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ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1b of the Directive 2014/53/EU; Part 2: Specific conditions for VHF radiotelephone transmitters and receivers

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Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document has been prepared in reply to the Commission's standardisation request Commission Implementing Decision C(2015) 5376 final of 04.08.2015 to provide a 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.

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 of [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 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
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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 together with ETSI EN 301 843-1 [1], covers the assessment of VHF radiotelephone transmitters and receivers for the maritime mobile service, and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of marine radiotelephone transmitters and receivers are not included in the present document. Such technical specifications are found in the related product standards for the effective use of the radio spectrum.

The present document specifies the applicable test conditions, performance assessment, and performance criteria for VHF radiotelephone transmitters and receivers for the maritime mobile service, and the associated ancillary equipment.

Examples of types of radiotelephone transmitters and receivers for the maritime mobile service covered by the present document are given in annex A.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and ETSI EN 301 843-1 [1], the provisions of the present document take precedence.

The electromagnetic environment used in the present document to develop the technical specifications encompasses the electromagnetic environment on-board ships as identified in CENELEC EN 60945 [i.5].

2 References

2.1 Normative 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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

[1] ETSI EN 301 843-1 (V2.1.0) (12-2015): "ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1b of the Directive 2014/53/EU; Part 1: Common technical requirements".

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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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] Void.

[i.2] 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.3] Void.

[i.4] ETSI EN 302 885 (2.1.0) (12-2015): "Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class D DSC; Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of the Directive 2014/53/EU".

[i.5] CENELEC EN 60945:2002 + Corrigendum 1 (2008): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".

[i.6] ETSI EN 301 025 (V2.1.0) (08-2015): "VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC); Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of the Directive 2014/53/EU".

[i.7] Commission Implementing Decision C(2015) 5376 final of 04.08.2015: Commission Implementing Decision 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 terms and definitions given in ETSI EN 301 843-1 [1] apply.

3.2 Symbols

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

emf	electromotive force
rms	root mean square
SINAD	(Signal + Noise + Distortion)/(Noise + Distortion)

3.3 Abbreviations

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

EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
RF	Radio Frequency

4 General and operational requirements

4.1 Environmental profile

The provisions of ETSI EN 301 843-1 [1], clause 4.1 shall apply with the following modifications.

For emission and immunity tests the normal test modulation, test arrangements, etc., as specified in the present document, clauses 4.1 to 4.5, shall apply.

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.

4.2 Arrangements for test signals

4.2.0 General

The provisions of ETSI EN 301 843-1 [1], clause 4.2 shall apply.

4.2.1 Arrangements for test signals at the input of the transmitter

The provisions of ETSI EN 301 843-1 [1], clause 4.2.1 shall apply.

4.2.2 Arrangements for test signals at the output of the transmitter

The provisions of ETSI EN 301 843-1 [1], clause 4.2.2 shall apply.

4.2.3 Arrangements for test signals at the input of the receiver

The provisions of ETSI EN 301 843-1 [1], clause 4.2.3 shall apply with the following modifications.

The wanted RF input signal, coupled to the receiver, shall be modulated with normal test modulation as specified for that type of equipment (see clause 4.5).

The level of the wanted signal shall be 40 dBµV (emf) unless indicated otherwise.

4.2.4 Arrangements for test signals at the output of the receiver

The provisions of ETSI EN 301 843-1 [1], clause 4.2.4 shall apply as appropriate.

4.2.5 Arrangements for testing transmitter and receiver together (as a system)

The provisions of ETSI EN 301 843-1 [1], clause 4.2.5 shall apply as appropriate.

4.3 Exclusion bands

4.3.0 General

The provisions of ETSI EN 301 843-1 [1], clause 4.3 shall apply as appropriate.

The emission measurement and immunity test exclusions are referred to as "exclusion bands" and are defined in the clauses 4.3.1 and 4.3.2.

4.3.1 Exclusion bands for receivers and receiver parts of transceivers

The exclusion band for marine radiotelephone receivers and receivers of transceivers is the frequency range determined by the switching range, as declared by the manufacturer, extended as follows:

- the lower frequency of the exclusion band is the lower frequency of the switching range, minus 5 % of the centre frequency of the switching range, or minus 10 MHz, whichever will result in the lowest frequency;
- the upper frequency of the exclusion band is the upper frequency of the switching range, plus 5 % of the centre frequency of the switching range, or plus 10 MHz, whichever will result in the highest frequency.

The switching range is the maximum frequency range over which the receiver can be operated without reprogramming or realignment.

4.3.2 Exclusion band for transmitters

The exclusion band for marine radiotelephone transmitters extends ±50 kHz from the nominal operating frequency of the transmitter.

4.4 Narrow band responses on receivers

The provisions of ETSI EN 301 843-1 [1], clause 4.4 shall apply with the following modifications.

No immunity tests shall be carried out on frequencies of identified narrow band responses on marine radiotelephone receivers or the receiver part of transceivers.

A reduction of the SINAD below 20 dB in the measured value of the speech output signal level shall be used as criterion for the identification of any unwanted responses.

The nominal frequency offset to be used for the identification of narrowband responses shall be ±50 kHz for the first part of the identification procedure, and ±62,5 kHz for its second part.

All narrowband responses shall be disregarded from immunity tests.

4.5 Normal test modulation

The normal test modulation shall be as follows:

- the transmitter shall be modulated with a sinusoidal audio frequency of 1 000 Hz and the frequency deviation shall be ±3 kHz;
- the wanted RF input signal shall be set to the nominal frequency of the receiver modulated with a sinusoidal audio frequency of 1 000 Hz and a frequency deviation of ±3 kHz.

5 Performance assessment

5.1 General

The provisions of ETSI EN 301 843-1 [1], clause 5.1 shall apply.

5.2 Equipment which can provide a continuous communication link

The provisions of ETSI EN 301 843-1 [1], clause 5.2 shall apply.

5.3 Equipment which does not provide a continuous communication link

The provisions of ETSI EN 301 843-1 [1], clause 5.3 shall apply.

5.4 Ancillary equipment

The provisions of ETSI EN 301 843-1 [1], clause 5.4 shall apply.

5.5 Equipment classification

Radiotelephone transmitters and receivers may belong to either the category of mobile or portable marine radio equipment.

6 Performance criteria

6.0 General

The provisions of ETSI EN 301 843-1 [1], clause 6 shall apply.

The equipment shall meet the special performance criteria set out in clauses 6.1 to 6.4, as appropriate.

6.1 Performance criteria A for continuous phenomena applied to transmitters and receivers

The provisions of ETSI EN 301 843-1 [1], clause 6.1 shall apply.

6.2 Performance criteria B for transient phenomena applied to transmitters and receivers

The provisions of ETSI EN 301 843-1 [1], clause 6.2 shall apply with the following modifications.

During the test sequence, degradation or loss of function or performance which is self-recoverable is allowed, but the EUT shall not unintentionally transmit or change actual operating state or stored data.

6.3 Performance criteria C applied to power supply failure

The provisions of ETSI EN 301 843-1 [1], clause 6.3 shall apply.

6.4 Performance check

6.4.0 General

The provisions of ETSI EN 301 843-1 [1], clause 6.4 shall apply with the modifications set out in clauses 6.4.1 and 6.4.2.

6.4.1 Transmitter

For the purpose of the present document, a "performance check" of the transmitter is taken to mean a measurement of:

- RF output power;
- frequency error;
- SINAD of the demodulated output signal.

The transmitter shall be connected to an artificial antenna.

The RF output signal shall be connected via an appropriate coupling device to a linear demodulator with a de-emphasis network of 6 dB/octave.

With the output power switch set at maximum:

- the RF output carrier power shall be between 6 W and 25 W;
- the frequency error of the unmodulated carrier shall be within ±1,5 kHz;
- with normal test modulation (see clause 4.5), the SINAD of the demodulated output signal shall be 20 dB or better.

6.4.2 Receiver

For the purpose of the present document a "performance check" of the receiver is taken to mean a measurement of the receiver's SINAD with a test signal at a carrier frequency equal to the nominal frequency of the receiver modulated by the normal test modulation (see clause 4.5) applied to the receiver antenna input.

An audio frequency load and measuring instrument for measuring the SINAD shall be connected to the receiver output terminal using a fixed RF input level of 40 dBµV (emf).

The level of measured SINAD shall be at least 20 dB with the receiver's audio frequency power control adjusted to produce 50 % of the rated output power.

6.5 Performance criteria for equipment which does not provide a continuous communication link

The provisions of ETSI EN 301 843-1 [1], clause 6.5 shall apply.

6.6 Performance criteria for ancillary equipment tested on a stand-alone basis

The provisions of ETSI EN 301 843-1 [1], clause 6.6 shall apply.

7 Applicability overview

7.1 Emission

7.1.1 General

ETSI EN 301 843-1 [1], table 1, contains the applicability of EMC emission measurements to the relevant ports of marine radio and/or associated ancillary equipment.

7.1.2 Special conditions

No special conditions shall apply to marine radiotelephone transmitters and receivers in the scope of the present document.

7.2 Immunity

7.2.1 General

ETSI EN 301 843-1 [1], table 2, contains the applicability of EMC immunity measurements to the relevant ports of marine radio and/or associated ancillary equipment.

7.2.2 Special conditions

The following special conditions set out in table 1, relate to the immunity test methods and performance criteria used in ETSI EN 301 843-1 [1], clause 9.

Table 1: Special conditions for EMC immunity tests

Reference to clauses in ETSI EN 301 843-1 [1]	Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 843-1 [1], clause 9
9.2.2: Test method; Radio frequency electromagnetic field.	**Wanted RF input signal for the receiver under test:** A receiver RF input level of 40 dBµV (emf) shall be used during the test.
9.5.2: Test method; Radio frequency, Common mode.	**Wanted RF input signal for the receiver under test:** A receiver RF input level of 40 dBµV (emf) shall be used during the test.

Annex A (normative): Relationship between the present document and the essential requirements of Directive 2014/53/EU

The provisions of ETSI EN 301 843-1 [1], annex A shall apply.

Annex B (informative): Examples of types of marine radiotelephone equipment in the scope of the present document

B.0 General

The provisions of the present document apply to radiotelephone transmitters and receivers intended for operation in the maritime mobile service, and associated ancillary equipment, as set out in the following clauses.

B.1 Radiotelephone transmitters and receivers for the maritime mobile service operating in the VHF bands

The present document applies to radiotelephone transmitters and receivers for use on-board ships and operating in the maritime VHF bands in the frequency range 156 MHz to 174 MHz, and the associated ancillary equipment as defined in, for example, ETSI EN 302 885 [i.4] and ETSI EN 301 025 [i.6].

History

Document history		
V1.1.1	February 2001	Publication
V1.2.1	June 2004	Publication
V2.1.0	December 2015	EN Approval Procedure AP 20160321: 2015-12-22 to 2016-03-21