

ANNEX 18

**RESOLUTION MSC.511(105)
(adopted on 28 April 2022)**

**PERFORMANCE STANDARDS FOR SHIPBORNE VHF RADIO INSTALLATIONS
CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.803(19), by which the Assembly, at its nineteenth session, adopted the *Recommendation on Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling*, which was subsequently amended by resolution MSC.68(68), annex 1,

RECALLING FURTHER resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

TAKING INTO ACCOUNT the amendments to the International Convention for the Safety of Life at Sea, 1974 ("the Convention") adopted by resolution MSC.496(105),

NOTING, in particular, regulations IV/7.1.1, 7.1.2 and 8.2 of the Convention concerning radiocommunications for the Global Maritime Distress and Safety System (GMDSS), which require ships to be provided with a VHF radio installation capable of voice communication and digital selective calling,

RECOGNIZING the need to revise the *Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling* to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED, at its 105th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its eighth session,

1 ADOPTS the revised *Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling*, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that shipborne VHF radio installations capable of voice communication and digital selective calling which will form part of the GMDSS:

- .1 if installed on or after 1 January 2024, conform to performance standards not inferior to those specified in the annex to the present resolution;
- .2 if installed on or after 23 November 1996 but before 1 January 2024, conform to performance standards not inferior to those specified in the annex to resolution A.803(19), as amended, or conform to performance standards not inferior to those specified in the annex to this resolution; and
- .3 if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.609(15).

ANNEX

PERFORMANCE STANDARDS FOR SHIPBORNE VHF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

PART A – GENERAL

1 INTRODUCTION

1.1 This equipment meets the requirement for VHF installations on ships as required by SOLAS regulations IV/7.1.1, 7.1.2 and 8.2.

1.2 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 resolutions A.694(17) and MSC.191(79), as amended, should comply with the following performance standards.

2 GENERAL

2.1 The installation, which may consist of more than one piece of equipment, should be capable of operating on single-frequency channels or on single- and two-frequency channels.

2.2 The equipment should 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 general radiocommunications.

2.3 The equipment should provide for the following categories of communications using voice:

- .1 distress, urgency and safety;
- .2 ship operational requirements; and
- .3 general radiocommunications.

2.4 The equipment should 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.

2.5 The installation may also include additional receivers.

2.6 A distress alert should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard associated with the equipment and should be physically separated from functional buttons/keys used for normal operation. This button should be a single button for no other purpose than to initiate a distress alert.

2.7 The dedicated distress button should:

- .1 be clearly identified and be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it should also be marked "DISTRESS"; and
- .2 be protected against inadvertent operation. The required protection of the distress button should consist of a spring-loaded lid or cover permanently attached to the equipment by, for example, hinges. It should not be necessary for the user to remove additional seals or to break the lid or cover in order to operate the distress button.

The operation of the distress button should generate a visible and audible indication. The distress button should initiate a distress alert when kept pressed for at least three seconds. A flashing light and an intermittent acoustic signal should start immediately. After the three seconds, the transmission of the distress alert is initiated and the indication should become steady and the acoustic signal should stop. If the distress button is released before a distress alert is initiated, the light should go out and the acoustic signal should stop.

2.8 The distress alert initiation should require at least two independent actions. The lifting of the protective lid or cover is considered as the first action. Pressing the distress button as specified above is considered as the second independent action.

2.9 The equipment should indicate the status of the distress alert transmission.

2.10 It should be possible to interrupt and initiate distress alerts at any time and to interrupt repetitive transmissions of distress messages. Such operation should not interrupt the transmission of a distress alert or distress message in progress but should prevent repetitive transmissions of a distress message.

3 POWER SUPPLY

The VHF radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the VHF installation from an alternative source of electrical energy.

4 CONTROLS AND INDICATORS

4.1 Control of the equipment should be possible at the position from which the ship is normally navigated. Control from that position should have priority if additional control units are provided. When there is more than one control unit, indication should be given to the other units that the equipment is in operation.

4.2 The equipment should provide a standard interface to enable the selections of channels and setting of Maritime Mobile Service Identity (MMSI) to be called from a remote control unit (e.g. INS) by using standardized interfaces.¹

4.3 DSC controls and indicators

4.3.1 It should be possible to initiate and make distress and safety calls from the position from which the ship is normally navigated. The means for initiating a distress call should be as prescribed in part A – General, paragraphs 2.6 to 2.8.

4.3.2 Initiation of DSC distress calls should supersede any other operation of the facility.

4.3.3 Self-identification data should be stored in the DSC unit. It should not be possible for the user easily to change these data.

4.3.4 Means should be provided to enable routine testing of the DSC facilities without radiation of signals.

4.3.5 Provision should be made for:

.1 specific alerts to indicate receipt of a distress or urgency calls or a call having distress category.² It should not be possible to disable this alarm and indication. Provision should be made to ensure that they can be reset only manually; and

.2 alerts for calls other than distress and urgency.

5 INTERFACES

5.1 Where the equipment is part of an integrated communication system (ICS), integrated navigation system (INS), integrated bridge system (IBS) or connected to a navigation system, this should not impair any of the GMDSS functions of the system or the equipment itself.

5.2 Equipment should provide an interface for bridge alert management (BAM) in accordance with resolution MSC.302(87) on *Performance standards for bridge alert management*.

5.3 The equipment should provide an interface to report a ship identifier and location data from a received distress alert, maritime safety information (MSI) or search and rescue (SAR) related information to navigation display system in order to enable a graphical display and possible linking to available target information.

5.4 All interfaces provided for communication with other navigation and communication equipment should comply with the relevant international standards.³

6 HUMAN-MACHINE INTERFACE

6.1 The human-machine interface (HMI) should provide all functions necessary to carry out all communication procedures including those required by the GMDSS.

¹ Refer to IEC 61162.

² Recommendation ITU-R M.493.

³ Refer to IEC 61162.

6.2 Visual indications and visual presentations of text and graphics of the system should conform to resolution MSC.191(79), as amended.

PART B – TRANSMITTER

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The equipment should be designated for operation on channels selected from and in accordance with appendix 18 to the Radio Regulations.

1.2 The radiotelephone facility should be capable of operating as follows:

.1 in the band 156.025 MHz to 157.425 MHz on single-frequency channels as specified in appendix 18 to the Radio Regulations; and

.2 in the band 156.025 MHz to 157.325 MHz for transmitting and the band 160.625 MHz to 161.925 MHz for receiving on two-frequency channels as specified in appendix 18 to the Radio Regulations.

1.3 The digital selective calling facility should be capable of operating on channel 70.

1.4 Class of emission should comply with chapter IX of the Radio Regulations.

2 FREQUENCY ACCURACY AND TOLERANCE

The frequency tolerance for ship station transmitters should not exceed 10 parts in 10^6 .

3 OUTPUT POWER

3.1 The transmitter output power should be between 6 and 25 W.

3.2 Provision should be made for reducing the transmitter output power to a value of less than 1 W. However, this reduction of the power is optional on channel 70.

4 PERMISSIBLE WARMING-UP PERIOD

The equipment should be operational within five seconds after switching on.

5 CONTINUOUS OPERATION

A manual non-locking push-to-talk switch to operate the transmitter with a visual indication that the transmitter is activated and facilities to limit the transmission time to a maximum of five minutes should be provided.

6 CONTROLS AND INDICATORS

6.1 Channel control and switching

6.1.1 Change of channel should be capable of being made as rapidly as possible, but in any event within five seconds.

6.1.2 The time taken to switch from the transmit to the receive condition, and vice versa, should not exceed 0.3 seconds.

6.1.3 An on/off switch should be provided for the entire installation with a visual indication that the installation is switched on.

6.1.4 A visual indication that the carrier is being transmitted should be provided.

6.1.5 The equipment should indicate the four-digit channel number, as given in the Radio Regulations appendix 18, to which it is tuned. It should allow the determination of the channel number under all conditions of external lighting. Where practicable, channels 16 and 70 should be distinctively marked.

6.1.6 The equipment should not be able to transmit during a channel switching operation.

6.1.7 Operation of the transmit/receive control should not cause unwanted emissions.

6.2 Radiotelephone facility

6.2.1 Provision should 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.

6.2.2 The receiver should be provided with a manual volume control by which the audio output may be varied.

6.2.3 A squelch (mute) control should be provided on the exterior of the equipment.

6.3 Loudspeaker and telephone handset (radiotelephone facility)

6.3.1 The receiver output should be suitable for use with a loudspeaker and a telephone handset. The audio output should be sufficient to be heard in the ambient noise level likely to be encountered on board ships.

6.3.2 It should be possible to switch off the loudspeaker without affecting the audio output of the telephone handset, if provided.

6.3.3 In the transmit condition during simplex operation, the output of the receiver should be muted.

6.3.4 In the transmit condition during duplex operation, only the telephone handset should be in circuit. Care should be taken to prevent any electrical or acoustic feedback, which could cause singing.

7 SAFETY PRECAUTIONS

7.1 The equipment, when operating, should not be damaged by the effects of open-circuited or short-circuited antenna terminals.

7.2 In case the standing wave ratio (SWR) becomes too high the power of the transmitter can be automatically reduced without stopping the transmission and an appropriate alert should be initiated.

8 ANTENNA SYSTEM

The VHF antenna or antennae should be vertically polarized and, as far as practicable, be omnidirectional in the horizontal plane. The installation should be suitable for efficient radiation and reception of signals at the operating frequencies.

PART C – RECEIVER

1 FREQUENCIES AND CLASSES OF EMISSION

See Part B 1.

2 FREQUENCY TOLERANCE AND ACCURACY

The frequency tolerance for ship station receivers should not exceed 10 parts in 10^6 .

3 USABLE SENSITIVITY

3.1 Radiotelephone facility

The sensitivity of the receiver should be equal to or better than $2 \mu\text{V}$ e.m.f. for a signal-to-noise and distortion (SINAD) ratio of 20 dB.

3.2 Digital selective calling facility

With a DSC modulated input signal having a level of $1 \mu\text{V}$ e.m.f. to its associated VHF receiver, the DSC equipment should be capable of decoding the received message with a maximum permissible output character error rate of 10^{-2} .

4 RECEIVER OUTPUT

4.1 For the reception of voice signals, the receiver should be suitable for use with a loudspeaker and a telephone handset and should be capable of providing power of at least 2 W to loudspeaker and at least 1 mW to the handset.

4.2 An output should be provided for DSC signals if the corresponding facility is not integrated.

5 PERMISSIBLE WARMING-UP PERIOD

See Part A 4.

6 IMMUNITY TO INTERFERENCE

The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.

7 CONTROLS

See Part B 6.

PART D – DIGITAL SELECTIVE CALLING FACILITY

1 DSC CAPABILITIES

1.1 The facility should conform to the provisions of the relevant ITU-R Recommendations pertaining to the DSC system.⁴

1.2 The DSC facility should comprise:

- .1 means to decode and encode DSC messages;
- .2 means necessary for composing the DSC message;
- .3 means to verify the prepared message before it is transmitted;
- .4 means to display the information contained in a received call in plain language;
- .5 facilities to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid which may be an integral part of the equipment. For equipment which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standards;⁵
- .6 means for the manual entry of position information and the time at which the position was determined; and
- .7 means to activate an alert when no position data is received from the electronic position-fixing aid or, in the case of manual input, the position information is over four hours old. Any position information not updated for more than 23.5 hours should be erased.

2 DISTRESS MESSAGE STORAGE

2.1 If the received messages are not printed immediately, sufficient capacity should be provided to enable at least 20 received distress messages to be stored in the DSC facility.

2.2 These messages should be stored until read-out and should be erased after 48 hours after their reception.

⁴ Class A DSC equipment conforming to Recommendation ITU-R M.493 should be used to meet this requirement.

⁵ Refer to IEC 61162.