



**Recommendation ITU-R M.2135-0**  
(10/2019)

**Technical characteristics of autonomous  
maritime radio devices operating  
in the frequency band 156-162.05 MHz**

**M Series**  
**Mobile, radiodetermination, amateur  
and related satellite services**

## Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

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### Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
<b>BO</b>	Satellite delivery
<b>BR</b>	Recording for production, archival and play-out; film for television
<b>BS</b>	Broadcasting service (sound)
<b>BT</b>	Broadcasting service (television)
<b>F</b>	Fixed service
<b>M</b>	<b>Mobile, radiodetermination, amateur and related satellite services</b>
<b>P</b>	Radiowave propagation
<b>RA</b>	Radio astronomy
<b>RS</b>	Remote sensing systems
<b>S</b>	Fixed-satellite service
<b>SA</b>	Space applications and meteorology
<b>SF</b>	Frequency sharing and coordination between fixed-satellite and fixed service systems
<b>SM</b>	Spectrum management
<b>SNG</b>	Satellite news gathering
<b>TF</b>	Time signals and frequency standards emissions
<b>V</b>	Vocabulary and related subjects

*Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

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## RECOMMENDATION ITU-R M.2135-0

**Technical characteristics of autonomous maritime radio devices operating in the frequency band 156-162.05 MHz**

(2019)

**Scope**

This Recommendation describes autonomous maritime radio devices (AMRD) for use in the maritime environment. The definition and categorization of AMRD are included in Annex 1. The technical and operational characteristics of AMRD Group B using automatic identification system (AIS) technology are detailed in Annex 2. The technical and operational characteristics of AMRD Group B using other than AIS technology are detailed in Annex 3.

**Keywords**

Aid to Navigation (AtoN), automatic identification system (AIS), autonomous maritime radio devices (AMRD), digital selective calling (DSC), Maritime

**Abbreviations/Glossary**

AtoN	Aid to Navigation
AIS	Automatic identification system
AMRD	Autonomous maritime radio devices
DSC	Digital selective calling
e.i.r.p.	equivalent isotropically radiated power
GMDSS	Global maritime distress and safety system
IMO	International Maritime Organization
SOLAS	International Convention for the Safety of Life at Sea
VHF	Very high frequency

**Related ITU Recommendations and Reports**

Recommendation ITU-R M.493-15: Digital selective-calling system for use in the maritime mobile service

Recommendation ITU-R M.585-8: Assignment and use of identities in the maritime mobile service; or the revised version

Recommendation ITU-R M.1371-5: Technical characteristics for an automatic identification system using time-division multiple access in the VHF maritime mobile band; or the revised version

Recommendation ITU-R M.541-10: Operational procedures for the use of digital selective-calling equipment in the maritime mobile service

Recommendation ITU-R RA.769-2: Protection criteria used for radio astronomical measurements

Report ITU-R M.2285-0: Maritime survivor locating systems and devices (man overboard systems) – An overview of systems and their mode of operation

The ITU Radiocommunication Assembly,

*considering*

- a) that the maritime mobile service is a defined service for the operation of specific types of stations, as defined in RR No. **1.28**;
- b) that the global maritime distress and safety system (GMDSS) is a maritime mobile service application;
- c) that the automatic identification system (AIS) is a technology for maritime safety related applications, providing identification functions, safety of navigation functions, aids to navigation, locating signals and data communications;
- d) that autonomous maritime radio devices (AMRD) reflect a new development in the maritime environment;
- e) that due to the rapid technical progress, more and more AMRD applications in the maritime environment will be operated;
- f) that, in order to enhance safety of navigation, there is a need to identify and categorize AMRD which operate autonomously in the maritime environment;
- g) that the operation of AMRD may be for safety-related purposes;
- h) that relevant characteristics for the operation of AMRD are also contained in the most recent version of Recommendations ITU-R M.493, ITU-R M.585 and ITU-R M.1371;
- i) that AMRD is categorized into Group A and Group B, which are described in Annex 1;
- j) that the International Maritime Organization (IMO), International Electrotechnical Commission (IEC) and the International Association of Marine Aids to Navigation and Lighthouse Authorities publish technical documents related to the design and usage of AMRD,

*recognizing*

- a) that the use of AMRD should not compromise the integrity of the GMDSS and the operations on AIS1 and AIS2 display and the VHF data link;
- b) that AMRD operate with maritime radio technology such as AIS and digital selective calling (DSC),

*recommends*

- 1** that the technical and operational characteristics of AMRD Group A should be in accordance with the most recent version of Recommendation ITU-R M.1371 or ITU-R M.493;
- 2** that the technical and operational characteristics of AMRD Group B using AIS technology should be in accordance with Annex 2;
- 3** that the technical and operational characteristics of AMRD Group B using other than AIS technology should be in accordance with Annex 3.

## Annex 1

### Categorization of autonomous maritime radio devices

An AMRD is a mobile station; operating at sea and transmitting independently of a ship station or a coast station. Two groups of AMRD are identified:

Group A AMRD that enhance the safety of navigation,

Group B AMRD that do not enhance the safety of navigation (AMRD which deliver signals or information which do not concern the navigation of the vessel or do not complement vessel traffic safety in waterways).

The term ‘enhance safety of navigation’ is derived from the International Convention for the Safety of Life at Sea (SOLAS), as amended by IMO. Within SOLAS, Chapter V is titled “Safety of navigation” and contains the relevant IMO regulations. Consequently, the criterion for distinguishing AMRD Group A from AMRD Group B is their influence on the safety of navigation. Any signal or information originated by an AMRD that reaches the navigator, can impact the navigation of the vessel. This includes AIS (signals which may be shown on radar and navigational displays) and VHF (channel 70 and working channels). The navigator decides how to act on this information. This information may enhance the safety of navigation. However, signals or information which do not concern the navigation of a vessel can distract or mislead the navigator and degrade the safety of navigation.

AMRD that enhance the safety of navigation should be subject to IMO SOLAS regulations for the presentation of information to the navigators on board vessels.

IMO is the responsible organization for the designation of AMRD Group A. AMRD Group A consists of man overboard-AIS class M and Mobile aids to navigation.

## Annex 2

### Technical and operational characteristics of group B autonomous maritime radio devices using automatic identification system technology

#### A2.1 Introduction

AMRD Group B are mobile stations operating at sea, transmitting independently of a ship station or a coast station. These AMRD Group B do not enhance the safety of navigation and they deliver signals or information which are not relevant for the navigator of general shipping. To avoid confusion or an overload of information on the bridge of a vessel AMRD Group B should not be permitted to use the designated frequencies for DSC and AIS 1 and AIS 2. Consequently, signals and information originated by AMRD Group B will not be indicated on DSC, Radar, Electronic chart display and information system or AIS.

**A2.2 Technical characteristics of group B autonomous maritime radio devices using automatic identification system technology**

- a) The transmitter e.i.r.p. should be limited to 100 mW.
- b) These devices operate on a non-interference basis, i.e. they should not interfere with nor claim protection from other existing services.
- c) These devices operate on one 25 kHz channel.
- d) These devices should have an integrated antenna. The height of the antenna should not exceed 1 m above the surface of the sea.
- e) These devices should have a protected external power switch and transmit indicator.

**Annex 3****Technical and operational characteristics of group B autonomous maritime radio devices using technology other than automatic identification system technology****A3.1 Introduction**

AMRD Group B described in this Annex are mobile stations operating at sea, transmitting independently of a ship station or a coast station. These AMRD Group B do not enhance the safety of navigation and they deliver signals or information which are not relevant for the navigator of general shipping. These AMRD Group B that use other than AIS technology should not be permitted to use the designated frequencies for AIS, including channels AIS 1 and AIS 2, or for DSC.

**A3.2 Technical characteristics of group B autonomous maritime radio devices using technology other than automatic identification system technology**

- a) The transmitter e.i.r.p. should be limited to 100 mW.
  - b) The transmitting duty cycle should be as low as possible and not to exceed 10%.
  - c) Duration of any single transmission should not exceed 100 ms.
  - d) These devices operate on a non-interference basis, i.e. they should not interfere with nor claim protection from other existing radio communications.
  - e) These devices are operated in either 25 kHz or 12.5 kHz channelling.
  - f) These devices should have an integrated antenna. The height of the antenna should not exceed 1 m above the surface of the sea.
  - g) These devices should have a protected external power switch and transmit indicator.
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