

Resolution A.806(19)
adopted on 23 November 1995
(Agenda item 10)

**PERFORMANCE STANDARDS FOR SHIPBORNE MF/HF RADIO INSTALLATIONS
CAPABLE OF VOICE COMMUNICATION, NARROW-BAND DIRECT PRINTING
AND DIGITAL SELECTIVE CALLING**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/10.2.1, 10.2.2, 10.2.4 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that ships be provided with a MF/HF radio installation capable of voice communication, narrow-band direct printing and digital selective calling, and that such MF/HF radio installations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for MF/HF radio installations capable of voice communication, narrow-band direct printing 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 the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Shipborne MF/HF Radio Installations Capable of Voice Communication, Narrow-Band Direct Printing and Digital Selective Calling set out in the annex to the present resolution;
2. RECOMMENDS Governments to ensure that shipborne MF/HF radio installations capable of voice communication, narrow-band direct printing and digital selective calling which will form part of the GMDSS:
 - (a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to the present resolution;
 - (b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.613(15);
3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SHIPBORNE MF/HF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION, NARROW-BAND DIRECT PRINTING AND DIGITAL SELECTIVE CALLING

Part A General

1 INTRODUCTION

The MF/HF radiotelephone, narrow-band direct printing and digital selective calling 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), 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 calling, using both voice and digital selective calling (DSC):

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

2.3 The equipment should provide for the following categories of communications, using both voice and narrow-band direct printing (NBDP):

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

2.4 The equipment should comprise at least:

- .1 a transmitter/receiver, including antenna(e);
- .2 an integral control unit and/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 narrow-band direct printing facility;
- .6 an integral or separate digital selective calling facility; and
- .7 a dedicated DSC watchkeeping facility to maintain a continuous watch on distress channels only. Where a scanning receiver is employed to watch more than one DSC distress channel, all selected channels should be scanned within 2 s and the dwell time on each channel should be adequate to allow detection of the dot pattern which precedes each DSC call. The scan should only stop on detection of a 100 baud dot pattern.

- 2.5 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 provided on the equipment.
- 2.6 The dedicated distress button should:
- .1 be clearly identified; and
 - .2 be protected against inadvertent operation.
- 2.7 The distress alert initiation should require at least two independent actions.
- 2.8 The equipment should indicate the status of the distress alert transmission.
- 2.9 It should be possible to interrupt and initiate distress alerts at any time.

3 POWER SUPPLY

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

4 CONTROL

It should be possible to conduct distress and safety communications from the position, or in the vicinity of the position, from which the ship is normally navigated.

Part B *Transmitter*

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The transmitter should be capable of transmitting on all frequencies allocated to the maritime mobile service in the frequency band 1,605 kHz to 27,500 kHz. As a minimum, the following frequencies should be readily accessible to the operator: the voice frequencies 2,182, 4,125, 6,215, 8,291, 12,290 and 16,420 kHz; the NBDP frequencies 2,174.5, 4,177.5, 6,268, 8,376.5, 12,520 and 16,695 kHz; and the DSC frequencies 2,187.5, 4,207.5, 6,312, 8,414.5, 12,577 and 16,804.5 kHz.

1.2 Radiotelephone frequencies are designated in terms of the carrier frequency; NBDP and DSC frequencies are designated in terms of the assigned (centre) frequency. When NBDP and DSC signals are transmitted using a transmitter in the J2B mode the (suppressed) carrier frequency should be adjusted so as to have the NBDP and the DSC signal transmitted on the assigned frequency. The selected transmitter frequency should be clearly identifiable on the control panel of the equipment.

1.3 The transmitter should be capable of transmitting (upper side band signals, where appropriate) using classes of emission J3E, H3E and either J2B or F1B.

1.3.1 When switching to the preset distress frequency 2,182 kHz, the appropriate class of emission in accordance with the Radio Regulations should be selected automatically.*

1.3.2 When switching to the assigned (centre) frequencies for NBDP and DSC specified in 1.1 above, classes of emission F1B or J2B should be selected automatically.*

* For existing transmitters, during the transition and amortization period, classes of emission may be selected manually.

1.4 It should be possible to change the transmitter from any class of emission to another for which it is designed to operate by means of not more than one control.

1.5 It should be possible for the user to select transmission frequencies independent of any receiver setting. This does not preclude the use of transceivers.

1.6 It should be possible to change the transmitter quickly from operation on any frequency to operation on any other frequency, and in any event within a period not exceeding 15 s. The equipment should not be able to transmit during channel switching operations.

1.7 Means should be provided to prevent overmodulation automatically.

2 FREQUENCY ACCURACY AND STABILITY

The transmitter frequency should remain within 10 Hz of the required frequency at all times following the warming-up period.

3 OUTPUT POWER

3.1 During normal modulation, the peak envelope power in the case of J3E or H3E emissions, or the mean power in the case of J2B or F1B emissions, should be at least 60 W* at any frequency within the specified frequency range.

3.2 If the rated output power exceeds 400 W[†] in the band, provision should be made for reducing the output to 400 W or less. Generally, only the minimum power necessary should be used for all radio communications.

4 PERMISSIBLE WARMING-UP PERIOD

The equipment should be capable of operation within 1 min after switching on.

5 CONTINUOUS OPERATION

Continuous operation should be possible when the transmitter is adjusted to operate at its rated power.

6 CONTROLS AND INDICATORS

6.1 Provision should be made for indicating the antenna current or power delivered to the antenna. Failure of the indicating system should not interrupt the antenna circuit.

6.2 Manually tuned equipment should be fitted with a sufficient number of indicators to permit accurate and rapid tuning.

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

6.4 All adjustment and controls necessary for switching the transmitter to operate on 2,182 kHz and 2,187.5 kHz should be clearly marked, in order that these operations may be performed readily.

7 SAFETY PRECAUTIONS

The equipment should be so designed and constructed that when the transmitter is providing power to the antenna, the transmitter is protected against damage resulting from disconnection of the antenna or short-circuiting of antenna terminals. If this protection is provided by means of a safety device, that device should automatically be reset following removal of the antenna open-circuit or short-circuit conditions.

* Note should be taken that in some areas of the world a 60 W value may not be adequate to ensure reliable communications. A value greater than 60 W may be required in these areas.

[†] The Radio Regulations (RR 4357) specify a 400 W maximum power for equipment operating in the MF band in region 1.

8 POWER SUPPLY

8.1 If it is necessary to delay the application of voltage, for example anode voltage, to any part of the transmitter after switching on, this delay should be provided automatically.

8.2 If the transmitter includes parts which are required to be heated in order to operate correctly, for example crystal ovens, the power supplies to the heating circuits should be so arranged that they can remain operative when other supplies to or within the equipment are switched off. If a special switch for the heating circuits is provided, its functions should be clearly indicated; it should normally be in the "on" position and be protected against inadvertent operation. The correct operating temperature should be reached within a period of 30 min after the application of power.

Part C *Receivers*

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The receiver should be capable of being tuned throughout the bands between 1,605 kHz and 27.5 MHz. Tuning should be either continuous, or by incremental steps, or by the selection of a number of spot frequencies considered by the Administration as adequate for the operation of the ship, or by any combination of these methods. As a minimum, the following frequencies should be readily accessible to the operator: the carrier frequencies 2,182, 4,125, 6,215, 8,291, 12,290 and 16,420 kHz for radiotelephony; the NBDP frequencies 2,174.5, 4,177.5, 6,268, 8,376.5, 12,520 and 16,695 kHz; and the DSC frequencies 2,187.5, 4,207.5, 6,312, 8,414.5, 12,577 and 16,804.5 kHz.

1.2 Radiotelephone frequencies should be designated in terms of the carrier frequency; NBDP and DSC frequencies should be designated in terms of the assigned (centre) frequency. The selected receiver frequency should be clearly identifiable on the control panel of the equipment.

1.3 The receiver should be capable of receiving upper sideband signals as appropriate for classes of emission J3E, H3E, J2B and F1B.

1.4 The class of emission should be selectable by not more than one control.

1.5 It should be possible for the user to select reception frequencies independent of any transmitter setting. This does not preclude the use of transceivers.

1.6 The receiver should be capable of being tuned to different frequencies quickly, and in any event within a period not exceeding 15 s.

2 FREQUENCY STABILITY AND ACCURACY

The receiver frequency should at all times remain within 10 Hz of the required frequency following the warming-up period.

3 USABLE SENSITIVITY

For classes of emission J3E and F1B the sensitivity of the receiver should be equal to or better than 6 μ V e.m.f. at the receiver input for a signal-to-noise ratio of 20 dB. For NBDP and DSC an output character error rate of 10^{-2} or less should be obtained for a signal-to-noise ratio of 12 dB.

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 the loudspeaker and at least 1 mW to the handset.

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

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be capable of operating within 1 min after switching on.

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

The receiver should be provided with automatic gain control.

8 POWER SUPPLY

If the receiver includes parts which are required to be heated in order to operate correctly, for example crystal ovens, the power supplies to the heating circuits should be so arranged that they can remain operative when other supplies to or within the equipment are switched off. If a special switch for the heating circuits is provided, its function should be clearly indicated; it should normally be in the "on" position and be protected against inadvertent operation. The correct operating temperature should be reached within a period of 30 min after the application of power.

Part D

Digital selective calling facility

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

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** means for the manual entry of the position information; additionally, automatic entry may be provided; and
- .6** means for the manual entry of the time at which the position was determined; additionally, automatic entry may be provided.

3 DISTRESS MESSAGE STORAGE

3.1 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.

3.2 These messages should be stored until readout.

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

- 4 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 2.5 of Part A.
- 5 Initiation of DSC distress calls should take precedence over any other operation of the facility.
- 6 Self-identification data should be stored in the DSC unit. It should not be possible for the user easily to change these data.
- 7 Means should be provided to enable routine testing of the DSC facilities without radiation of signals.
- 8 Provision should be made for a specific aural alarm and visual indication to indicate receipt of a distress or urgency call or a call having a distress category. It should not be possible to disable this alarm and indication. Provision should be made to ensure that they can be reset only manually.

Part E

Narrow-band direct printing (NBDP) facility

- 1 The facility should conform to the relevant ITU-R Recommendations pertaining to the NBDP system.* It should provide for the use of maritime mobile service identities in accordance with appendix 43 of the ITU Radio Regulations. The facility should be capable of operating in the FEC and ARQ modes on the single-frequency channels allocated for distress NBDP operation.
- 2 Self-identification data should be stored in the NBDP unit. It should not be possible for the user easily to change these data.
- 3 The NBDP facility should comprise:
 - .1 means to decode and encode messages;
 - .2 means for composing and verifying messages to be transmitted; and
 - .3 means for providing a record of received messages.

* NBDP equipment conforming to Recommendation ITU-R M.476 may be used until the cost is amortized. It is recommended that newly installed NBDP equipment should conform to Recommendation ITU-R M.625.