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| --- | --- |
| **Radiocommunication Study Groups** |  |
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| Source: Document 5B/TEMP/160  Subject: WRC-19 agenda item 1.9.2 Resolution **360 (Rev.WRC 15)** | **Annex 5 to Document 5B/411-E** |
| **28 November 2017** |
| **English only** |
| Annex 5 to the Working Party 5B Chairman’s Report | |
| WORKING DOCUMENT TOWARD A PRELIMINARY DRAFT CPM TEXT  FOR WRC-19 AI 1.9.2 | |
|  | |

chapter 5

Maritime, aeronautical and amateur services

(Agenda items 1.1, 1.8, 1.9 (1.9.1, 1.9.2), 1.10, 9.1 (issue 9.1.4))

…/…

Agenda item 1.9.2

(**WP 5B** / **WP 4C**, **WP 5A**, **WP 5C**, (WP 1A), (WP 3M))

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

*1.9.2 modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (Earth to space and space-to-Earth), preferably within the frequency bands 156.0125-157.4375 MHz and 160.6125-162.0375 MHz of Appendix* ***18****, to enable a new VHF data exchange system (VDES) satellite component, while ensuring that this component will not degrade the current terrestrial VDES components, applications specific messages (ASM) and AIS operations and not impose any additional constraints on existing services in these and adjacent frequency bands as stated in recognizing d) and e) of Resolution* ***360 (Rev.WRC-15)****;*

Resolution **360 (Rev.WRC‑15)** – *Consideration of regulatory provisions and spectrum allocations to the maritime mobile-satellite service to enable the satellite component of the VHF Data Exchange System and enhanced maritime radiocommunication*

# 5/1.9.2/1 Executive summary

*[****Editorial note:*** *Text of the executive summary, not more than half a page of text to describe briefly the purpose of the agenda item, summarize the results of the studies carried out and, most importantly, provide a brief description of the method(s) identified that may satisfy the agenda item]*

# 5/1.9.2/2 Background

The studies associated with WRC-15 AI 1.16 resulted in elaboration of a concept for the VHF data exchange system (VDES) reflected in Recommendation ITU-R M.2092-0. The system combines the current automatic identification system (AIS), applications specific messages (ASM) as well as data exchange terrestrial and satellite components.

During WRC-15 no allocations were made to VDES satellite component since the compatibility studies with the incumbent services in the frequency bands assumed for operation of VDES satellite component and in the adjacent frequency bands were incomplete.

To this effect, Resolution **360** **(WRC-12)** was revised and updated to invite the WRC-19 to consider, based on the results of ITU-R studies, modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (MMSS) (Earth-to-space and space‑to‑Earth), preferably within the frequency bands 156.0125 - 157.4375 MHz and 160.6125 ‑ 162.0375 MHz of RR Appendix **18**, to enable a new VDES satellite component, while ensuring that this component will not degrade the current terrestrial VDES components, ASM and AIS operations and not impose any additional constraints on existing services in these and adjacent frequency bands as stated in *recognizing d)* and *e)* of Resolution **360 (Rev. WRC-15)**.

# 5/1.9.2/3 Summary and Analysis of the results of ITU-R studies

## 5/1.9.2/3.1 Discussion on compatibility with incumbent services

Compatibility studies between satellite component and incumbent services have been done.

One approach is based on coordination thresholds as contained in Recommendation ITU-R M.2092, and another approach is based on a protection criteria of I/N=-6, Recommendation ITU-R M.1808 and Recommendation ITU-R F.758.

Two study approaches lead to different pfd masks that are based on different assumptions as mentioned above of the studies, with the view to ensure compatibility with incumbent fixed and mobile services.

Every possible effort should be made to reconcile the result obtained. Taking into account to the extent appropriate of information contain in the working document towards a PDNR ITU-R M.[VDES-SAT], which provides inter alia, why a VDES satellite component is required, together with its spectrum needs. The Report also provides measure for the protection of RAS from the VDE-SAT downlink emissions in the bands 150.05-153 MHz and 322-328.6 MHz.

## 5/1.9.2/3.2 Frequency plans

The following two frequency plans are being studied in working document towards a preliminary draft new Report ITU-R M.[VDES-SAT].

Frequency plan alternative 1

Frequency plan alternative 1 allow for utilization of the channels 24, 84, 25, 85, 26 and 86 of RR Appendix **18** in a shared manner between VDE-TER and VDE-SAT.

− Four channels 1024, 1084, 1025 and 1085 are shared between ship-to-shore and ship-to-satellite (VDE-SAT uplink) services.

− Two channels 1026 and 1086 are exclusively reserved for ship-to-satellite (VDE-SAT uplink) services.

− Four channels 2024, 2084, 2025 and 2085 are shared among shore-to-ship, ship to ship and satellite-to-ship (VDE-SAT downlink) services.

− Two channels 2026 and 2086 are exclusively reserved for satellite-to-ship (VDE-SAT downlink) services.

Frequency plan alternative 2

Frequency plan alternative 2 allow for utilization of channels 24, 84, 25 and 85 primarily for =VHF data exchange terrestrial (VDE-TER), while channels 26 and 86 exclusively reserved for VHF data exchange satellite (VDE-SAT) uplink. VDE-SAT uplink is also possible in channels 24, 84, 25 and 85, but the VDE-SAT uplink in these channels do not impose constraints on VDE-TER. Frequencies are exclusively reserved for VDE-SAT downlink within the frequency range 160.9625 MHz to 161.4875 MHz, which is not channelized in RR Appendix **18**.

− Four channels 1024, 1084, 1025 and 1085 are reserved for ship-to-shore services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on ship-to-shore services.

− Four channels 2024, 2084, 2025 and 2085 are reserved for shore-to-ship and ship-to-ship services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on shore-to-ship and ship-to-ship services.

− Four channels 1026, 1086, 2026 and 2086 are exclusively reserved for ship to satellite (VDE-SAT uplink) services.

− Frequencies are exclusively reserved for satellite-to-ship (VDE-SAT downlink) services within the frequency range 160.9625 MHz to 161.4875 MHz, which is not channelized in RR Appendix **18**.

Existing relevant Recommendations and Reports are listed as following:

1. Recommendation [ITU-R F.758](http://www.itu.int/rec/R-REC-F.758/en): System parameters and considerations in the development of criteria for sharing or compatibility between digital fixed wireless systems in the fixed service and systems in other services and other sources of interference
2. Recommendation [ITU-R M.1808](http://www.itu.int/rec/R-REC-M.1808/en): Technical and operational characteristics of conventional and trunked land mobile systems operating in the mobile service allocations below 869 MHz to be used in sharing studies
3. Recommendation [ITU-R M.2092](http://www.itu.int/rec/R-REC-M.2092/en): Technical characteristics for a VHF data exchange system in the VHF maritime mobile band
4. Preliminary draft new report ITU-R M.[VDES-SAT]:

# 5/1.9.2/4 Methods to satisfy the agenda item

### 5/1.9.2/4.1 Method A

The Method proposes a new primary allocation for the maritime mobile-satellite service (Earth‑to-space), for frequency band 157.1875-157.3375 MHz (channels 1024, 1084, 1025, 1085, 1026 and 1086) and frequency band 161.8875-161.9375 (channels 2026 and 2086). The channels 1026, 1086, 2026 and 2086 are exclusively reserved for ship to‑satellite (VDE-SAT uplink) services. The channels 1024, 1084, 1025 and 1085 are reserved for ship-to-shore services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on ship-to-shore services.

The Method proposes a new primary allocation for the maritime mobile-satellite service (space‑to-Earth) for frequency band 160.9625 - 161.4875 MHz, for improved VDE communication capacity and coverage.

Coordination of VDE space stations of the MMSS (space-to-Earth) with respect to terrestrial services is described in modification of RR Appendix **5**,taking into account thepfd mask defined the last study cycle in the Recommendation ITU-R M.2092-0.

It is proposed also to clarify that the coordination between MMSS and terrestrial services is subject to the application of the provisions of RR No. **9.14**.

The Method proposes to modify provisions RR Nos. **5.208A** and **5.208B** in order to ensure the protection of the RAS in the nearest frequency band.

In order to protect the RAS, Annex 1 to Resolution **739** **(Rev.WRC-07)** is revised to include MMSS in the frequency band 160.9625 - 161.4875 MHz.

This method is in line with the Report ITU-R M.[VDES-SAT].

### 5/1.9.2/4.2 Method B

Due to the sharing difficulties of the VDES satellite component uplink and downlink with the systems in the land mobile service it is proposed to make no changes in the Radio Regulations.

### 5/1.9.2/4.3 Method C

The Method proposes a new primary allocation for the maritime mobile-satellite service (Earth‑to-space) for the frequency band 157.1875-157.3375 MHz (channels 1024, 1084, 1025, 1085, 1026 and 1086 of RR Appendix **18**).

The Method proposes a new primary allocation for the maritime mobile-satellite service (space‑to-Earth) for the frequency band 161.7875-161.9375 MHz (channels 2024, 2084, 2025, 2085, 2026 and 2086 of RR Appendix **18**), for improved VDE communication capacity and coverage.

The Method proposes to modify provisions RR No. **5.208A** and No. **5.208B** in order to ensure the protection of the RAS in the nearest frequency band. In order to protect the RAS, Annex 1 to Resolution **739** **(Rev.WRC-15)** would be revised to include MMSS in the frequency band 161.7875-161.9375 MHz.

The Method proposes to add provision RR No. **5.226B** in order to ensure the coordination of terrestrial services in the same frequency band. Coordination of VDE space stations of the MMSS (space-to-Earth) with respect to terrestrial services is described in modification of RR Appendix **5**,proposing a pfd mask.

# 5/1.9.2/5 Regulatory and procedural considerations

## 5/1.9.2/5.1 Method A

ARTICLE 5

Frequency allocations

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

MOD

|  |  |  |
| --- | --- | --- |
| 148-**161.9375** MHz | | |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 156.8375-157.1875  FIXED  MOBILE except aeronautical mobile | 156.8375-157.1875  FIXED  MOBILE | |
| 5.226 | 5.226 | |
| 157.1875-  157.3375  FIXED  MOBILE except aeronautical mobile  MARITIME MOBILE-SATELLITE (Earth-to-space) | 157.1875-  157.3375  FIXED  MOBILE  MARITIME MOBILE-SATELLITE (Earth-to-space) | |
| 5.226 ADD 5.226A | 5.226 ADD 5.226A | |
| 157.3375-  160.9625  FIXED  MOBILE except aeronautical mobile | 157.3375-  160.9625  FIXED  MOBILE | |
| 5.226 | 5.226 | |
| **160.9625**  **161.4875**  FIXED  MOBILE except aeronautical mobile  MARITIME MOBILE-SATELLITE (space-to-Earth) MOD 5.208A MOD 5.208B | 1160.9625-  161.4875  FIXED  MOBILE  MARITIME MOBILE-SATELLITE (space-to-Earth) MOD 5.208A MOD 5.208B | |
| 5.226 ADD 5.226B | 5.226 ADD 5.226B | |
| 161.4875-  161.7875  FIXED  MOBILE except aeronautical mobile | 161.4875-  161.7875  FIXED  MOBILE | |
| 5.226 | 5.226 | |
| 161.7875-  161.9375  FIXED  MOBILE except aeronautical mobile  MARITIME MOBILE-SATELLITE (Earth-to-space) | 161.7875-  161.9375  FIXED  MOBILE  MARITIME MOBILE-SATELLITE (Earth-to-space) | |
| 5.226 ADD 5.226A | 5.226 ADD 5.226A | |

ADD

5.226A The use of the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix **18**.     (WRC‑19)

ADD

5.226B The use of the frequency band 160.9625-161.4875 MHz by the maritime mobile-satellite (space-to-Earth) service is limited to the systems which operate in accordance with Appendix **18**. Such use is subject to the application of the provisions of No. **9.14** for coordination with stations of terrestrial services.     (WRC‑19)

**Reasons:** The above modifications of RR Article **5** identify a MMSS allocation uplink and downlink for the VHF Data Exchange System which is described in the Report ITU‑R M.[VDES-SAT]. It is also clarified, in the footnote RR No. **5.226B**, that the coordination between MMSS and terrestrial services is subject to the application of the provision of RR No. **9.14**.

MOD

5.208A In making assignments to space stations in the mobile-satellite service in the bands 137-138 MHz, 387‑390 MHz, 400.15-401 MHz and in the maritime-mobile satellite service (space-to-Earth) in the band 160.9625-161.4875 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the bands 150.05-153 MHz, 322-328.6 MHz, 406.1-410 MHz and 608-614 MHz from harmful interference from unwanted emissions. The threshold levels of interference detrimental to the radio astronomy service are shown in the relevant ITU‑R Recommendation.     (WRC-19)

MOD

5.208B[[1]](#footnote-1)\* In the frequency bands:

137-138 MHz,

160.9625-161.4875 MHz,  
 387-390 MHz,  
 400.15-401 MHz,  
 1 452-1 492 MHz,  
 1 525-1 610 MHz,  
 1 613.8-1 626.5 MHz,  
 2 655-2 690 MHz,  
 21.4-22 GHz,

Resolution **739** **(Rev.WRC-15)** applies.     (WRC-19)

MOD

APPENDIX 5 (REV.WRC‑19)

Identification of administrations with which coordination is to be effected or  
agreement sought under the provisions of Article 9

ANNEX 1

MOD

# 1 Coordination thresholds for sharing between MSS (space-to-Earth) and terrestrial services in the same frequency bands and between non‑GSO MSS feeder links (space-to-Earth) and terrestrial services in the same frequency bands and between RDSS (space-to-Earth) and terrestrial services in the same frequency bands     (WRC‑19)

MOD

## 1.1 Below 1 GHz[[2]](#footnote-2)\*

…

1.1.4 In the band 160.9625-161.4875 MHz, coordination of a space station of the maritime mobile-satellite service (space-to-Earth) with respect to terrestrial services is required only if the power spectral and flux-density produced by this space station exceeds the following mask in dB(W/(m2 · 4 kHz)) at the Earth’s surface:



where θis the angle of arrival of the incident wave above the horizontal plane (degrees).

**Reasons:** It is proposed to extend the coordination threshold defined in Annex 1 of RR Appendix **5** for the VDES using the frequency band 160.9625-161.4\_75 MHz by using the pfd mask defined in the Recommendation ITU-R M.2092-0.

MOD

APPENDIX 18 (REV.WRC‑19)

Table of transmitting frequencies in the  
VHF maritime mobile band

(See Article 52)

| Channel designator | Notes | Transmitting frequencies  (MHz) | | Inter-ship | Port operations  and ship movement | | Public corres-pondence |
| --- | --- | --- | --- | --- | --- | --- | --- |
| From ship stations | From coast stations | Single frequency | Two frequency |
| 24 | *w), ww), x), xx)* | 157.200 | 161.800 |  | x | x | x |
| 1024 | *w), ww), x), xx), AAA)* | 157.200 |  |  |  |  |  |
| 2024 | *w), ww), x), xx), AAA)* | 161.800 | 161.800 | x  (digital only) |  |  |  |
| 84 | *w), ww), x), xx)* | 157.225 | 161.825 |  | x | x | x |
| 1084 | *w), ww), x), xx),*  *AAA)* | 157.225 |  |  |  |  |  |
| 2084 | *w), ww), x), xx), AAA)* | 161.825 | 161.825 | x  (digital only) |  |  |  |
| 25 | *w), ww), x), xx)* | 157.250 | 161.850 |  | x | x | x |
| 1025 | *w), ww), x), xx),*  *AAA)* | 157.250 |  |  |  |  |  |
| 2025 | *w), ww), x), xx), AAA)* | 161.850 | 161.850 | x  (digital only) |  |  |  |
| 85 | *w), ww), x), xx)* | 157.275 | 161.875 |  | x | x | x |
| 1085 | *w), ww), x), xx),*  *AAA)* | 157.275 |  |  |  |  |  |
| 2085 | *w), ww), x), xx), AAA)* | 161.875 | 161.875 | x  (digital only) |  |  |  |
| 26 | *w), ww), x)* | 157.300 | 161.900 |  | x | x | x |
| 1026 | *w), ww), x), AAA)* | 157.300 |  |  |  |  |  |
| 2026 | *w), ww), x), AAA)* |  | 161.900 |  |  |  |  |
| 86 | *w), ww), x)* | 157.325 | 161.925 |  | x | x | x |
| 1086 | *w), ww), x), AAA)* | 157.325 |  |  |  |  |  |
| 2086 | *w), ww), x), AAA)* |  | 161.925 |  |  |  |  |
| 27 | *z), zx)* | 157.350 | 161.950 |  |  | x | x |
| 1027 | *z), zz)* | 157.350 | 157.350 |  | x |  |  |
| ASM1 | *z)* | 161.950 | 161.950 |  |  |  |  |
| 87 | *z), zz)* | 157.375 | 157.375 |  | x |  |  |
| 28 | *z), zx)* | 157.400 | 162.000 |  |  | x | x |
| 1028 | *z), zz)* | 157.400 | 157.400 |  | x |  |  |
| ASM2 | *z)* | 162.000 | 162.000 |  |  |  |  |
| 88 | *z), zz)* | 157.425 | 157.425 |  | x |  |  |
| AIS 1 | *f), l), p)* | 161.975 | 161.975 |  |  |  |  |
| AIS 2 | *f), l), p)* | 162.025 | 162.025 |  |  |  |  |
|  | | | | | | | |

**Notes referring to the Table**

*General notes*

NOC

Notes *a)* to *e)*

*Specific notes*

NOC

Notes *f)* to v*)*

MOD

*w)* In Regions 1 and 3:

The frequency bands 157.200‑157.325 MHz and 161.800-161.925 MHz (corresponding to channels: 24, 84, 25, 85, 26 and 86) are identified for the utilization of the VHF Data Exchange System (VDES) described in the most recent version of Recommendation ITU‑R M.2092. These frequency bands may also be used for analogue modulation described in the most recent version of Recommendation ITU‑R M.1084 by an administration that wishes to do so, subject to not causing harmful interference to, or claiming protection from other stations in the maritime mobile service using digitally modulated emissions and subject to coordination with affected administrations.     (WRC‑19)

MOD

*wa)*  In Regions 1 and 3:

The frequency bands 157.025‑157.100 MHz and 161.625-161.700 MHz (corresponding to channels: 80, 21, 81 and 22) are identified for utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842 using multiple 25 kHz contiguous channels.

The frequency bands 157.150‑157.175 MHz and 161.750-161.775 MHz (corresponding to channels: 23 and 83) are identified for utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842 using two 25 kHz contiguous channels. From 1 January 2017, the frequencies 157.125 MHz and 161.725 MHz (corresponding to channel: 82) are identified for the utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842.

The frequency bands 157.025‑157.175 MHz and 161.625-161.775 MHz (corresponding to channels: 80, 21, 81, 22, 82, 23 and 83) can also be used for analogue modulation described in the most recent version of Recommendation ITU‑R M.1084 by an administration that wishes to do so, subject to not claiming protection from other stations in the maritime mobile service using digitally modulated emissions and subject to coordination with affected administrations.     (WRC‑19)

NOC

Note *ww)*

NOC

Note *x)*)

MOD

*xx)* The channels 24, 84, 25 and 85 may be merged in order to form a unique duplex channel with a bandwidth of 100 kHz in order to operate the VDES terrestrial component described in the most recent version of Recommendation ITU‑R M.2092.     (WRC‑19)

NOC

Note *y)*

MOD

*z)* These channels are each split into two simplex channels. The channels 2027 and 2028 designated as ASM 1 and ASM 2 are used for application specific messages (ASM) as described in the most recent version of Recommendation ITU-R M.2092.     (WRC‑19)

NOC

Note *zx)*

MOD

*zz)* The channels 1027, 1028, 87 and 88 are used as single-frequency analogue channels for port operation and ship movement.     (WRC‑19)

ADD

*AAA)* These channels which are also allocated to the maritime mobile-satellite service (Earth-to-space), shall be used for the reception of VDES messages from ships as described in the most recent version of the Recommendation ITU-R M.2092 in the following way:

– The channels 1024, 1084, 1025 and 1085 are reserved for ship-to-shore services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on ship-to-shore services.

– The channels 2024, 2084, 2025 and 2085 are reserved for shore-to-ship and ship-to-ship services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on shore-to-ship and ship-to-ship services.

– The channels 1026, 1086, 2026 and 2086 are exclusively reserved for ship-to-satellite (VDE-SAT uplink) services. (WRC-19)

**Reasons:** The channels are identified for the satellite uplink of the VDES.

*[****Chairman’s note****: are all of the NOC’s above NOC or should they be NOC e.g. positively supporting no change]*

MOD

RESOLUTION 739 (Rev.WRC-19)

Compatibility between the radio astronomy service and the active space services in certain adjacent  
and nearby frequency bands

The World Radiocommunication Conference (Geneva, 2019),

MOD

ANNEX 1 TO RESOLUTION 739 (Rev.WRC-19)

Unwanted emission threshold levels

TABLE 1-2

epfd thresholds(1) for unwanted emissions from all space stations of a non-GSO satellite system   
at a radio astronomy station

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Space service | Space service band | Radio astronomy band | Single dish, continuum observations | | Single dish, spectral line observations | | VLBI | | Condition of application: the API is received by the Bureau following the entry into force of the Final Acts of: |
| epfd(2) | Reference bandwidth | epfd(2) | Reference bandwidth | epfd(2) | Reference bandwidth |
| **(MHz)** | **(MHz)** | **(dB(W/m2))** | **(MHz)** | **(dB(W/m2))** | **(kHz)** | **(dB(W/m2))** | **(kHz)** |
| MSS (space-to-Earth) | 137-138 | 150.05-153 | −238 | 2.95 | NA | NA | NA | NA | WRC-07 |
| MMSS (space-to-Earth) | 160.9625-161.4875 | 150.05-153 | −238 | 2.95 | NA | NA | NA | NA | WRC-19 |
| MSS (space-to-Earth) | 387-390 | 322-328.6 | −240 | 6.6 | −255 | 10 | −228 | 10 | WRC-07 |
| MSS (space-to-Earth) | 400.15-401 | 406.1-410 | −242 | 3.9 | NA | NA | NA | NA | WRC-07 |
| MSS (space-to-Earth) | 1 525-1 559 | 1 400-1 427 | −243 | 27 | −259 | 20 | −229 | 20 | WRC-07 |
| RNSS (space-to-Earth)(3) | 1 559-1 610 | 1 610.6-1 613.8 | NA | NA | −258 | 20 | −230 | 20 | WRC‑07 |
| MSS (space-to-Earth) | 1 525-1 559 | 1 610.6-1 613.8 | NA | NA | −258 | 20 | −230 | 20 | WRC-07 |
| MSS (space-to-Earth) | 1 613.8-1 626.5 | 1 610.6-1 613.8 | NA | NA | −258 | 20 | −230 | 20 | WRC-03 |

SUP

Resolution 360 (Rev.WRC‑15)

Consideration of regulatory provisions and spectrum allocations to the maritime mobile-satellite service to enable the satellite component of the VHF Data Exchange System and enhanced maritime radiocommunication

**Reasons:** It is proposes to suppress Resolution 360 (Rev.WRC-15) since it will become superfluous after the studies are completed and the identification of frequencies in order to enhance maritime radiocommunication has been made by WRC-19.

## 5/1.9.2/5.2 Method B

ARTICLE 5

Frequency allocations

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

NOC

**148–161.9375 MHz**

|  |  |  |
| --- | --- | --- |
| **Allocation to services** | | |
| **Region 1** | **Region 2** | **Region 3** |
| **156.8375–161.9375**  FIXED  MOBILE except aeronautical mobile (R) | **156.8375–161.9375**  FIXED  MOBILE | |
| 5.226 | 5.226 | |

### 5/1.9.2/5.3 Method C

ARTICLE 5

Frequency allocations

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

MOD

148-161.9375 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| .../... | | |
| 156.8375-157.1875  FIXED  MOBILE except aeronautical mobile | 156.8375-157.1875  FIXED  MOBILE | |
| 5.226 | 5.226 | |
| 157.1875-157.3375  FIXED  MOBILE except aeronautical mobile  MARITIME MOBILE-SATELLITE (Earth-to-space) | 157.1875-157.3375  FIXED  MOBILE  MARITIME MOBILE-SATELLITE (Earth-to-space) | |
| 5.226 ADD 5.226A | 5.226 ADD 5.226A | |
| 157.3375-161.7875  FIXED  MOBILE except aeronautical mobile | 157.3375-161.7875  FIXED  MOBILE | |
| 5.226 | 5.226 | |
| 161.7875-161.9375  FIXED  MOBILE except aeronautical mobile  MARITIME MOBILE-SATELLITE (space-to-Earth) MOD 5.208A MOD 5.208B | 161.7875-161.9375  FIXED  MOBILE  MARITIME MOBILE-SATELLITE (space-to-Earth) MOD 5.208A MOD 5.208B | |
| 5.226 ADD 5.226B | 5.226 ADD 5.226B | |

**Reasons:** The above modifications of RR Article **5** identify a MMSS allocation uplink and downlink for the VHF Data Exchange System which is described in Recommendation ITU‑R M.2092-0.

MOD

5.208A In making assignments to space stations in the mobile-satellite service in the bands 137-138 MHz, 387‑390 MHz, 400.15-401 MHz and for the maritime-mobile-satellite service (space-to-Earth) in the band 161.7875-161.9375 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the bands 150.05-153 MHz, 322-328.6 MHz, 406.1-410 MHz and 608-614 MHz from harmful interference from unwanted emissions. The threshold levels of interference detrimental to the radio astronomy service are shown in the relevant ITU‑R Recommendation.     (WRC‑19)

**Reasons:** The frequency range 161.7875-161.9375 MHz is a new allocation to the maritime mobile-satellite service (space-to-Earth). To ensure protection of the RAS this frequency range has to be added to RR No. **5.208A**.

MOD

5.208B[[3]](#footnote-3)\* In the frequency bands:

137-138 MHz,  
 161.7875-161.9375 MHz,  
 387-390 MHz,  
 400.15-401 MHz,  
 1 452-1 492 MHz,  
 1 525-1 610 MHz,  
 1 613.8-1 626.5 MHz,  
 2 655-2 690 MHz,  
 21.4-22 GHz,

Resolution **739** **(Rev.WRC-19)** applies.     (WRC-19)

**Reasons:** The frequency range 161.7875-161.9375 MHz is a new allocation to the maritime mobile-satellite service (space-to-Earth). To ensure protection of the RAS this frequency range has to be added to RR No. **5.208B**.

ADD

5.226A The use of the frequency band 157.1875-157.3375 MHz by the maritime mobile-satellite service (Earth-to-space) is limited to the systems which operate in accordance with Appendix **18**.     (WRC‑19)

**Reasons:** Identify a MMSS allocation uplink for the VHF Data Exchange System which is described in Recommendation ITU‑R M.2092-0.

ADD

5.226B The use of the frequency band 161.7875-161.9375 MHz by the maritime mobile-satellite service (space-to-Earth) is limited to the systems which operate in accordance with Appendix **18**. Such use is subject to the application of the provisions of No. **9.14** for coordination with stations of terrestrial services.     (WRC‑19)

**Reasons:** Identify a MMSS allocation downlink for the VHF Data Exchange System which is described in Recommendation ITU‑R M.2092-0. It is also clarified, in the footnote RR No. **5.226B**, that the coordination between MMSS and terrestrial services is subject to the application of the provision of RR No. **9.14**.

MOD

APPENDIX 5 (REV.WRC‑19)

Identification of administrations with which coordination is to be effected or  
agreement sought under the provisions of Article 9

ANNEX 1

MOD

# 1 Coordination thresholds for sharing between MSS (space-to-Earth) and terrestrial services in the same frequency bands and between non‑GSO MSS feeder links (space-to-Earth) and terrestrial services in the same frequency bands and between RDSS (space-to-Earth) and terrestrial services in the same frequency bands     (WRC‑19)

MOD

## 1.1 Below 1 GHz[[4]](#footnote-4)\*

…

1.1.4 In the band 161.7875-161.9375 MHz, coordination of a space station of the maritime mobile-satellite service (space-to-Earth) with respect to terrestrial services is required only if the power spectral and flux-density produced by this space station exceeds the following mask in dB(W/(m2 · 4 kHz)) at the Earth’s surface:



where θis the angle of arrival of the incident wave above the horizontal plane (degrees).

**Reasons:** It is proposed to extend the coordination threshold defined in Annex 1 of RR Appendix **5** for the VDES using the frequency band 161.7875-161.9375 MHz by using the pfd mask defined in the Recommendation ITU-R M.2092-0.

MOD

APPENDIX 18 (REV.WRC‑19)

Table of transmitting frequencies in the  
VHF maritime mobile band

(See Article 52)

.../...

| Channel designator | Notes | Transmitting frequencies  (MHz) | | Inter-ship | Port operations  and ship movement | | Public corres-pondence |
| --- | --- | --- | --- | --- | --- | --- | --- |
| From ship stations | From coast stations | Single frequency | Two frequency |
| … | … | … | … | … | … | … | … |
| 24 | *w), ww), x), xx)* | 157.200 | 161.800 |  | x | x | x |
| 1024 | *w), ww), x), xx),*  *AAA)* | 157.200 |  | x  (digital only) |  |  |  |
| 2024 | *w), ww), x), xx),*  *BBB)* | 161.800 | 161.800 | x  (digital only) |  |  |  |
| 84 | *w), ww), x), xx)* | 157.225 | 161.825 |  | x | x | x |
| 1084 | *w), ww), x), xx),*  *AAA)* | 157.225 |  | x  (digital only) |  |  |  |
| 2084 | *w), ww), x), xx),*  *BBB)* | 161.825 | 161.825 | x  (digital only) |  |  |  |
| 25 | *w), ww), x), xx)* | 157.250 | 161.850 |  | x | x | x |
| 1025 | *w), ww), x), xx),*  *AAA)* | 157.250 |  | x  (digital only) |  |  |  |
| 2025 | *w), ww), x), xx),*  *BBB)* | 161.850 | 161.850 | x  (digital only) |  |  |  |
| 85 | *w), ww), x), xx)* | 157.275 | 161.875 |  | x | x | x |
| 1085 | *w), ww), x), xx),*  *AAA)* | 157.275 |  | x  (digital only) |  |  |  |
| 2085 | *w), ww), x), xx),*  *BBB)* | 161.875 | 161.875 | x  (digital only) |  |  |  |
| 26 | *w), ww), x)* | 157.300 | 161.900 |  | x | x | x |
| 1026 | *w), ww), x),*  *AAA)* | 157.300 |  |  |  |  |  |
| 2026 | *w), ww), x),*  *BBB)* |  | 161.900 |  |  |  |  |
| 86 | *w), ww), x)* | 157.325 | 161.925 |  | x | x | x |
| 1086 | *w), ww), x),*  *AAA)* | 157.325 |  |  |  |  |  |
| 2086 | *w), ww), x),*  *BBB)* |  | 161.925 |  |  |  |  |
| 27 | *z), zx)* | 157.350 | 161.950 |  |  | x | x |
| 1027 | *z), zz)* | 157.350 | 157.350 |  | x |  |  |
| ASM 1 | *z)* | 161.950 | 161.950 |  |  |  |  |
| 87 | *z), zz)* | 157.375 | 157.375 |  | x |  |  |
| 28 | *z), zx)* | 157.400 | 162.000 |  |  | x | x |
| 1028 | *z), zz)* | 157.400 | 157.400 |  | x |  |  |
| ASM 2 | *z)* | 162.000 | 162.000 |  |  |  |  |
| 88 | *z), zz)* | 157.425 | 157.425 |  | x |  |  |
| AIS 1 | *f), l), p)* | 161.975 | 161.975 |  |  |  |  |
| AIS 2 | *f), l), p)* | 162.025 | 162.025 |  |  |  |  |
|  | | | | | | | |

.../...

MOD

*w)* In Regions 1 and 3:

The frequency bands 157.200‑157.325 MHz and 161.800-161.925 MHz (corresponding to channels: 24, 84, 25, 85, 26 and 86) are identified for the utilization of the VHF Data Exchange System (VDES) described in the most recent version of Recommendation ITU‑R M.2092. These frequency bands may also be used for analogue modulation described in the most recent version of Recommendation ITU‑R M.1084 by an administration that wishes to do so, subject to not causing harmful interference to, or claiming protection from other stations in the maritime mobile service using digitally modulated emissions and subject to coordination with affected administrations.     (WRC‑19)

MOD

*wa)*  In Regions 1 and 3:

The frequency bands 157.025‑157.100 MHz and 161.625-161.700 MHz (corresponding to channels: 80, 21, 81 and 22) are identified for utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842 using multiple 25 kHz contiguous channels.

The frequency bands 157.150‑157.175 MHz and 161.750-161.775 MHz (corresponding to channels: 23 and 83) are identified for utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842 using two 25 kHz contiguous channels. From 1 January 2017, the frequencies 157.125 MHz and 161.725 MHz (corresponding to channel: 82) are identified for the utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842.

The frequency bands 157.025‑157.175 MHz and 161.625-161.775 MHz (corresponding to channels: 80, 21, 81, 22, 82, 23 and 83) can also be used for analogue modulation described in the most recent version of Recommendation ITU‑R M.1084 by an administration that wishes to do so, subject to not claiming protection from other stations in the maritime mobile service using digitally modulated emissions and subject to coordination with affected administrations.     (WRC‑19)

NOC

Note *ww)*

NOC

Note *x)*

MOD

*xx)* The channels 24, 84, 25 and 85 may be merged in order to form a unique duplex channel with a bandwidth of 100 kHz in order to operate the VDES terrestrial component described in the most recent version of Recommendation ITU‑R M.2092.     (WRC‑19)

NOC

Note *y)*

MOD

*z)* These channels are each split into two simplex channels. The channels 2027 and 2028 designated as ASM 1 and ASM 2 are used for application specific messages (ASM) as described in the most recent version of Recommendation ITU-R M.2092.     (WRC‑19)

NOC

Note *zx)*

MOD

*zz)* The channels 1027, 1028, 87 and 88 are used as single-frequency analogue channels for port operation and ship movement.     (WRC‑19)

**Reasons:** The above modifications of RR Appendix **18** identify a MMSS allocation uplink and downlink for the VHF Data Exchange System which is described in Recommendation ITU‑R M.2092-0.

ADD

*AAA)* The combination of the channels 1024, 1084, 1025, 1085, 1026 and 1086, which are also allocated to the maritime mobile-satellite service (Earth-to-space), shall be used for the reception of VDES messages from ships as described in the most recent version of Recommendation ITU-R M.2092.  (WRC-19)

**Reasons:** The channels are identified for the satellite uplink of the VDES.

ADD

*BBB)* The combination of the channels 2024, 2084, 2025, 2085, 2026 and 2086, which are also allocated to the maritime mobile-satellite service (space-to-Earth), shall be used for the reception of VDES messages from satellites as described in the most recent version of Recommendation ITU-R M.2092.  (WRC-19)

**Reasons:** The channels are identified for the satellite downlink of the VDES.

*[****Chairman’s note****: are all of the NOC’s above NOC or should they be NOC e.g. positively supporting no change]*

MOD

RESOLUTION 739 (Rev.WRC-19)

Compatibility between the radio astronomy service and the active  
space services in certain adjacent and nearby frequency bands

The World Radiocommunication Conference (Geneva, 2019),

…

ANNEX 1 TO RESOLUTION 739 (Rev.WRC-19)

Unwanted emission threshold levels

…

TABLE 1-2

epfd thresholds(1) for unwanted emissions from all space stations of a non-GSO satellite system   
at a radio astronomy station

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Space service | Space service frequency band | Radio astronomy frequency band | Single dish, continuum observations | | Single dish, spectral line observations | | VLBI | | Condition of application: the API is received by the Bureau following the entry into force of the Final Acts of: |
| epfd(2) | Reference bandwidth | epfd(2) | Reference bandwidth | epfd(2) | Reference bandwidth |
| **(MHz)** | **(MHz)** | **(dB(W/m2))** | **(MHz)** | **(dB(W/m2))** | **(kHz)** | **(dB(W/m2))** | **(kHz)** |
| MSS (space-to-Earth) | 137-138 | 150.05-153 | −238 | 2.95 | NA | NA | NA | NA | WRC-07 |
| MMSS (space-to-Earth) | 161.7875-161.9375 | 150.05-153 | −238 | 2.95 | NA | NA | NA | NA | WRC-19 |
| MSS (space-to-Earth) | 387-390 | 322-328.6 | −240 | 6.6 | −255 | 10 | −228 | 10 | WRC-07 |
| MSS (space-to-Earth) | 400.15-401 | 406.1-410 | −242 | 3.9 | NA | NA | NA | NA | WRC-07 |
| MSS (space-to-Earth) | 1 525-1 559 | 1 400-1 427 | −243 | 27 | −259 | 20 | −229 | 20 | WRC-07 |
| RNSS (space-to-Earth)(3) | 1 559-1 610 | 1 610.6-1 613.8 | NA | NA | −258 | 20 | −230 | 20 | WRC‑07 |
| MSS (space-to-Earth) | 1 525-1 559 | 1 610.6-1 613.8 | NA | NA | −258 | 20 | −230 | 20 | WRC-07 |
| MSS (space-to-Earth) | 1 613.8-1 626.5 | 1 610.6-1 613.8 | NA | NA | −258 | 20 | −230 | 20 | WRC-03 |
| NA: Not applicable, measurements of this type are not made in this frequency band.  (1) These epfd thresholds should not be exceeded for more than 2% of time.  (2) Integrated over the reference bandwidth with an integration time of 2 000 s.  (3) This Resolution does not apply to current and future assignments of the radionavigation-satellite system GLONASS/GLONASS-M in the frequency band 1 559-1 610 MHz, irrespective of the date of reception of the related coordination or notification information, as appropriate. The protection of the radio astronomy service in the frequency band 1 610.6‑1 613.8 MHz is ensured and will continue to be in accordance with the bilateral agreement between the Russian Federation, the notifying administration of the GLONASS/GLONASS-M system, and IUCAF, and subsequent bilateral agreements with other administrations. | | | | | | | | | |

**Reasons:** The frequency range 161.7875-161.9375 MHz is a new allocation to the maritime mobile-satellite service (space-to-Earth). To ensure protection of the RAS this frequency range has to be added to Annex 1 to Resolution **739**.

SUP

RESOLUTION 360 (REV.WRC‑15)

Consideration of regulatory provisions and spectrum allocations to the maritime mobile-satellite service to enable the satellite component of the VHF Data Exchange System and enhanced maritime radiocommunication

The World Radiocommunication Conference (Geneva, 2015),

**Reasons:** It is proposes to suppress Resolution **360 (Rev.WRC-15)** since it will become superfluous after the studies are completed and the identification of frequencies in order to enhance maritime radiocommunication has been made by WRC-19.

1. \* This provision was previously numbered as No. 5.347A. It was renumbered to preserve the sequential order. [↑](#footnote-ref-1)
2. \* These provisions apply only to the MSS. [↑](#footnote-ref-2)
3. \* This provision was previously numbered as No. 5.347A. It was renumbered to preserve the sequential order. [↑](#footnote-ref-3)
4. \* These provisions apply only to the MSS. [↑](#footnote-ref-4)