



**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**

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Foreword

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

Part 1: "Common requirements";

Part 2: "Class A/B DSC";

Part 3: "Class D DSC";

Part 4: "Class E DSC";

Part 5: "Handheld VHF Class H DSC";

Part 6 "Class M DSC".

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.

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).

"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 a multipart 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.17] and Recommendations ITU-R, the International Convention for the Safety Of Life At Sea (SOLAS) [i.16], and the relevant resolutions of the International Maritime Organization (IMO).

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.493-14 [2] and complies with the IMO Global Maritime Distress and Safety System (GMDSS) carriage requirements for MF/HF installations and/or VHF installations.
- Class B: provides minimum facilities for equipment on ships not required to use class A equipment and complies with the minimum IMO GMDSS carriage requirements for MF and/or VHF installations. This equipment should provide for:
 - alerting, acknowledgement and relay facilities for distress purposes;
 - calling and acknowledgement for general communication purposes; and
 - calling in connection with semi-automatic/automatic services, as defined in Recommendation ITU-R M.493-14 [2], annex 2, clause 3.
- 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.
- 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.
- 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.
- Class M: provides minimum facilities for VHF Man Overboard devices as defined in Recommendation ITU-R M.493-14 [2].

NOTE 1: Class A and Class B 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.493-14 [2], tables 4.10.1 and 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.

2 References

2.1 Normative references

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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.493-14 (2015): "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 Ed. 4.0 (2010): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners".
- [8] IEC 61162-2 Ed. 1.0 (1998): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission".
- [9] IEC 61162-3 Ed. 1.2:2008+AMD1:2010+AMD2:2014: "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 3: Serial data instrument network".
- [10] IEC 61162-450 Ed. 1.1:2011+AMD1:2016: "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".

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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 ed. 2.1 (2001): "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] Report ITU-R M.501: "Digital selective-calling system for future operational requirements of the maritime mobile service".
- [i.4] Void.
- [i.5] Recommendation ITU-R M.821-1 (1997): "Optional expansion of the digital selective-calling system for use in the maritime mobile service".
- [i.6] 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.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 the 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 the Directive 2014/53/EU".
- [i.12] ISO 3791: "Office machines and data processing equipment - Keyboard layouts for numeric applications".
- [i.13] MSC 302(87): "Adoption of performance standards for bridge alert management".
- [i.14] IEC 61924-2 Edition 1: "Maritime navigation and radiocommunication equipment and systems - integrated navigation systems - Part 2: Modular structure for INS - operational and performance requirements, methods of testing and required test results" (including IEC 61924-2 Corrigendum 1 November 2013).
- [i.15] 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 the Directive 2014/53/EU".
- [i.16] "International Convention for the Safety of Life at Sea", 1974.
- [i.17] ITU Radio Regulations (2016).

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions 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.17], Article 19.

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

3.2 Abbreviations

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

AC	Alternating Current
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
GMDSS	Global Maritime Distress and Safety System
HF	High Frequency
IEC	International Electrotechnical Commission
IMO	International Maritime Organization
ISO	International Standardization Organization
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
PM	Phase Modulation
RF	Radio Frequency
Rx	Receive
S/N	Signal to Noise
SOLAS	Safety Of Life At Sea
SSB	Single Side Band
Tx	Transmit
UTC	Universal Time Co-ordinated
VHF	Very High Frequency

4 General requirements

4.1 General

The equipment shall comprise the necessary facilities for coding and transmission of DSC and for decoding and conversion of the information content of received DSC to visual form in plain language.

A naming convention is used that is based upon how the messages are handled in software or by the automated procedures. This approach organizes the DSC messages into two major sets; DSC messages that contain the distress information (distress DSC messages), and those that do not (non distress DSC messages).

Within the non distress DSC messages the operator generally has the option to specify the addressing mode or destination (format), the priority (category), the type of subsequent communication or activity (telecommand), and the frequency or channel (frequency message) parameters. Certain DSC messages require a fixed set of these parameter combinations and these DSC messages have been given the names test, position request, group, individual routine, medical transports, and neutral craft. The remaining DSC messages are denoted as "general" when necessary.