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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

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European Standard (Telecommunications series)

**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)
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Foreword

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

Every EN prepared by ETSI is a voluntary standard. The present document may contain text concerning conformance testing of the equipment to which it relates. This text should be considered as guidance only and does not make the present document mandatory.

National transposition dates	
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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 may be used in the Medium Frequency (MF), High Frequency (HF) and Very High Frequency (VHF) Maritime Mobile Service (MMS), both in connection with distress and safety communication and in connection with public correspondence.

The present document 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 [5] and ITU-R Recommendations, the International Convention for the Safety Of Life At Sea (SOLAS) [3], and the relevant resolutions of the International Maritime Organization (IMO).

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

- Class A - includes all the facilities defined in annex 1 of ITU-R Recommendation M.493-6 [6];
- Class B - provides minimum facilities for equipment on ships not required to use class A equipment and complies with the minimum IMO Global Maritime DistreSS (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 ITU-R Recommendation M.493-6 [6], annex 2, subclause 3;
- Class D - provides minimum facilities for VHF DSC distress, urgency and safety as well as routine calling and reception, not necessarily in full accordance with IMO GMDSS carriage requirements for VHF installations;
- Class E - provides minimum facilities for MF and/or HF DSC distress, urgency and safety as well as routine calling and reception, not necessarily in full accordance with IMO GMDSS carriage requirements for MF/HF installations;
- Class F - provides for VHF DSC distress, urgency and safety calling and also for reception of acknowledge to its own distress calls (in order to terminate the transmission);
- Class G - provides for MF DSC distress, urgency and safety calling and also for reception of acknowledge to its own distress calls (in order to terminate the transmission).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETR 028: "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [2] IEC 60529: "Degrees of protection provided by enclosures (IP Code)".
- [3] International Convention for the Safety of Life at Sea (1974) as amended in 1988.
- [4] ISO Standard 3791: "Office machines and data processing equipment - Keyboard layouts for numeric applications".
- [5] ITU Radio Regulations.
- [6] ITU-R Recommendation M.493-6: "Digital selective-calling system for use in the maritime mobile service".
- [7] ITU-R Recommendation M.541-5: "Operational procedures for the use of digital selective-calling (DSC) equipment in the maritime mobile service".
- [8] ITU-R Recommendation M.689-2: "Operational procedures for an international maritime VHF radiotelephone system with automatic facilities based on DSC signalling format".
- [9] ITU-R Recommendation M.1082-1: "International maritime MF/HF radiotelephone system with automatic facilities based on DSC signalling format".
- [10] ITU-R Recommendation SM.332-4 (1978): "Selectivity of receivers".
- [11] ITU-T Recommendation E.161 (1988): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".
- [12] ITU-T Recommendation V.11: "Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s".
- [13] NMEA 0183, version 2.0.0: "Standard for interfacing marine electronic devices".

3 General requirements

3.1 Construction

3.1.1 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.

The design and function of DSC equipment shall comply with the provisions of ITU-R Recommendation M.493-6 [6].

The equipment may be either;

- an independent unit for connection to an external radio installation designed for maritime radio communication; or
- mechanically and electrically integrated in such radio equipment.

The equipment shall be constructed in conformity with good engineering practice, both mechanically and electrically, and shall be suitable for use on-board ships.

If the DSC equipment is integrated into radio equipment the receiver part of the equipment shall be designed for continuous operation.

3.1.2 DSC signals input/output: analogue signals

If the equipment is designed as an independent DSC unit for connection to the audio frequency terminals of external radio equipment, the input and output impedances shall be 600 Ω free of earth.

3.1.3 DSC signals input/output: digital signals

If the equipment is designed as an independent DSC unit, with binary inputs and outputs for DSC, the logic level shall comply with ITU-T Recommendation V.11 [12].

3.1.4 Decoding

The DSC equipment shall be so designed that in the decoding process the greatest possible use is made of parity bits for error detection, time multiplex repetitions and error check characters in the received call (see ITU-R Recommendation M.493-6 [6], annex 1, subclause 1.6 and, if appropriate subclause 1.7.2).

3.1.5 Accessibility

All parts of the equipment which 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 description.

3.1.6 Calibration

The equipment shall be so constructed that its main modules can easily be replaced and put into operation without elaborate calibration or re-adjustment.

3.1.7 Selection of signal characteristics

Equipment constructed for DSC to be used on frequencies both in the MF/HF range and in the maritime VHF band shall automatically select the signal characteristics relevant to the frequency range concerned (see ITU-R Recommendation M.493-6 [6], annex 1, subclauses 1.2 and 1.3).

3.1.8 Reduction of power for VHF equipment

Integrated VHF DSC equipment shall automatically reduce power (see subclause 6.3) for transmission of ships originated routine "all ships calls".

3.1.9 VHF channel 70 access

Equipment for transmission of DSC in the maritime VHF band shall be provided with facilities which, except for distress and safety calls, automatically prevents the transmission of DSC on channel 70 until the channel is free.

3.1.10 Automatic/semi-automatic service

Equipment designed for use in an automatic/semi-automatic VHF radiotelephone service using DSC shall comply with the provisions of ITU-R Recommendation M.689-2 [8].

Equipment designed for use in an automatic/semi-automatic MF/HF radiotelephone service using DSC shall comply with the provisions of ITU-R Recommendation M.1082-1 [9].

3.2 Switching time

For integrated equipment, the Radio Frequency (RF) channel switching arrangement shall be such that the time necessary to change from using one of the channels to using any other channel in the same band does not exceed 5 s.

For integrated equipment, the time necessary to change over from RF transmission to RF reception or vice versa, shall not exceed 0,3 s.

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3.3 Frequencies **(standards.iteh.ai)**

For integrated equipment, the RF equipment shall be capable of transmitting and/or receiving on one or more of the following frequencies: <https://standards.iteh.ai/catalog/standards/sist/0c3878fe-4caf-4ecb-b316-bae217a1eb9e/sist-en-300-338-1999>

- 2 187,5 kHz only;
- 4 207,5 kHz, 6 312 kHz, 8 414,5 kHz, 12 577 kHz and 16 804,5 kHz only;
- VHF channel 70 only.

In addition, the RF equipment may be capable of transmitting and/or receiving on frequencies from the following bands as permitted by the ITU Radio Regulations [5]:

- 415 kHz to 526,5 kHz;
- 1 606,5 kHz to 4 000 kHz;
- 4 MHz to 27,5 MHz;
- 156 MHz to 174 MHz.

3.4 Classes of emission

Integrated equipment used for MF/HF transmission and/or reception shall provide for the following classes of emission:

- F1B Frequency Modulation (FM) with digital information, without a sub-carrier for automatic reception; or
- J2B Single SideBand (SSB) with digital information, with the use of a modulating sub-carrier, with the carrier suppressed to at least 40 dB below peak envelope power.

Integrated equipment used for VHF transmission and/or reception shall provide for the following class of emission:

- G2B Phase Modulation (PM) with digital information, with a sub-carrier for automatic reception.