmitter under test with the modulation signal for the normal test modulation shall be located outside the test environment, unless the transmitter is modulated by its own internal source, see the relevant part of the present document dealing with the particular type of radio equipment.

The transmitter shall be modulated with normal test modulation, by an internal or external signal source capable of delivering the normal test modulation as specified in the relevant part of the present document dealing with the particular type of radio equipment.