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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

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Foreword

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

The present document may be referenced in the Marine Equipment Directive [i.9], Annex A.1 ("e*quipment for which detailed testing standards already exist in international instruments*").

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
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1 Scope

The present document states the minimum operational and performance requirements for shipborne receivers intended to be connected to an external installation, including a decoder for DSC, and used as receivers for watchkeeping DSC on board ships operating in the mobile MF, MF/HF and VHF band allocated in the ITU Radio Regulations [1] to the maritime mobile service, both in connection with distress and safety communication and in connection with general communication.

These requirements include the relevant provisions of the ITU Radio Regulations [1], Recommendation ITU-Rs M.493-13 [3], M.541-9 [9] and the IMO Resolutions A.803 (19) [i.5], A.804 (19) [i.6], A.806 (19) [i.7] and A.694 (17) [i.4].

The present document specifies also technical characteristics, methods of testing and required test results for dedicated watchkeeping receivers for use with radio installations in the GMDSS as required by chapter IV of the SOLAS [i.8].

DSC watchkeeping receivers may be a separate equipment or be integrated with a DSC or radiotelephone equipment.

For integrated equipment the present document specifies the requirements and methods of testing of the DSC watchkeeping receivers only.

DSC watchkeeping receivers can be either fixed-frequency receivers or, in MF/HF bands, scanning receivers.

Requirements for the DSC equipment or radiotelephone equipment are given in EN 300 338-2 [10], EN 301 925 [i.1] and EN 300 373-1 [i.3] respectively.

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 reference 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.

2.1 Normative references

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

[1] ITU Radio Regulations (2012).

[2] 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".

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

[4] ISO 3791 (1976): "Office machines and data processing equipment -- Keyboard layouts for numeric applications".

[5] IEC 61162-1 (2010): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners".

[6] 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".

[7] Recommendation ITU-T V.11 (10/1996): "Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s".

[8] IEC 60417: "Graphical symbols for use on equipment".

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

[10] ETSI EN 300 338-2: "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".

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] ETSI EN 301 925: "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".

[i.2] Recommendation ITU-R SM.332-4 (1978): "Selectivity of receivers".

[i.3] ETSI EN 300 373-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime mobile transmitters and receivers for use in the MF and HF bands; Part 1: Technical characteristics and methods of measurement".

[i.4] IMO Resolution A.694 (17): "General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids".

[i.5] IMO Resolution A.803 (19) amended by MSC.68 (68): "Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling".

[i.6] IMO Resolution A.804 (19) as amended by MSC.68 (68): "Performance Standards for Shipborne MF Radio Installations capable of Voice Communications and Digital Selective Calling".

[i.7] IMO Resolution A.806 (19) as amended by MSC.68 (68): "Performance standards for shipborne MF/HF radio installations capable of voice communication, narrow-band direct-printing and digital selective calling".

[i.8] International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended.

[i.9] Council Directive 96/98/EC of 20 December 1996 on marine equipment, as amended by commission directive 2011/75/EU.

3 Definitions 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

continuous watch: continuous watch means that the radio watch concerned is not interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or check

F1B: frequency modulation with digital information, without a sub-carrier for automatic reception

G2B: phase-modulation with digital information, with a sub-carrier for automatic reception

J2B: single sideband with digital information, with the use of a modulating sub-carrier for automatic reception, with the carrier suppressed to at least 40 dB below peak envelope power

performance check: check of calling sensitivity (see clause 7.2)

3.2 Abbreviations

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

a.c.	alternating current
AGC	Automatic Gain Control
d.c.	direct current
DSC	Digital Selective Calling
e.m.f.	electromotive force
EUT	Equipment Under Test
GMDSS	Global Maritime Distress and Safety System
HF	High Frequency
IF	Intermediate Frequency
IMO	International Maritime Organization
MF	Medium Frequency
MF/HF	Medium and High Frequency
r.m.s.	root mean square
RF	Radio Frequency
SER	Symbol Error Rate
SOLAS	(International Convention for the) Safety Of Life At Sea
VHF	Very High Frequency

4 General and operational requirements

4.1 General

The manufacturer shall declare that compliance to the requirements of this clause is achieved and shall provide relevant documentation.

The present document deals with equipment having integrated or associated DSC decoder.

If the radio equipment under test is intended for DSC operation in connection with an external DSC decoder, compliance with the present document can only be achieved, if the manufacturer supplies the test house with the specific stand-alone DSC decoder, intended for DSC operation, in connection with the radio equipment under test. The radio equipment and the external DSC decoder shall then be tested as fully integrated DSC equipment in accordance with the present document.

For non-integrated equipment it shall be notified in the test report, that compliance is only achieved, if the specific radio equipment is operated with the associated DSC decoder.

Interfaces for external DSC decoder are not mandatory for integrated equipment.

Though not required it is appropriate, if provided, that these interfaces are in compliance with clauses 4.6.1 and 4.6.2.

4.2 Construction

4.2.1 General

The equipment shall be so constructed that it is capable of keeping continuous watch on relevant DSC channels (see clause 5.1) and of being operated readily.

4.2.2 Design

In all respects the mechanical and electrical design and construction and the finish of the equipment shall conform with good engineering practice, and the equipment shall be suitable for use on board ships at sea.

The equipment shall be designed for continuous operation.

4.2.3 Accessibility

All parts of the equipment that are subject to inspection and maintenance adjustments, shall be easily accessible. Components shall be easily identifiable either by markings within the equipment, or with the aid of technical descriptions.

4.2.4 Calibration and maintenance

The equipment shall be so constructed that its main modules can easily be replaced and put into operation without elaborate recalibration or readjustment.

4.2.5 Antenna static protection

In order to protect against damage due to static voltages that may appear at the input of the receiver, there shall be a d.c. path from the antenna terminal to ground not exceeding 100 kΩ.

4.2.6 Digital input panels

Where a digital input panel with the digits "0" to "9" is provided, the digits should be arranged to conform with Recommendation ITU-T E.161 [2]. However, where an alphanumeric keyboard layout, as used on office machinery and data processing equipment, is provided, the digits "0" to "9" may, alternatively, be arranged to conform with ISO 3791 [4].

4.3 Controls and indicators

4.3.1 General

The number of operational controls, their design and manner of functioning, location, arrangement and size should provide for simple, quick and efficient operation. All operational controls shall permit normal adjustments to be easily performed and shall be arranged in a manner which minimizes the risk of inadvertent activation.

4.3.2 Identification

All operational controls and indicators shall be easy to identify and read from the position at which the equipment is normally operated.

The controls and indicators shall be identified in English. Symbols as specified in IEC 60417 [8] may be used in addition.

4.3.3 Protection against possible maladjustment

Controls not required for normal operation shall not be readily accessible.

Operational controls, the inadvertent exercise of which could switch off the equipment, lead to its performance degradation or to false indications not obvious to the operator, shall be protected especially against unintentional operation.

4.3.4 Light sources

For equipment with controls and indicators the illumination shall be dazzle-free and adjustable to extinction, except that those warning and alarm indicators which are illuminated in the warning/alarm condition, and indicators required for switching on/off or resetting the equipment, or for initiation of distress alerting, shall be clearly visible in all appropriate conditions of ambient illumination.

4.3.5 Operation

The equipment shall be so designed that misuse of the controls cannot cause injury to personnel.

4.4 Software

Facilities shall be provided to protect all operational software incorporated in the equipment.

Any software required in an equipment to facilitate operation, including that for its initial activation/reactivation, shall be permanently installed within the equipment, in such a way that it is not possible for the user to have access to this software.

Means shall be provided to monitor the operation of the equipment at appropriate regular intervals and to activate an alarm or signal in the event of a failure which is not recoverable automatically. The whole process shall be described in the manual of the manufacturer.

4.5 Memory

Pre-programmed DSC distress calling frequencies and information inherent to the operation of the equipment shall be stored in non-volatile devices.

If the equipment contains information in operator programmable memory devices, such devices shall be protected from interruptions in the power supply up to at least 10 hours duration.

4.6 Interfaces (applicable to non-integrated equipment)

Other interfaces than those described in clauses 4.6.1 and 4.6.2 may be provided but they shall not in any case degrade the performance of the equipment.

4.6.1 Audio Frequency

600 Ω earth free line output (0 dBm ± 3 dB).

4.6.2 Digital interfaces

- Control interface:
  - stop/start signal in accordance with Recommendation ITU-T V.11 [7], and/or
  - interfaces for frequency control or read-out of scanning receivers complying with IEC 61162-1 [5].

4.7 Marking and identification

Each unit of the equipment shall be marked externally with the following information which, shall be clearly visible:

1) identification of the manufacturer;
2) equipment type designation or model identification;
3) serial number of the unit;