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HARMONISED EUROPEAN STANDARD

**Maritime mobile transmitters and receivers
for use in the MF and HF bands;
Harmonised Standard covering the essential requirements
of articles 3.2 and 3.3(g) of Directive 2014/53/EU**

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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.12] 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.1].

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 tables A.1 and A.2 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 replaces ETSI EN 300 373-2 [i.10] and ETSI EN 300 373-3 [i.11].

National transposition dates

Date of adoption of this EN:	25 April 2017
Date of latest announcement of this EN (doa):	31 July 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2018
Date of withdrawal of any conflicting National Standard (dow):	31 January 2019

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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document specifies technical characteristics and methods of measurements for radio transmitters and receivers, for use on vessels, operating in either the Medium Frequency (MF) only or in the Medium and High Frequency (MF/HF) bands allocated in the International Telecommunications Union (ITU) Radio Regulations [i.9], to the Maritime Mobile Service (MMS).

The present document refers to equipment for one or more of the following:

- Single SideBand (SSB) modulation for telephony transmission and reception (J3E);
- Frequency Shift Keying (FSK) or SSB modulation of a keyed sub-carrier to transmit and receive Digital Selective Calling (DSC) signals.

The present document also refers to radio equipment with either an integrated or external DSC controller.

The requirements in the present document are applicable to receivers for operating on all frequencies in the bands 1 606,5 kHz to 4 000 kHz or 1 606,5 kHz to 27,5 MHz as allocated in the ITU Radio Regulations [i.9], to the MMS.

Other spot frequency receivers should meet all the requirements of the present document and other relevant standards as applicable for the frequencies and modes provided.

If the equipment, or parts of it, are designed in such a manner that they can be used for other categories of maritime radiocommunication (e.g. Morse telegraphy or NBDP - ETSI ETS 300 067 [i.4]), those parts of the equipment should fulfil the relevant requirements of the appropriate standards for the service(s) in question e.g. ETSI ETS 300 067 [i.4].

The present document covers the essential requirements of article 3.2 and article 3.3(g) of Directive 2014/53/EU [i.1] under the conditions identified in annex A.

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.

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

- [1] ETSI TS 103 052 (V1.1.1) (03-2011): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiated measurement methods and general arrangements for test sites up to 100 GHz".
- [2] ITU Recommendation E.161 (02-2001): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".
- [3] ETSI EN 300 338-4 (V1.2.1) (02-2017): "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 4: Class E DSC".

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] 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.2] ETSI TR 100 028-1 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".
- [i.3] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.4] ETSI ETS 300 067 (11-1990): "Radio Equipment and Systems (RES); Radiotelex equipment operating in the maritime MF/HF service; Technical Characteristics and methods of measurement".
- [i.5] Recommendation ITU-R SM.332-4 (07-1978): "Selectivity of receivers".
- [i.6] Recommendation ITU-R SM.326-7 (11-1998): "Determination and measurement of the power of amplitude-modulated radio transmitters".
- [i.7] ISO 3791 (1976): "Office machines and data processing equipment - Keyboard layouts for numeric applications".
- [i.8] CENELEC EN 60945 (2002): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".
- [i.9] ITU Radio Regulations (2016).
- [i.10] ETSI EN 300 373-2 (V1.2.1) (2009-12): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime mobile transmitters and receivers for use in the MF and HF bands; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive".
- [i.11] ETSI EN 300 373-3 (V1.2.1) (2009-12): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime mobile transmitters and receivers for use in the MF and HF bands; Part 3: Harmonized EN covering essential requirements under article 3.3(e) of the R&TTE Directive; Equipment with integrated or associated equipment for Class E Digital Selective Calling (DSC)".
- [i.12] 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.
- [i.13] CENELEC EN 60945 4th edition (2002): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

assigned frequency: centre of the frequency band assigned to a station

carrier frequency: frequency to which the transmitter or receiver is tuned

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

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 (ITU Radio Regulations [i.9]).

standard output power: output power of the receiver measured across a resistor equal to the nominal value of the load impedance as declared by the manufacturer

NOTE: Standard output power is 1 mW for earphone reception, 500 mW for loudspeaker reception and 0 dBm into 600 Ω for the audio line outputs.

3.2 Symbols

For the purposes of the present document, the symbols given in the ITU Radio Regulations [i.9] and the following apply:

dB	decibel
dBm	dBmilliwatt
dB μ V	dBmicrovolt
F1B	frequency modulation, single channel containing quantized or digital information without the use of a modulating sub-carrier, telegraphy for automatic reception
g	gram
h	hour
Hz	hertz
J2B	SSB, suppressed carrier, single channel containing quantized or digital information with the use of a modulating sub-carrier, telegraphy for automatic reception
J3E	SSB, suppressed carrier, single channel containing analogue information, telephony
k	kilo
kHz	kilohertz
kPa	kilopascal
l	litre
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
mW	milliwatt
NaCl	sodium chloride
Ω	ohm
pF	picofarad
s	second
V	volt
W	watt

3.3 Abbreviations

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

AGC	Automatic Gain Control
BER	Bit Error Rate
CSP	Channel Spacing
DC	Direct Current
DSC	Digital Selective Calling
emf	electromotive force

EN	European Norm
EUT	Equipment Under Test
FM	Frequency Modulation
FSK	Frequency Shift Keying
GNSS	Global Navigation Satellite System
ISO	International Standards Organization
ITU	International Telecommunications Union
MF	Medium Frequency
MF/HF	Medium and High Frequency
MMS	Maritime Mobile Service
NBDP	Narrowband Direct Printing
PEP	Peak Envelope Power
RBW	Reference BandWidth
RF	Radio Frequency
RMS	Root Mean Square
SINAD	Signal plus Noise plus Distortion to Noise plus Distortion
SNR	Signal-to-Noise Ratio
SSB	Single Side Band

4 General 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, but as a minimum, shall be that specified in the test conditions contained in the present document. 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.

4.2 General, operational and technical requirements

4.2.1 Testing of requirements

There are no defined tests for the requirements in clause 4.2. The availability of the specified controls shall be verified by visual inspection.

4.2.2 General requirements

4.2.2.1 Composition

4.2.2.1.1 DSC requirements

The equipment shall contain either:

- a dedicated watchkeeping receiver for the DSC decoder;
- a DSC encoder;
- a DSC decoder; and
- an integral GNSS receiver providing locating function;

Or:

- a dedicated DSC controller interface as specified in clause 4.2.2.1.3.

4.2.2.1.2 Audio frequencies interfaces

The following inputs and outputs applicable to the type of equipment shall be provided:

- a) transmitters:
 - SSB Telephony:
 - 600 Ω earth free audio input;
 - microphone input;
- b) receivers:
 - SSB Telephony:
 - 600 Ω earth free audio output;
 - earphone output;
 - speaker output.

Audio processing may be applied to audio outputs for handset, external speaker, etc., but shall not affect line level audio interfaces. Where audio processing is activated it shall be assessed. The acoustic speech recognition is equal to, or better than without audio processing enabled under receive conditions at sensitivity level.

4.2.2.1.3 DSC Interface

If the equipment does not have an integrated DSC controller then, the equipment shall have a dedicated interface for an external DSC controller compliant with ETSI EN 300 338-4 [3].

Other interfaces than those described in this clause may be provided but shall not in any case have an impact which will degrade the performance of the equipment.

4.2.2.1.4 Digital input panels

Where a digital input panel with the digits "0" to "9" is provided, the digits shall be arranged to conform to one of the options described in clause 3 of Recommendation ITU-T E.161 [2]. However, where an alphanumeric keyboard layout is provided, the digits "0" to "9" may, alternatively, be arranged to conform to ISO 3791 [i.7].

4.2.2.1.5 GNSS receiver antenna

The integrated GNSS receiver shall have the possibility to connect an external antenna.

4.2.2.2 Construction

The attention of the manufacturer is drawn to CENELEC EN 60945 [i.8] which offers guidelines on the construction and ergonomic details for equipment intended to be used on board vessels.

All controls shall be of sufficient size to enable the usual control functions to be easily performed and the number of controls should be the minimum necessary for simple and satisfactory operation.

Adequately detailed operating instructions shall be provided with the equipment.

The equipment shall be capable of operating on single-frequency and two-frequency channels with manual control (simplex).

4.2.2.3 Controls and indicators

4.2.2.3.1 General

All controls shall be easily identified from the position at which the operator operates the equipment.