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| **Radiocommunication Study Groups** |  |
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| **November 2017** |
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| Annex 3 to the Working Party 5B Chairman’s Report |
| WORKING DOCUMENT TOWARDS DRAFT CPM TEXT |
| Agenda item 1.9.1 |

*1.9 to consider, based on the results of ITU R studies:*

*1.9.1 regulatory actions within the frequency band 156-162.05 MHz for autonomous maritime radio devices to protect the GMDSS and automatic identifications system (AIS),
in accordance with Resolution* ***362 (WRC-15)****;*

Resolution **362 (WRC‑15)** – *Autonomous maritime radio devices operating in the frequency band 156-162.05 MHz*

# 5/1.9.1/1 Executive summary

Applications with autonomous maritime radio devices (AMRDs) reflect a new development in recent times. Due to the rapid technical progress and cost-effective production, more and more of such applications in the maritime environment are created and used.

The aim of this agenda item is to prevent unregulated operation of AMRDs in order to enhance safety of navigation and to ensure the integrity of the global maritime distress and safety system (GMDSS) which is the only system for distress, urgency, safety and routine communication for general shipping. Furthermore, the integrity of the collisions avoidance system automatic identification system (AIS) including the AIS VHF data link needs to be ensured.

# 5/1.9.1/2 Background

The term AMRD is not part of the database on ITU Terms and Definitions and needs clarification for a wider audience. The following definition of AMRD was concluded:

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

– Group A: AMRDs that enhance the safety of navigation,

– Group B: AMRDs that do not enhance the safety of navigation (AMRDs which deliver signals or information which do not concern the vessel can distract or mislead the navigator and degrade the safety of navigation).

Only Group A, AMRDs that enhance the safety of navigation, should use the frequencies of the current RR Appendix **18**. These frequencies have been allocated for the operation of vessels. The restriction on usage of these frequencies guarantees the integrity of GMDSS and AIS.

Group B, AMRDs that do not enhance the safety of navigation, but also operating in the maritime environment should not be permitted to use the listed frequencies of the current RR Appendix **18**. The intention is to identify special frequencies for the usage of these AMRDs in the “gap” of the table of transmitting frequencies in the VHF maritime mobile band. The signals or information originated by this group of AMRDs do not concern the operation of vessels.

*Considering* a) of Resolution **362 (WRC-15)** addresses with this agenda item “enhance safety of navigation”. The relevant term is derived from the International Convention for the Safety of Life at Sea (SOLAS), as amended. Within SOLAS, Chapter V is titled “Safety of navigation” and contains all relevant regulations. Consequently, the criterion for distinguishing the two categories of AMRDs is the influence on the safety of navigation. Any signal or information originated by an AMRD, which reaches the navigator, may influence the safety of navigation. This includes AIS (signals should be shown on Radar and eventually also on the electronic display and information system (ECDIS)) and VHF (working channels, Ch. 16 and Ch. 70). In any case the navigator has to decide how to proceed. In a positive case the safety of navigation will be enhanced. AMRDs which deliver signals or information which do not concern the vessel can distract or mislead the navigator and degrade the safety of navigation.

Although the term “safety of navigation” is used in SOLAS and other IMO documents, there is no definition existing. To evaluate the categories of AMRDs it seems to be necessary to explain in this Report how “safety of navigation” has to be understood. The regulations listed in SOLAS Chapter V are relevant to achieve safety of navigation.

Consequently, in distinguishing the two groups of AMRDs the question has to be answered: is safety of navigation enhanced or rather degraded?

Most likely the AMRDs that enhance the safety of navigation should preferably be subject of IMO SOLAS regulations for the presentation of information to the navigators on board vessels. Thus, it should be clearly understood that this is the “Group A AMRDs”. The other non-regulated AMRDs should be considered as Group B AMRDs.

# 5/1.9.1/3 Summary and analysis of the results of ITU-R studies

Applications with autonomous maritime radio devices

To distinguish the two categories of AMRDs a two-step approach was used.

The first step was a compilation of the existing applications of AMRD which could be found on the worldwide market. To get a clear overview on these devices, to compile and to categorize the existing AMRDs in the different countries, Working Party 5B requested the Director of the Radiocommunication Bureau to issue a circular letter (5/LCCE/64), sent to ITU Member States with a questionnaire to request information of such devices. Responses were received from
16 member administrations and one non-governmental organisation member.

The information was consolidated into tables to give a general description of the applications. Applications described in the responses to the questionnaire included diver emergency and Danbuoy/lifebuoy uses and these have been included in a man over-board (MOB) category as the function appears the same: A separate category for routine diver functions has been created.

AIS channels in the maritime mobile service frequency bands are occupied and different transmitting power and intervals, message formats and unregulated MMSIs are adopted by these AMRDs.

Fishnet indicators have been divided into 2 categories; one to identify and locate a hazard; one for net recovery only.

General categories of ‘Tracking an object which is not a hazard to navigation’ and ‘Mobile AtoN for an object which is a hazard to navigation’ have been created. A racing mark and an oceanographic meteorological buoy could be in either category.

EPIRB and AIS-SART have been excluded as they are already in the Radio Regulations (RR). It may be necessary to consider the definition of EPIRB which is in the RR.

Two respondents indicated that future mobile AtoN might include virtual and physical types.

One respondent also reported devices operating on Industrial, Scientific and Medical (ISM) frequencies.

The second step was listing a consolidation of the detail of individual AMRDs and containing the technical realization by the applications. Various technologies, such as AIS, DSC, synthetic voice, or the combination of the technologies mentioned above are applied. These AMRDs operates at 121.5 MHz, 406 MHz, Channels 6/16/70, AIS 1, AIS 2 and other frequency bands outside the maritime mobile service. Some AMRDs in use are assigned with MMSIs.

It could be concluded from the studies that the application of AMRDs lacks harmonized technical standards and frequency bands. The technical standards should cover the transmitting power and intervals, technologies used, message formats and so on. Meanwhile, it is necessary to find proper frequency bands for the application of AMRDs, whether within or without the maritime mobile service frequency bands, without causing any interference to the existing services.

Existing relevant Recommendations and Reports are listed as following:

i) Recommendation [ITU-R M.493-14](http://www.itu.int/rec/R-REC-M.493/en): Digital selective-calling system for use in the maritime mobile service;

ii) Recommendation [ITU-R M.585-7](http://www.itu.int/rec/R-REC-M.585/en): Assignment and use of identities in the maritime mobile service; or the revised version;

iii) Recommendation [ITU-R M.1371-5](http://www.itu.int/rec/R-REC-M.1375/en)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;

iv) Preliminary draft new Report ITU-R M.[AMRD]: Autonomous maritime radio devices;

v) Preliminary draft new Report ITU-R M.[NEW\_MARNUM]: New numbering scheme for maritime identities

Analyses on spectrum requirements

AMRDs specified as Group A should be operated on frequencies of the current Appendix 18. No additional spectrum requirement for this category of devices has been identified. However, this group should be restricted to a clearly arranged number of applications (e. g. MOB Class M only).For AMRDs specified as Group B the following spectrum requirements have been considered:

– AIS-technology used by AMRD applications seems to be sufficient operated on [one] 25 kHz channel only. There is a low antenna height and the transmission power will be restricted to 1 W. A huge amount of AMRDs in a certain area cannot be expected. [It is unlikely to overload this 25 kHz channel.]

– Analogue voice telephony used AMRD applications seem to be sufficient operated on [two] 25 kHz channel[s]. Only a small number of AMRDs using analogue voice telephony have been notified. There is a low antenna height and the transmission power will be restricted to 1 W. If needed, channel sharing is necessary.

– To enable the operation of AMRDs which currently use ISM frequencies a spectrum allocation of [25] kHz seems to be sufficient. There is a low antenna height and the transmission power will be restricted to 1 W.

All together for AMRDs specified as Group B a piece of spectrum of [100] kHz should be sufficient.

[In RR Appendix **18** the frequency 160.900 MHz (Ch. 2006) is already reserved for experimental use for future applications (see footnote *r)*). This frequency solely should be used by AIS‑technology for AMRDs Group B.

For analogue voice telephony and other technology 75 kHz of spectrum should be allocated for the use of AMRDs Group B between 157.4375 MHz – 160.6125 MHz which is already allocated to the MOBILE service.]

*[Editor’s note: Agenda item 1.9.2 (VDES SAT) has new frequency allocations under consideration in the frequency band 160.9625 MHz - 161.4875 MHz. The frequencies for future AMRDs group B should be chosen in the frequency band 157.4375 MHz - 160.6125 MHz.]*

Analyses on identification requirements

AMRDs that are noted as Group A should use the numbering scheme given in Recommendation ITU-R [M.585-7](http://www.itu.int/rec/R-REC-m.585/en) and the symbols given in Recommendation ITU-R [M.1371-5](http://www.itu.int/rec/R-REC-m.1371/en). Revisions of the recommendations might be necessary to display special AMRDs on the ECDIS.

AMRDs noted as Group B should use a new numbering system which is under development (Preliminary draft new Report ITU-R M.[NEW\_MARNUM])

# 5/1.9.1/4 Methods to satisfy the agenda item

## 5/1.9.1/4/1 Autonomous maritime radio devices Group B

In order to accommodate the variety of Group B AMRD technologies the following methods are proposed

*[Editor’s note: BR have advised that the CPM text should refer to a recommendation and not to put characteristics of devices/use directly in the Radio Regulations, ie 1W.]*

**5/1.9.1/4/1/1/1 Method A1-1**

For operation of AIS-technology the frequency [160.900 MHz (Ch. 2006)] (new AMRD AIS) is proposed. [For this reason it is proposed to amend RR Appendix 18 footnote *r)* as appropriate.]. [Such use should be in accordance with the latest version of Recommendation ITU-R M.xxx]

*[Editor’s note: M.xxx could be a new Recommendation to be developed from the PDNR[AMRD].]*

### 5/1.9.1/4/1/1/2 Method A1-2

Modify the *Radio Regulations* to allow Group A AMRDs to use maritime mobile service frequency bands, and to allow Group B AMRDs to use frequency band 161.4375-161.4875 MHz. [Such use should be in accordance with the latest version of Recommendation ITU-R M.xxx.]

### 5/1.9.1/4/1/2 Method A2

For operation of analogue voice telephony two [25 kHz channels with the frequencies [160.575] MHz (AMRD 1) and [160.600] MHz (AMRD 2)] are proposed. For this reason an additional footnote 5.226A in RR. Article 5 should be implemented as appropriate.

*[Editor’s note: Other frequency options include but are not limited to 159.550MHz (AMRD 1) and 159.600MHz (AMRD 2)]*

### 5/1.9.1/4/1/3 Method A3

For usage for other technology not channelized spectrum of [25 kHz in the bands 160.5375MHz–160.5625 MHz is proposed. For this reason an additional footnote 5.226B in RR. Article 5 should be implemented as appropriate.

*[Editor’s note: Other frequency options include but are not limited to the band 159.7875MHz to 159.8125MHz.]*

# 5/1.9.1/5 Regulatory and procedural considerations

## 5/1.9.1/5/1 For Method A1-1

MOD

APPENDIX 18 (REV.WRC‑19)

Table of transmitting frequencies in the
VHF maritime mobile band

(See Article 52)

*r)* In the maritime mobile service, this frequency is reserved for usage of autonomous maritime radio devices Group B for AIS-technology. The maximum output power is limited to 1 W.     (WRC‑19)

*[Editor’s note: A definition of AMRDs needs to be referenced e. g. in a Recommendation.]*

### 5/1.9.1/5/1/1 For Method A1-2

The possible modifications to the provisions of RR to satisfy the frequency need for AMRDs are considered as following:

MOD

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
(See No. 2.1)

|  |
| --- |
| 148-161.9375 MHz |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| … | … | … |
| 156.8375-161.9375FIXEDMOBILE except aeronauticalmobile | 156.8375-161.9375 FIXED MOBILE |
| 5.226 **ADD**5.xxx  |  5.226 **ADD**5.xxx  |

ADD

5.xxx The frequency band [161.4375-161.4875] MHz can be used by Group B Autonomous Maritime Radio Devices subject to causing no harmful interference to the existing services.

MOD

APPENDIX 18 (rev.wrc-15)

Table of transmitting frequencies in the
VHF maritime mobile band

(See Article 52)

**Notes referring to the Table**

…

*General Notes*

…

*l) These channels (AIS 1 and AIS 2) are used for Group A AMRDs and an automatic identification system (AIS) capable of providing worldwide operation, unless other frequencies are designated on a regional basis for this purpose. Such use should be in accordance with the most recent version of Recommendation ITU-R M.1371. (WRC-07)*

### 5/1.9.1/5/2 For Methods A2 and A3

MOD

ARTICLE 5

Frequency allocations

|  |
| --- |
| 148-161.9375 MHz |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 148-149.9FIXEDMOBILE except aeronauticalmobile (R)MOBILE-SATELLITE(Earth-to-space) 5.209 | 148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 |
| 5.218 5.219 5.221 |  5.218 5.219 5.221 |
| 149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 |
| 150.05-153FIXEDMOBILE except aeronauticalmobileRADIO ASTRONOMY5.149 | 150.05-154 FIXED MOBILE |
| 153-154FIXEDMOBILE except aeronauticalmobile (R)Meteorological aids |  5.225 |
| 154-156.4875FIXEDMOBILE except aeronauticalmobile (R)5.225A 5.226  | 154-156.4875FIXEDMOBILE5.226 | 154-156.4875FIXEDMOBILE5.225A 5.226  |
| 156.4875-156.5625 MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227 |
| 156.5625-156.7625FIXEDMOBILE except aeronauticalmobile (R) | 156.5625-156.7625  FIXED MOBILE |
| 5.226 |  5.226 |
| 156.7625-156.7875MARITIME MOBILEMobile-satellite (Earth-to-space) | 156.7625-156.7875MARITIME MOBILEMOBILE-SATELLITE (Earth-to-space) | 156.7625-156.7875MARITIME MOBILEMobile-satellite (Earth-to-space) |
| 5.111 5.226 5.228 | 5.111 5.226 5.228 | 5.111 5.226 5.228 |
| 156.7875-156.8125 MARITIME MOBILE (distress and calling) 5.111 5.226 |
| 156.8125-156.8375MARITIME MOBILEMobile-satellite (Earth-to-space) | 156.8125-156.8375MARITIME MOBILEMOBILE-SATELLITE (Earth-to-space) | 156.8125-156.8375MARITIME MOBILEMobile-satellite (Earth-to-space) |
| 5.111 5.226 5.228 | 5.111 5.226 5.228 | 5.111 5.226 5.228 |
| 156.8375-161.9375FIXEDMOBILE except aeronauticalmobile | 156.8375-161.9375 FIXED MOBILE |
| 5.226 5.226A 5.226B |  5.226 5.226A 5.226B |

#### 5/1.9.1/5/2/1 For Method A2

ADD

5.226A The [frequencies [160.575] MHz (AMRD 1) and [160.600] MHz (AMRD 2)] may be used by autonomous maritime radio devices Group B for analogue voice radio telephony. [Emissions on these frequencies by autonomous maritime radio devices operating in the maritime environment for communications shall not exceed 1 W.][The characteristics of the devices should conform to those specified in Recommendation ITU-R M.xxx]     (WRC‑19)

*[Editor’s note: A definition of AMRDs needs to be referenced e. g. in a Recommendation.]*

#### 5/1.9.1/5/2/2 For Method A3

ADD

5.226B The frequencies in the bands [160.5375 MHz–160.5625 MHz]) may be used by autonomous maritime radio devices Group B. [Emissions on this frequency by autonomous maritime radio devices operating in the maritime environment shall not exceed 1 W.][The characteristics of the devices should conform to those specified in Recommendation ITU-R M.xxx] (WRC‑19)

*[Editor’s note: A definition of AMRDs needs to be referenced e. g. in a Recommendation.]*

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