

**RESOLUTION A.334(IX)**

*Adopted on 12 November 1975  
Agenda item 7(c)*

**RECOMMENDATION ON OPERATIONAL STANDARDS FOR  
RADIOTELEPHONE TRANSMITTERS AND RECEIVERS**

THE ASSEMBLY,

NOTING Article 16(i) of the IMCO Convention concerning the functions of the Assembly,

BEARING IN MIND the provisions of Regulation 15 of Chapter IV of the International Convention for the Safety of Life at Sea, 1960, as amended,

HAVING CONSIDERED the Report of the Maritime Safety Committee on its thirty-second session,

ADOPTS the Recommendation on Operational Standards for Radiotelephone Transmitters and Receivers annexed to this Resolution,

RECOMMENDS Administrations to ensure that shipborne radiotelephone transmitters and receivers conform to operational standards not inferior to those specified in the Recommendation.

ANNEX

**RECOMMENDATION ON OPERATIONAL STANDARDS FOR  
RADIOTELEPHONE TRANSMITTERS AND RECEIVERS**

**PART A – RADIOTELEPHONE TRANSMITTERS**

**1. Introduction**

The radiotelephone transmitter required by Regulation 15 of Chapter IV of the International Convention for the Safety of Life at Sea, 1960, as amended, should comply with the following operational standards.

**2. Frequencies and classes of emission**

- 2.1 The radiotelephone transmitter should be capable of transmitting on a number of frequencies considered by the Administration adequate for the operation of the ship, but in no case on less than 2182 kHz and one additional frequency in the bands between 1605 and 2850 kHz.
- 2.2 Frequencies should be designated in terms of the carrier frequency. The selected transmitter frequency should be clearly identifiable on the front of the equipment.

- 2.3 (a) The transmitter should be capable of transmitting with classes of emission A3H, A3A and A3J\*.
- (b) When switching to the distress frequency 2182 kHz the class of emission A3H should be selected automatically\*. Additionally, provisions may be made for the use of classes of emission A3A or A3J on 2182 kHz.
- (c) The upper sideband should be used.
- 2.4 It should be possible to change the transmitter from any class of emission for which it is designed to operate to any other by means of a single control.
- 2.5 It should be readily possible by use of external control to select transmission frequencies independent of any receiver setting.
- 2.6 It should be possible to change the transmitter from operation on any frequency to operation on any other frequency as quickly as possible, but in any event within a period not exceeding 15 seconds.

### 3. Frequency accuracy and stability

When the equipment is at normal operating temperature, the frequency of transmission should not change by more than 40 Hz over any 15 minute period. It should, under the conditions specified in paragraph 11, be within 100 Hz of the frequency to which the transmitter is intended to be tuned. For transmitters to be installed after 1 January 1982 a value of 50 Hz should apply.

### 4. Output power

- 4.1 The maximum peak envelope power at any frequency within the specified frequency range should be between 60 watts and 400 watts.
- 4.2 If the rated output power exceeds 150 watts, provision should be made for reducing the output power to 60 watts or less.

### 5. Permissible warming-up period

The equipment should be capable of operation on 2182 kHz within 30 seconds after switching on.

### 6. Continuous operation

Continuous operation should be possible when the transmitter is adjusted to develop its rated peak envelope power, when modulated:

- (a) by the radiotelephone alarm signal or an equivalent signal for at least 15 minutes, and
- (b) with normal speech.

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\* The World Maritime Administrative Radio Conference, Geneva 1974, instructed CCIR to study the use of classes of emission A3A and A3J for distress and safety purposes. This study should be completed in time for a decision by the next competent World Administrative Radio Conference on the date for the final conversion to classes of emission A3A and A3J on the carrier frequency 2182 kHz. Subsequent further consideration of the use of emission A3H may therefore be required.

## 7. Controls and indicators

- 7.1 Provision should be made for an antenna current meter indicator, or other appropriate device, the failure of which should not disconnect the antenna circuit.
- 7.2 The equipment should be fitted with a sufficient number of indicators to permit accurate and rapid tuning. Any malfunction of automatic tuning devices, if fitted, should not prohibit rapid proper operation on 2182 kHz.
- 7.3 All controls should be of such size as to permit normal adjustments to be easily performed and the number of controls should be the minimum necessary for satisfactory and simple operation.
- 7.4 All controls, instruments and indicators should be clearly labelled. In particular, all adjustments and controls necessary for switching the transmitter to operate on 2182 kHz should be clearly marked in order that this operation may be readily performed.

## 8. Power supply

- 8.1 The transmitter should continue to operate in accordance with the operational standards contained in this Recommendation in the presence of variations of the power supply normally to be expected in a ship.
- 8.2 Provision should be made for protecting the transmitter from the effects of excessive voltages, transients and reversal of the power supply.
- 8.3 If it is necessary to delay the application of voltage, for example anode voltage, to any part of the transmitter after switching on, the delay should be provided automatically.
- 8.4 If the equipment 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 arranged so 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. The correct operating temperature should be reached within a period of 30 minutes after the application of power.

**Note:** Operational standards for sources of energy are under consideration.

## 9. Radiotelephone alarm signal

- 9.1 The transmitter should be fitted, preferably internally, with a radiotelephone alarm signal generator meeting the operational standards for such equipment.
- 9.2 It should be possible to interrupt the transmission of the radiotelephone alarm signal at any time in order to permit the immediate transmission of a distress message.
- 9.3 It should be possible to transmit the radiotelephone alarm signal on any frequency available on the transmitter.
- 9.4 Means of monitoring transmission of the alarm signal should be provided.
- 9.5 Means should be provided to test the transmitter in conjunction with the alarm signal on a frequency other than 2182 kHz and using a suitable, well screened artificial antenna.
- 9.6 Means should be provided to prevent the accidental transmission of the alarm signal.

## 10. Safety precautions

- 10.1 The equipment should be so designed and constructed that when the transmitter is delivering full power to the antenna, the transmitter is protected against disconnection of the antenna or short-circuiting of antenna terminals, by automatically resetting means if necessary.
- 10.2 Means should be provided for earthing the case of the transmitter but should not cause any terminal of the source of electrical energy to be earthed.
- 10.3 As far as practicable, accidental access to dangerous voltages within the equipment should be prevented and an appropriate warning notice be affixed.

## 11. Durability and resistance to effects of climate

The equipment should continue to operate in accordance with the operational standards contained in this Recommendation, under the conditions of sea states, vibration, humidity and change of temperature likely to be experienced in a ship.

## 12. Miscellaneous

- 12.1 The transmitter should be so designed as to limit mutual interference with other electronic equipment, particularly its associated receivers, such that satisfactory operation is ensured.
- 12.2 To permit rapid change-over from transmission to reception when manual switching is used, the control for the switching device should, where practicable, be located on the microphone or the telephone handset.
- 12.3 For normal speech the depth of modulation should be at least 70 per cent. Automatic means should be provided to prevent overmodulation.
- 12.4 Equipment should be provided with an external indication of manufacture, type and/or number.
- 12.5 Information should be provided to enable competent members of the ship's staff to operate and maintain the equipment efficiently.
- 12.6 The internal parts of the equipment should be easily accessible for inspection and maintenance purposes.

## PART B – RADIOTELEPHONE RECEIVERS

### 1. Introduction

The radiotelephone receiver required by Regulation 15 of Chapter IV of the International Convention for the Safety of Life at Sea, 1960, as amended, should comply with the following operational standards.

### 2. Frequencies and classes of emission

- 2.1 The receiver should be capable of being tuned throughout the bands between 1605 and 2850 kHz. Tuning should be continuous, or by incremental steps; alternatively by the selection of a number of spot frequencies considered by the Administration adequate for the operation of the ship, or by any combination of these methods. The frequency of 2182 kHz should always be included.
- 2.2 Frequencies should be designated in terms of the carrier frequency. The frequency to which the receiver is tuned should be clearly identifiable on the front of the equipment.

- 2.3 The receiver should be capable of receiving signals of classes of emission A3H, A3A and A3J using upper sideband, as well as A3.
- 2.4 The selection of the class of emission should be by means of a single control.
- 2.5 It should be readily possible by use of external control to select reception frequencies independent of any transmitter setting.
- 2.6 It should be possible to change the receiver from operation on any frequency to operation on any other frequency as quickly as possible and in any event within a period not exceeding 15 seconds.

### 3. Frequency stability and accuracy of tuning

- 3.1 Under the conditions listed in paragraphs 10.1 and 12 of these standards and, if necessary, after an appropriate warming-up period as referred to in paragraph 10.3, the difference between the nominal frequency indicated on the receiver and the actual tuning frequency should not exceed:
  - 100 Hz for spot frequency tuning, or
  - 300 Hz for other methods of tuning.

The frequency drift should not exceed 40 Hz over any period of 15 minutes.

- 3.2 The tuning arrangement should be capable of reducing the difference between the frequency of a received signal and the actual tuning frequency to a value not exceeding 10 Hz.

### 4. Usable sensitivity

- 4.1 For classes of emission A3A and A3J, the sensitivity of the receiver should be equal to or better than 6 microvolts for a signal-to-noise ratio of 20 dB.
- 4.2 For classes of emission A3 and A3H, the sensitivity of the receiver should be equal to or better than 30 microvolts for a signal-to-noise ratio of 20 dB.

### 5. Receiver output

The receiver should be suitable for use with a loudspeaker and an earpiece and should be capable of delivering power of at least 500 milliwatts to the loudspeaker and at least 1 milliwatt to the earpiece.

### 6. Permissible warming-up period

The equipment should be capable of operation on 2182 kHz within 30 seconds after switching on.

### 7. Controls and indicators

- 7.1 All controls should be of such size as to permit normal adjustments to be easily performed and the number of controls should be the minimum necessary for satisfactory and simple operation. Any malfunction of automatic tuning devices, if fitted, should not prohibit rapid proper operation on 2182 kHz.
- 7.2 All controls, instruments and indicators should be clearly labelled.
- 7.3 The receiver shall be provided with a manual control of audiofrequency gain.

### 8. Selectivity

The selectivity of the receiver should be such that the intelligibility of the wanted signal is not seriously affected by unwanted signals.

**9. Automatic gain control**

The receiver should be provided with automatic gain control.

**10. Power supply\***

10.1 The receiver should continue to operate in accordance with the operational standards contained in this Recommendation in the presence of variations of the power supply normally to be expected in a ship.

10.2 Provision should be made for protecting the receiver from the effects of excessive voltages, transients and reversal of the power supply.

10.3 If the equipment 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 arranged so 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. The correct operating temperature should be reached within a period of 30 minutes after the application of power.

**11. Safety precautions**

11.1 The equipment should be so designed and constructed that the receiver is protected against damage when a strong radio frequency signal is applied to its input. The receiver shall operate normally without further attention when the signal is removed.

11.2 The receiver should have means of protection against damage due to static voltages which may appear at its input.

11.3 Means should be provided for earthing the case of the receiver but this should not cause any terminal of the source of electrical energy to be earthed.

11.4 As far as practicable, accidental access to dangerous voltages within the equipment should be prevented and an appropriate warning notice be affixed.

**12. Durability and resistance to effects of climate**

The receiver should continue to operate in accordance with the operational standards contained in this Recommendation under the conditions of sea state, vibration, humidity and change of temperature likely to be experienced in a ship.

**13. Miscellaneous**

13.1 The receiver should be so designed as to limit mutual interference with other electronic equipment, particularly its associated transmitters and receivers, such that satisfactory operation is ensured.

13.2 Equipment should be provided with an external indication of manufacture, type and/or number.

13.3 Information should be provided to enable competent members of the ship's staff to operate and maintain the equipment efficiently.

13.4 The internal parts of the equipment should be easily accessible for inspection and maintenance purposes.

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\* Operational standards for sources of energy are under consideration.