

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Global maritime distress and safety system (GMDSS) –  
Part 7: Shipborne VHF radiotelephone transmitter and receiver – Operational and  
performance requirements, methods of testing and required test results**

**Système mondial de détresse et de sécurité en mer (SMDSM) –  
Partie 7: Emetteurs et récepteurs radiotéléphoniques en ondes métriques (VHF),  
à bord des navires – Exigences d'exploitation et de fonctionnement, méthodes  
d'essai et résultats d'essai exigés**



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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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Partie 7: Emetteurs et récepteurs radiotéléphoniques en ondes métriques (VHF),  
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# CONTENTS

FOREWORD .....	3
1 Scope .....	5
2 Normative references .....	5
3 Performance requirements.....	6
3.1 Introduction.....	6
3.2 General.....	6
3.3 General requirements .....	7
3.4 Environmental requirements and electromagnetic compatibility .....	10
4 Technical characteristics .....	10
4.1 General.....	10
4.2 Class of emission and modulation characteristics .....	11
4.3 Transmitter .....	11
4.4 Receiver .....	11
4.5 DSC facility.....	12
5 Methods of testing and required test results .....	13
5.1 Test conditions .....	13
5.2 General conditions of measurement .....	14
5.3 General requirements .....	16
5.4 Transmitter .....	16
5.5 Receiver .....	23
5.6 Duplex operation .....	31
5.7 (3.3.9, 4.5) DSC operation .....	32
5.8 (3.4) Electromagnetic compatibility .....	32
Annex A (normative) .....	36
Annex B (informative) Bibliography .....	38
Figure 1 – Transmitter permissible frequency deviation.....	33
Figure 2 – Test set-up for measuring transient frequency behaviour .....	33
Figure 3 – Storage oscilloscope view $t_1$ , $t_2$ and $t_3$ .....	34
Figure 4 – Receiver audiofrequency response .....	35
Figure A.1 – IF filter specification .....	36
Table A.1 – Selectivity characteristic .....	36
Table A.2 – Attenuation points close to carrier .....	37
Table A.3 – Attenuation points distant from carrier .....	37

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### GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

#### Part 7: Shipborne VHF radiotelephone transmitter and receiver – Operational and performance requirements, methods of testing and required test results

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**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.**

Annex A forms an integral part of this standard.

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## **GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –**

### **Part 7: Shipborne VHF radiotelephone transmitter and receiver – Operational and performance requirements, methods of testing and required test results**

#### **1 Scope**

This part of IEC 61097 specifies the minimum performance requirements, technical characteristics and methods of testing with required test results for VHF radio installations capable of voice communication and digital selective calling as required by chapter IV of the 1988 amendments to the 1974 International Convention for Safety of Life at Sea (SOLAS), and which is associated with IEC 60945. When a requirement in this standard is different from IEC 60945, the requirement in this standard shall take precedence.

This standard incorporates the applicable part of the performance standards included in IMO Resolution A.524(13) and A.803(19), the technical characteristics included in Recommendation ITU-R M.489-2 (formerly CCIR Recommendation 489-1), and takes account of IMO Resolution A.694(17), and conforms with the ITU Radio Regulations where applicable.

NOTE – All text of this standard, whose wording is identical to that in IMO Resolution A.524(13) and A.803(19) and Recommendation ITU-R M.489-2 is printed in *italics* and the Resolution/Recommendation and clause numbers are indicated in brackets.

The requirements for the DSC and/or watchkeeping receiver, when integrated in the equipment, are in IEC 61097-3 and the future IEC 61097-8 respectively.

#### **2 Normative references**

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61097. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61097 are encouraged to investigate the possibility of applying the most recent edition of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60945:1994, *Marine navigational equipment – General requirements – Methods of testing and required test results*

IEC 61097-3:1994, *Global maritime distress and safety system (GMDSS) – Part 3: Digital selective calling (DSC) equipment – Operational and performance requirements, methods of testing and required test results*

IEC 61162-1:1995, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

IMO International Convention for the Safety of Life At Sea (SOLAS): 1974, as amended in 1988 (GMDSS) – *Chapter IV: Radiocommunications*

IMO Resolution A.524(13):1983, *Performance standards for VHF multiple watch facility*

IMO Resolution A.694(17): 1991, *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO Resolution A.803(19): 1995, *Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling*

ITU Radio Regulations: 1995, Appendix S3: *Table of maximum permitted spurious emission power levels*

ITU Radio Regulations: 1990, Appendix 18: *Table of transmitting frequencies in the band 156-174 MHz for stations in the maritime mobile service*

ITU-R M.489-2: 1995, *Technical characteristics of radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz*

ITU-T V.11: 1993, *Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s*

ITU-T V.24: 1993, *List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit terminating equipment (DCE)*

ITU-T V.28: 1993, *Electrical characteristics for unbalanced double-current interchange circuits*

### 3 Performance requirements

#### 3.1 Introduction

Performance requirements described in this clause are specified by referring to IMO Resolutions and ITU Recommendations.

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3.2.1 (A.803(19)/1) *The VHF radio installation, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in Resolution A.694(17) and detailed in IEC 60945, shall comply with the following requirements and with the technical characteristics contained in clause 4 of this standard.*

3.2.2 (A.803(19)/2.1) *The installation, which may consist of more than one piece of equipment, shall be capable of operating on single-frequency channels or on single or two-frequency channels. For two-frequency channels the Radio Regulations require a separation of 4,6 MHz between the transmitting frequency and the receiving frequency.*

3.2.3 (A.803(19)/2.2) *The equipment shall provide for the following categories of calls using both voice and digital selective calling (DSC):*

- .1 distress, urgency and safety;*
- .2 ship operational requirements; and*
- .3 public correspondence.*

3.2.4 (A.803(19)/2.3) *The equipment shall provide for the following categories of communication using voice:*

- .1 distress, urgency and safety;*
- .2 ship operational requirements; and*

.3 public correspondence.

### 3.3 General requirements

#### 3.3.1 Composition

3.3.1.1 (A.803(19)/2.4) *The equipment shall comprise at least:*

- .1 *a transmitter/receiver including antenna;*
- .2 *an integral control unit or one or more separate control units;*
- .3 *a microphone with a press-to-transmit switch, which may be combined with a telephone in a handset;*
- .4 *an internal or external loudspeaker;*
- .5 *an integral or separate digital selective calling facility; and*
- .6 *a dedicated DSC watchkeeping facility to maintain a continuous watch on channel 70.*

3.3.1.2 (A.803(19)/2.5) *The installation may also include additional receivers.*

#### 3.3.2 Controls and indicators

3.3.2.1 (A.803(19)/4.1.3) *An on/off switch shall be provided for the entire installation with a visual indication that the installation is switched on.*

3.3.2.2 (A.803(19)/4.2.1) *Provision shall be made for changing from transmission to reception by use of a press-to-transmit switch. Additionally, facilities for operation on two-frequency channels without manual control may be provided.*

3.3.2.3 (A.803(19)/4.2.2) *The receiver shall be provided with a manual volume control by which the audio output may be varied.*

3.3.2.4 (A.803(19)/4.2.3) *A squelch (mute) control shall be provided on the exterior of the equipment.*

3.3.2.5 (A.803(19)/4.1.5) *The equipment shall indicate the channel number, as given in the Radio Regulations, to which it is tuned. It shall allow the determination of the channel number under all conditions of external lighting. Where practicable, channels 16 and 70 shall be distinctively marked.*

3.3.2.6 (A.803(19)/4.1.4) *A visual indication that the carrier is being transmitted shall be provided.*

3.3.2.7 (A.803(19)/4.1.6) *Control of the equipment shall be possible at the position from which the ship is normally navigated. Control from that position shall have priority if additional control units are provided. When there is more than one control unit, indication shall be given to the other units that the equipment is in operation.*

3.3.2.8 Channel selection by a digital input panel shall require only to key the desired channel numbers.

3.3.2.9 Change of frequencies, except for automatic DSC or multiple watch operation may be initiated by channel selector controls only.

3.3.2.10 (A.803(19)/2.6) *A distress alert shall be activated only by means of a dedicated distress button. This button shall not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.*

3.3.2.11 (A.803(19)/2.7) *The dedicated distress button shall:*

- .1 be clearly identified; and*
- .2 be protected against inadvertent operation.*

3.3.2.12 (A.803(19)/2.8) *The distress alert initiation shall require at least two independent actions.*

3.3.2.13 (A.803(19)/2.9) *The equipment shall indicate the status of the distress alert transmission.*

3.3.2.14 (A.803(19)/2.10) *It shall be possible to interrupt and initiate distress alerts at any time.*

### 3.3.3 *Loudspeaker and handset*

3.3.3.1 (A.803(19)/10.1) *The receiver output shall be suitable for use with a loudspeaker and/or a telephone handset. The audio output shall be sufficient to be heard in the ambient noise level likely to be encountered on board ships.*

3.3.3.2 (A.803(19)/10.2) *It shall be possible to switch off the loudspeaker without affecting the audio output of the telephone handset, if provided.*

3.3.3.3 (A.803(19)/10.3) *In the transmit condition during simplex operation the output of the receiver shall be muted.*

### 3.3.4 *Switching time*

3.3.4.1 (A.803(19)/4.1.1) *Change of channel shall be capable of being made as rapidly as possible, but in any event within 5 s.*

3.3.4.2 (A.803(19)/4.1.2) *The time taken to switch from the transmit to the receive condition, and vice versa, shall not exceed 0,3 s.*

### 3.3.5 *Safety precautions*

(A.803(19)/6) *The equipment, when operating, shall not be damaged by the effects of open-circuited or short-circuited antenna terminals.*

### 3.3.6 *Frequency bands*

3.3.6.1 (A.803(19)/3.1) *The equipment shall be designated for operation on one or more channels selected from and in accordance with appendix 18 of the Radio Regulations.*

3.3.6.2 (A.803(19)/3.2) *The equipment shall be capable of operating as follows:*

- .1 in the band 156,3 MHz to 156,875 MHz on single-frequency channels as specified in appendix 18 to the Radio Regulations including at least 156,3 MHz (CH 6), 156,65 MHz (CH 13), 156,8 MHz (CH 16), and 156,525 MHz (CH 70);*
- .2 in the band 156,025 MHz to 157,425 MHz for transmitting and the band 160,625 MHz to 162,025 MHz for receiving on two-frequency channels as specified in appendix 18 to the Radio Regulations; and*
- .3 the equipment shall be so designed that the use of channel 70 for purpose other than DSC is prevented.*

### 3.3.7 *Marking and identification*

Marking and identification shall be in accordance with IEC 60945.

### 3.3.8 *Warming-up period*

(A.803(19)/5) *The equipment shall be operational within 1 min of switching on.*

### 3.3.9 *DSC facilities*

(A.803(19)/3.3) *The digital selective calling facility shall be at least capable of operating on channel 70, and conform to the requirements of IEC 61097-3.*

The DSC facility may be physically integrated into the equipment or form an independent unit.

#### 3.3.9.1 *DSC signal input and output*

If the DSC facility is not integrated, the equipment shall have DSC signal input and output impedances of 600  $\Omega$ , symmetrical and free of earth, with a closed-circuit level adjustable to 0,775 V (r.m.s.)  $\pm 10$  dB for connection to the AF terminals of an independent DSC facility.

Alternatively, an input and output may be provided for DSC signals at logic levels. The electrical characteristics of the input and output shall be compatible with ITU-T V.11 and the definition of functions shall comply with IEC 61162-1. The B-state shall be the logic "0", and the Y-state shall be the logic "1".

Additionally, DSC signals may be provided with V.24/V.28 signals (EIA-232-D).

#### 3.3.9.2 *Printer interface*

For equipment with an integrated DSC facility, the electrical characteristics of an interface/output for an external printer, if required, shall be a CENTRONICS type interface/output or be compatible with ITU-T V.28 and the definition of function shall comply with ITU-T V.24. Voluntarily other types of printer interfaces may be provided.

#### 3.3.9.3 *Data interface*

For equipment with an integrated DSC facility, data interfaces, if provided, for the connection of electronic navigational aids shall be compatible with IEC 61162-1.

If the DSC facility is not integrated, the equipment shall have data interfaces for radio control purposes compatible with IEC 61162-1. Equipment forming integral parts of a specific radio installation only, may instead utilize other protocols for radio control purposes.

### 3.3.10 *Multiple watch facilities*

(A.524(13)/1) *VHF radiotelephone equipment having multiple watch facilities shall comply with the following requirements:*

3.3.10.1 (A.524(13)/2.1) *The equipment shall include a provision for the automatic scanning of a priority channel and one additional channel only.*

3.3.10.2 (A.524(13)/2.2) *The priority channel is that channel which will be sampled even if there is a signal on the additional channel and on which the receiver will lock during the time a signal is detected.*

3.3.10.3 (A.524(13)/2.3) *The additional channel is that channel which will be monitored during the periods the equipment is not sampling or receiving signals on the priority channel.*

3.3.10.4 (A.524(13)/2.4) *Provision shall be included to switch the scanning facility on and off by means of a manually operated control. In addition it shall be ensured that the receiver remains on the same channel as the transmitter for the entire duration of any communication with the ship, e.g. the scanning facility shall be switched off automatically when the handset is off its hook. The scanning facility shall be switched on automatically when the handset is replaced on its hook.*

3.3.10.5 (A.524(13)/2.5) *Selection of the additional channel and, if provided, of the priority channel shall be possible at the operating position of the equipment. If the selection of the priority channel is not provided, the priority channel shall be channel 16.*

3.3.10.6 (A.524(13)/2.6) *When the scanning facility is in operation, the channel number of both channels on which the equipment is operating shall be clearly indicated simultaneously.*

3.3.10.7 (A.524(13)/2.7) *In a transceiver, transmission shall not be possible when the scanning facility is operating. When the scanning facility is switched off, both transmitter and receiver shall be tuned automatically to the selected additional channel.*

3.3.10.8 (A.524(13)/2.8) *A transceiver shall be provided with a single manual control (e.g. push-button) in order to switch the equipment quickly for operation on the priority channel.*

3.3.10.9 (A.524(13)/2.9) *At the operating position of a transceiver the selected additional channel shall be clearly indicated as being the operational channel of this receiver.*

#### 3.4 *Environmental requirements and electromagnetic compatibility*

Unless otherwise stated in this standard, the equipment shall comply with the requirements of the environmental and electromagnetic conditions specified in IEC 60945.

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## 4 **Technical characteristics**

### 4.1 *General*

4.1.1 The equipment shall be designed to operate satisfactorily with a channel separation of 25 kHz in accordance with appendix 18 of the Radio Regulations.

4.1.2 (A.803(19)/4.1.7) *The equipment shall not be able to transmit during channel switching operation.*

4.1.3 (A.803(19)/4.1.8) *Operation of the transmit/receive control shall not cause unwanted emissions.*

4.1.4 (489-2/1.1.4) *Where duplex or semi-duplex systems are in use, the performance of the equipment shall continue to comply with the requirements of this standard.*

4.1.5 When using digital selective calling the equipment shall have the following capabilities:

- .1 sensing\* to determine the presence of a signal on 156,525 MHz (CH 70); and
- .2 automatic prevention of the transmission of a call, except for distress and safety calls, when the channel is occupied by calls.

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\* Sensing may be achieved by an associated DSC watchkeeping receiver.