

**ANNEX 18**

**RESOLUTION MSC.434(98)  
(adopted on 16 June 2017)**

**PERFORMANCE STANDARDS FOR A SHIP EARTH STATION  
FOR USE IN THE GMDSS**

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

RECALLING FURTHER regulations IV/10.1 and 14.1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, concerning radiocommunications for the Global Maritime Distress and Safety System (GMDSS), which require, respectively, that ships remaining in sea area A3 be provided with a ship earth station and that such ship earth stations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

FURTHER RECALLING resolution A.1001(25) by which the Assembly adopted the criteria and requirements for mobile-satellite communication services being designed for use in the GMDSS,

NOTING that the International Mobile Satellite Organization (IMSO) oversees certain public interests in satellites' operations, including the continued provision of satellite services for the GMDSS,

RECOGNIZING the need to prepare performance standards for satellite communication equipment designed in accordance with resolution A.1001(25) in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between satellite communication equipment and other communication and navigation equipment aboard the ship,

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

1 ADOPTS the *Performance standards for a ship earth station for use in the GMDSS*, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that every ship earth station which forms part of the GMDSS:

- .1 if designed to operate in a mobile satellite service recognized on or after 1 January 2021, complies with the relevant requirements of resolution A.1001(25) and conforms to performance standards not inferior to those specified in the annex to the present resolution; and

- .2 if designed to operate on a mobile satellite service recognized before 1 January 2021:
  - .1 conforms to the relevant requirements of resolution A.1001(25) and to the performance standards not inferior to those specified in the annex to the present resolution; or
  - .2 conforms to performance standards not inferior to those specified in the annex to:
    - .1 resolution MSC.130(75) on *Performance standards for Inmarsat ship earth stations capable of two-way communications*, if installed after 1 February 1999;
    - .2 resolution A.808(19) on *Performance Standards for Ship Earth Stations Capable of Two-Way Communications*, if installed on or after 23 November 1996 and before 1 February 1999;
    - .3 resolution A.698(17) on *Performance Standards for Ship Earth Stations Capable of Two-Way Communications*, if installed before 23 November 1996;
- 3 INVITES IMSO to coordinate with the recognized GMDSS service providers with a view to ensuring consistency between their ship earth station design and installation guidelines and the performance standards specified in the annex to the present resolution.

## ANNEX

### PERFORMANCE STANDARDS FOR A SHIP EARTH STATION FOR USE IN THE GMDSS

#### 1 INTRODUCTION

The ship earth station installation capable of two-way radiocommunications should comply with the general requirements set out in resolutions A.694(17), A.813(19), MSC.191(79), and with the following minimum requirements.

#### 2 TECHNICAL REQUIREMENTS

##### 2.1 General

- .1 The ship earth station should operate using a recognized mobile-satellite service and meet the functional requirements of resolution A.1001(25). The ship earth station should comply with the technical standard provided by the recognized mobile-satellite service provider and be certified by this provider for operation in the GMDSS, in order to ensure operational reliability.
- .2 The ship earth station should comply with ITU Radio Regulations.

##### 2.2 Functional requirements

- .1 The ship earth station should be capable of automatically recognizing the priority of ship-to-ship, ship-to-shore and shore-to-ship communications and should process them in accordance with the message priority defined by the ITU Radio Regulations. The order of processing these communications should be:
  - .1 distress;
  - .2 urgency;
  - .3 safety; and
  - .4 other communications.
- .2 The ship earth station should provide a specific visual indication when unable to detect or otherwise make contact with the satellites of the mobile-satellite system for a period of one minute or more, as referred to in the appendix.

##### 2.3 Integrated systems and equipment interfaces

- .1 The equipment should meet the requirements for Bridge Alert Management (BAM) system<sup>1</sup>. Equipment interfaces should comply with recognized international standards. Where the ship earth station 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 these systems or the ship earth station itself.

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<sup>1</sup> Resolutions A.811(19), MSC.252(83) and MSC.302(87); guideline SN.1/Circ.288; international standards IEC 62940, IEC 61924-2 and IEC 62923.

- .2 The ship earth station should provide an interface from which data from Enhanced Group Call (EGC) communications, including Maritime Safety Information (MSI), can be provided to navigation display systems, in accordance with recognized international standards.
- .3 The ship earth station should provide either an integral electronic position fixing equipment or have an interface for position updating conforming to the recognized international standards.
- .4 The ship earth station should provide an interface in accordance with recognized international standards to report a ship's identifier and location data from a received distress alert relay to navigation display systems in order to enable graphical display and possible linking to available target information.

### **3 OPERATION**

#### **3.1 Primary human-machine interface (HMI)**

- .1 The primary HMI should provide all functions necessary to carry out all communication procedures including those required by the GMDSS.

#### **3.2 Ship earth station identity**

- .1 No control external to the equipment should be available for alteration of the ship station identity.

#### **3.3 Transmission of distress alerts/calls**

- .1 It should be possible to initiate transmission of distress alerts/calls at any time. It should be possible to initiate transmission of distress alerts/calls whilst the ship earth station is transmitting lower priority communications, and whilst it is receiving communications of any priority, if necessary by pre-emption of those communications.
- .2 It should be possible to initiate and make distress alerts/calls from the position at which the ship is normally navigated. The equipment should include an option making it possible to initiate transmission of distress alerts/calls at a position remote from the primary HMI of the equipment.
- .3 The HMI should include a dedicated distress button that has no other function than activating distress transmissions.
- .4 A distress alert/call should be activated only by means of a dedicated distress button (a physical button, not a touchscreen button). The dedicated distress button<sup>2</sup> should not be any key of a digital input panel or a keyboard provided on the equipment. The distress button should be clearly identified and protected against inadvertent activation, requiring at least two independent actions. 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.

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<sup>2</sup> MSC/Circ.862.

- .5 The distress button should be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it should be also be red in colour and marked "DISTRESS".
  - .6 The required protection of the distress button should consist of a spring-loaded lid or cover permanently attached to the equipment by, e.g. 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.
  - .7 The equipment should indicate the status of the distress alert/call. The operation of the distress button should generate a visible and audible indication. The distress button should be kept pressed for at least 3 seconds. A flashing light and an intermittent audible signal should start immediately. After the transmission of the distress alert/call is initiated, the visual indication should become steady and the audible signal should cease.
  - .8 The equipment should automatically initiate repetitive initial distress alerts/calls, which are repeated until cancelled on the ship or until appropriately acknowledged. It should be possible to interrupt repetitive initial distress alerts/calls. Such operation should not interrupt the transmission of a distress alert/call in progress but should prevent repetitive transmissions of a distress alert/call.
  - .9 The distress alert should contain identification of the station in distress, its position and the time of the position fix.
  - .10 The equipment should be capable of transmitting and receiving subsequent distress communication.
  - .11 After initiating a false distress alert/call, it should be possible to send a cancellation of the alert/call. This cancellation should not be initiated by cutting the power supply to the ship earth station nor by the operator switching the ship earth station off.
- 3.4 Test facilities
- .1 It should be possible to test the distress capability of the ship earth station without initiating a distress alert/call.
- 3.5 Reception of distress, urgency and safety alerts/calls
- .1 It should be possible for the ship earth station to receive distress, urgency and safety priority alerts/calls whilst it is being used for communications of a lower priority than that being received.
  - .2 Provision should be made for an audible signal and visual indication at the position from which the ship is normally navigated, to indicate receipt of a distress or urgency enhanced group call message. It should not be possible to disable this indication and it should only be possible to reset it manually and only from the position where the message is displayed or printed. The audible signals for distress, urgency and their acknowledgements should be continuously repeated until manually terminated.

- .3 For the presentation of received distress and urgency alerts/calls intended as text to be read, the equipment should include or interface to either:
  - .1 an integrated printing device; or
  - .2 a dedicated display device<sup>3</sup>, printer output port and a non-volatile message memory; or
  - .3 a connection to a navigation system and a non-volatile message memory.
  
- 3.6 Audible signals and visual indications:
  - .1 The audible signals should be activated in relation to:
    - .1 distress alert/calls or distress relay alert/calls; and
    - .2 urgency calls and messages.
  - .2 For visual indication the ship earth station should conform to MSC 191(79).
  - .3 BAM classification of priorities and categories is attached as appendix.
  
- 3.7 Enhanced Group Call (EGC) messages, including Maritime Safety Information (MSI)
  - .1 Facilities should be provided for the ship earth station to receive maritime safety information (MSI) for the NAVAREA/METAREA and the coastal warning areas and different classes of messages:
    - .1 where the ship is sailing and 300 NM beyond the limits of the NAVAREA/METAREA;
    - .2 for the planned voyage; and
    - .3 for a fixed position.

Additional means should be provided to filter received MSI based on NAVAREA/METAREA and the coastal warning area codes and different classes of messages.
  - .2 The station should be able to receive and filter distress relay and urgency messages in accordance with area defined within the EGC message and the ship's position.
  - .3 For the presentation of received EGC communications intended as text to be read, the equipment should include or interface to either:
    - .1 an integrated printing device; or

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<sup>3</sup> Where there is no printer, the display device should be located in the position from which the ship is normally navigated.

- .2 a dedicated display device<sup>4</sup>, printer output port and a non-volatile message memory; or
- .3 a connection to a navigation system and a non-volatile message memory.
- .4 If a dedicated display device or a connection to a navigation system is used, it should meet the general requirements of the Organization for such devices<sup>5</sup> and the following additional requirements:
  - .1 the capability of showing at least 16 lines by 40 characters, with a non-volatile memory of at least 255 messages of 1,023 characters;
  - .2 an indication of newly received unsuppressed messages should be immediately displayed until acknowledged, as referred to in the appendix; and
  - .3 the design and size of the display device should be such that displayed information is easily read under all conditions, by observers at normal working distances and viewing angles.
- .5 If a printing device is used, it should meet the general requirements of the Organization for such devices and the following additional requirements:
  - .1 the printing device should be capable of printing at least the standard International Reference Alphabet (IRA) character set. Other character sets can be optionally used according to ISO 2022<sup>6</sup> standards and ITU-T Recommendations T.50;
  - .2 the printing device should be able to print at least 40 characters per line;
  - .3 means should be provided to prevent the re-printing of a message once it has been received without error;
  - .4 any messages should be displayed or printed regardless of the character error rate of its reception. The equipment should use an asterisk (the "\*" character) or a low line (the "\_" character) if a corrupted character is received; and
  - .5 a "paper low" condition should generate a caution, as referred to in the appendix.
- .6 For the presentation of received group call messages intended as text to be read, or intended as imagery to be viewed, on another connected device or an integrated system, paragraph 2.3.1 also applies.

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<sup>4</sup> Where there is no printer, the dedicated display device should be located in the position from which the ship is normally navigated.

<sup>5</sup> Resolution MSC.191(79).

<sup>6</sup> ISO/IEC 2022:1994, Information technology – Character code structure and extension techniques.

### 3.8 Position updating

- .1 Facilities should be provided to automatically update the ship's position and the time at which the position was determined from a suitable electronic position fixing equipment which may be an integral part of the equipment.
- .2 To enable updating of the position:
  - .1 the status of the position update should be visible to the operator (e.g. offline, manual or automatic);
  - .2 if position data is being updated automatically, a caution should be raised if no update has been performed for a period of 10 minutes, as referred to in the appendix. The caution should be removed by receiving new position data;
  - .3 the equipment should have facilities for manually entering the ship's position and the time of the position fix;
  - .4 if the ship's manually-set position is older than 4 hours, a caution should be raised, as referred to in the appendix. The caution should be removed by inputting or receiving new position data; and
  - .5 if the ship's position is older than 24 hours, the position is clearly identified with date and time of the fix in UTC for distress alerting purposes.

## 4 POWER SUPPLY AND SOURCES OF ENERGY

4.1 The ship earth station should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the ship earth station and all equipment necessary for its normal functioning, from an alternative source of electrical energy.

4.2 Changing from one source of supply to another or any interruption of up to 60 seconds duration of the supply of electrical energy should not require the equipment to be manually re-initialized, should not result in loss of received communications stored in the memory and should not render the equipment inoperative when power is restored.

## 5 ANTENNA SITING

5.1 Where an omni-directional antenna is used, it is desirable that the antenna be sited in such a position that no obstacle is likely to degrade significantly the performance of the equipment. The manufacturer should provide information, in the installation manual, on the required free line of sight and the angles in the fore and aft directions and in the port and starboard directions that are required for reliable operation, taking into account ship movements in heavy seas.

5.2 Where a stabilized directional antenna is used, it is desirable that the antenna be sited in such a position that no obstacle is likely to degrade significantly the performance of the equipment. The manufacturer should provide information in the installation manual, on the required free line of sight and the angles of elevation required for reliable operation, taking into account ship movement in heavy seas.



5.3 For omni-directional antennas, the manufacturer should specify sizes and critical distances of objects related to the antenna which cause a shadow sector, likely to degrade significantly the performance of the equipment, taking into account ship movement in heavy seas. This information should be documented in the installation manual.

5.4 For directional antennas, the manufacturer should specify sizes and critical distances of objects to the antenna, which cause shadow sectors, likely to degrade significantly the performance of the equipment, taking into account ship movement in heavy seas. This information should be documented in the installation manual.

5.5 To ensure reliable and continuous operation of the satellite communication system the manufacturer should specify the necessary distances required between the satellite antenna and marine radar in the installation manual.

5.6 In case of multiple ship earth stations operating on adjacent frequency bands, the antenna should be installed such as to ensure electromagnetic compatibility.

## **6 RADIO FREQUENCY RADIATION HAZARDS**

A warning of potential radiation hazards should be displayed in appropriate locations. A label should be attached external to a radome or antenna indicating the distances at which radiation levels of 100 W/m<sup>2</sup>, 25 W/m<sup>2</sup> and 10 W/m<sup>2</sup> exist. These distances should be noted in the user manual.

## APPENDIX

### CLASSIFICATION OF SHIP EARTH STATION INDICATIONS

BAM classification<sup>7</sup> of ship earth station warnings or cautions, as specified in these performance standards.

Cause	Alarm	Warning	Caution	Category A	Category B
No contact with satellites (referred to in paragraph 2.2.2)			X		X
Received distress communications (referred to in paragraph 3.6)		X		X	
Received urgency message (referred to in paragraph 3.6)		X		X	
Received safety message (referred to in paragraph 3.7.4.2)			X		X
Paper low (referred to in paragraph 3.7.5.5)			X		X
Loss of position (referred to in paragraph 3.8.2.2)			X		X
Manual position older than 4h (referred to in paragraph 3.8.2.4)			X		X

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<sup>7</sup> As referred to in resolution MSC.302(87)