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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 1: Common requirements

Reference

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Keywords

DSC, GMDSS, maritime, radio

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Foreword

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

The present document is part 1 of a multi-part deliverable covering Digital Selective Calling (DSC), as identified below:

Part 1: "Common requirements";

Part 2: "Class A DSC";

Part 3: "Class D DSC";

Part 4: "Class E DSC";

Part 5: "Handheld VHF Class H DSC";

Part 6: "Class M DSC";

Part 7: "Interfacing DSC radio equipment to Bridge Alert Management systems (BAM)";

Part 8: "Enabling DSC radio equipment with remote control capabilities".

The present document covers the common requirements for all classes of DSC equipment. Operator interfaces and operating system details are class specific and will be found in the appropriate part.

National transposition dates	
Date of adoption of this EN:	18 May 2021
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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).

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

1 Scope

The present document states the minimum requirements for equipment to be used for generation, transmission and reception of Digital Selective Calling (DSC) for use on board ships.

DSC is intended to be used in the Medium Frequency (MF), High Frequency (HF) and Very High Frequency (VHF) bands of the Maritime Mobile Service (MMS), for distress, urgency and safety communication and general communications.

The present document is part 1 of a multi-part deliverable that covers the requirements to be fulfilled by:

- DSC equipment integrated with a transmitter and/or a receiver;
- DSC equipment not integrated with a transmitter and/or a receiver.

These requirements include the relevant provisions of the ITU Radio Regulations [i.15] and Recommendations ITU-R M.493-15 [2], M.541-10 [3], M.689-3 [4] and M.1082-1 [5], the International Convention for the Safety Of Life At Sea (SOLAS) [i.14], and the following resolutions/circulars of the International Maritime Organization (IMO): A.694(17) [14], A.803(19) [15] amended by MSC.68(68) Annex 1 [17], A.804(19) [16], MSC.68(68) Annex 2 [17], A.806(19) [18], MSC.68(68) Annex 3 [17], MSC 302(87) [12] and MSC/Circ.862 [19].

Equipment for generation, transmission and reception of DSC designed according to the following equipment classes:

- Class A: includes all the facilities defined in annex 1 of Recommendation ITU-R M.493-15 [2] and complies Performance Standards A.803(19) for VHF [15], A.804(19) for MF [16] and A.806(19) for MF/HF equipment capable of voice and DSC [18].
- Class D: provides minimum facilities for VHF DSC distress, urgency and safety as well as routine calling and reception as recommended by IMO MSC/Circ.803 [i.2] for non-SOLAS vessels participating in the GMDSS and defined by Recommendation ITU-R M.493-15 [2].
- Class E: provides minimum facilities for MF and/or HF DSC distress, urgency and safety as well as routine calling and reception as recommended by IMO MSC/Circ.803 [i.2] for non-SOLAS vessels participating in the GMDSS and Recommendation ITU-R M.493-15 [2].
- Class H: provides minimum facilities for handheld VHF DSC distress, urgency and safety as well as routine calling and reception as recommended by IMO MSC/Circ.803 [i.2] for non-SOLAS vessels participating in the GMDSS and Recommendation ITU-R M.493-15 [2].
- Class M: provides minimum facilities for VHF Man Overboard devices as defined in Recommendation ITU-R M.493-15 [2].

NOTE 1: Class A equipment may support the optional semi-automatic/automatic service in accordance with Recommendations ITU-R M.689-3 [4], M.1082-1 [5] and M.493-15 [2], tables A1-4.10.1 and A1-4.10.2 and are encouraged to do so.

NOTE 2: Class D and Class E equipment may also support the optional semi-automatic/automatic service.

NOTE 3: Class D, Class E, Class H should provide a defined list of functions as a closed list for these classes of equipment is the preferable approach to ensure safe and simple operation. Optional functions should be avoided, with the intention to provide the same functionality of all equipment of one class.

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 https://docbox.etsi.org/Reference/.

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

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

[2] Recommendation ITU-R M.493-15 (2019): "Digital selective-calling system for use in the maritime mobile service".

[3] Recommendation ITU-R M.541-10 (2015): "Operational procedures for the use of digital selective-calling equipment in the maritime mobile service".

[4] Recommendation ITU-R M.689-3 (2012): "International maritime VHF radiotelephone system with automatic facilities based on DSC signalling format".

[5] Recommendation ITU-R M.1082-1 (1997): "International maritime MF/HF radiotelephone system with automatic facilities based on digital selective calling signalling format".

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

[7] IEC 61162-1:2016: "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners".

[8] IEC 61162-2:1998 (Ed. 1.0): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission".

[9] IEC 61162-3:2008+AMD1:2010+AMD2:2014 (Ed. 1.2): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 3: Serial data instrument network".

[10] IEC 61162-450:2018: "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 450: Multiple talkers and multiple listeners - Ethernet interconnection".

[11] Recommendation ITU-R M.1080 (1994): "Digital selective calling system enhancement for multiple equipment installations".

[12] IMO Resolution MSC.302(87): "Adoption of performance standards for bridge alert management".

[13] IEC 62923 (parts 1 and 2): "Maritime navigation and radiocommunication equipment and systems - Bridge alert management".

[14] 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".

[15] IMO Resolution A.803(19): "Performance Standards for Shipborne VHF Radio Installations Capable of Voice Communication and Digital Selective Calling".

[16] IMO Resolution A.804(19): "Performance Standards for Shipborne MF Radio Installations Capable of Voice Communication and Digital Selective Calling".

[17] IMO Resolution MSC.68(68): "Adoption of Amendments to Performance Standards for Shipborne Radio Communication Equipment".

[18] IMO Resolution A.806(19): "Performance Standards for Shipborne MF/HF Radio Installations Capable of Voice Communication, Narrow-Band Direct-Printing and Digital Selective Calling".

[19] IMO Circular MSC 862: "Clarifications of Certain Requirements in IMO Performance Standards for GMDSS Equipment".

[20] Recommendation ITU-R M.821-1 (1997): "Optional expansion of the digital selective-calling system for use in the maritime mobile service".

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 60529:2001 (Ed. 2.1): "Degrees of protection provided by enclosures (IP Code)".

[i.2] IMO Circular MSC/Circ.803: "Participation of non-SOLAS ships in the Global Maritime Distress and Safety System (GMDSS)".

[i.3] Void.

[i.4] Void.

[i.5] Void.

[i.6] ETSI EN 301 925: "Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands; Technical characteristics and methods of measurement".

[i.7] 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".

[i.8] ETSI EN 301 025: "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.9] 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.10] ETSI EN 303 402: "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".

[i.11] ETSI EN 302 885: "Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class H DSC; Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of Directive 2014/53/EU".

[i.12] ISO 3791: "Office machines and data processing equipment - Keyboard layouts for numeric applications".

[i.13] ETSI EN 303 132: "Maritime low power VHF personal locating beacons employing Digital Selective Calling (DSC); Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

[i.14] International Convention for the Safety of Life at Sea (SOLAS), 1974.

[i.15] ITU Radio Regulations (2020).

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

B-state: condition when transmitting the higher of the two Digital Selective Calling (DSC) frequencies

critical error: set of information characters obtained from one or more received DSC messages is considered to have critical errors if the automated procedure needs information characters from that set in order to proceed or perform any task, but the required information characters are in error

EXAMPLE: An acknowledgement cannot be composed to an individual DSC message that has errors in the sender's MMSI.

distress alert: single DSC sentence containing the distress format character and the distress information

distress alert attempt: complete set of distress alerts used during the transmission stage

NOTE: Usually an attempt consists of 5 distress alerts sent without a break.

distress class call: special set of DSC messages that contain the distress information and whose frequency of subsequent communication is taken implicitly from the frequency on which the DSC message is sent

NOTE: They include the distress alert, distress relay, distress alert acknowledgement, and distress relay acknowledgement.

distress information: string of DSC characters making up the five pieces of information describing a distress event

NOTE 1: They consist of (in order) the Maritime Mobile Service Identity (MMSI) number of the vessel in distress, the nature of distress, the position of the vessel in distress, the time of that position, and the preferred means of subsequent communication.

NOTE 2: It is only found in distress category calls.

distress relay: means of sending a "distress alert" from a vessel, which itself is not in distress, for a vessel that is in distress but unable to send its own distress or to relay distress information that has not otherwise been acknowledged as received

general class call: all the DSC messages that do not contain the distress information and in those cases where there are subsequent communications, the frequencies and/or channels of these communications are given explicitly in the message

NOTE: The set also includes all the special calls that do not involve subsequent communications such as the test call and position and polling request.

multi-frequency alert attempts: use of consecutive transmissions on between three and six frequencies, including both the MF and HF 8 MHz band DSC distress and safety frequencies

standby: state of the operational unit when it is not in one of the procedures but is still able to receive DSC calls

valid MMSI: maritime mobile service identity formed of a series of nine digits, consisting of three digits of the Maritime Identification Digits (MID) and six more digits

NOTE 1: These identities are included in the address and self-identification parts of the call sequence and are transmitted as five characters $C_5C_4C_3C_2C_1$, comprising the ten digits of:

(X_1, X_2) (X_3, X_4) (X_5, X_6) (X_7, X_8) and (X_9, X_{10})

respectively, whereas digit X_{10} is always the figure 0 unless the equipment is also designed in accordance with Recommendation ITU-R M.1080 [11].

NOTE 2: This is defined in the ITU Radio Regulations [i.15], article 19.

Y-state: condition when transmitting the lower of the two DSC frequencies

3.2 Symbols

Void.

3.3 Abbreviations

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

AC	Alternating Current
BAM	Bridge Alert Management
CH	Channel
DC	Direct Current
DSC	Digital Selective Calling
DX	First transmission of sequence
ECC	Error Check Character
EUT	Equipment Under Test
FM	Frequency Modulation
FSI	Frequency Set Information
GGA	GPS fix data
GLL	Geographical position Lat/Long
GMDSS	Global Maritime Distress and Safety System
GNS	GNSS fix data
HF	High Frequency
IEC	International Electrotechnical Commission
IMO	International Maritime Organization
ISO	International Organization for Standardization
ITU	International Telecommunications Union
ITU-R	ITU - Radiocommunications sector
ITU-T	ITU - Telecommunications sector
MF	Medium Frequency
MID	Maritime Identification Digits
MMS	Maritime Mobile Service
MMSI	Maritime Mobile Service Identity
MoB	Man over Board
MSC	Maritime Safety Committee (IMO)
PM	Phase Modulation
RF	Radio Frequency
RMC	Recommended Minimum specific GNSS data
Rx	Receive
S/N	Signal to Noise
SOLAS	Safety Of Life At Sea
SSB	Single Side Band
STS	Standard Test Signal
Tx	Transmit
UTC	Universal Time Co-ordinated
VHF	Very High Frequency