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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 16 to Document 16-E** |
|  | **14 October 2015** |
|  | **Original: English** |
|  | |
| Canada | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.16 | |

1.16 to consider regulatory provisions and spectrum allocations to enable possible new Automatic Identification System (AIS) technology applications and possible new applications to improve maritime radiocommunication in accordance with Resolution **360** **(WRC‑12)**;

Issue B and Issue C

Introduction

The need for wideband communications between ships and coastal stations was recognized during WRC-12 and resulted in the creation of this agenda item. During the WRC-15 cycle, much work has been accomplished toward proposed new wide band VHF Data Exchange Systems (VDES) in the maritime mobile service as well as in the maritime mobile satellite service. Studies have been carried out, use case scenarios have been compiled, and four different channel plans have been proposed. Canada believes that even with this progress, VDES remains at a developmental stage. Therefore, Canada is proposing changes to the Radio Regulations to implement a phased-in approach to VDES for both the terrestrial and satellite components. This will provide an opportunity to address any outstanding concerns before VDES is fully implemented. This will also provide practical solutions relating to e-navigation which continues to be developed.

Proposal

Taking into account the work performed during this study period, Canada proposes the following in order to enable the development of VDES for the maritime community:

Terrestrial component of the VDES (Issue B)

– Identify the following duplex channels of RR Appendix 18: 24, 84, 25 and 85 and permit the merging of these channels for a better data rate for VDES.

– Note *ww)* to Appendix 18 is modified to reflect the use of terrestrial VDES

The terrestrial component does not require any changes to RR Article 5.

Satellite component of the VDES (Issue C)

– The addition of a secondary allocation in RR Article **5** to the maritime mobile-satellite service in the frequency bands 157.1875-157.2875 MHz (Earth-to-space) and 161.7875-161.8875 MHz (space-to-Earth)

– New footnotes to RR Article **5** explaining the use and additional regulatory provisions related to the secondary allocation to the maritime mobile-satellite service

– Resulting modifications to existing RR Article 5 footnotes 5.208A and 5.208B

– New notes *vdes1)* and *vdes2)* to Appendix 18 proposed to reflect the use of satellite VDES

Resulting modifications to Resolution 739 (Rev.WRC-07) to protect the radio astronomy service.

Proposals

ARTICLE 5

Frequency allocations

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

MOD CAN/16A16/1

148-223 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 | |
| 157.1875-157.2875  FIXED  MOBILE except aeronautical mobile | 157.1875-157.2875  FIXED  MOBILE  Maritime mobile-satellite (Earth-to-space) ADD 5.A116 | |
| 5.226 | 5.226 | |
| 157.2875-161.7875  FIXED  MOBILE except aeronautical mobile | 157.2875-161.7875  FIXED  MOBILE | |
| 5.226 | 5.226 | |
| 161.7875-161.8875  FIXED  MOBILE except aeronautical mobile | 161.7875-161.8875  FIXED  MOBILE  Maritime mobile-satellite (space-to-Earth) ADD 5.B116  MOD 5.208A MOD 5.208B | |
| 5.226 | 5.226 | |
| 161.8875-161.9625  FIXED  MOBILE except aeronautical mobile | 161.8875-161.9625  FIXED  MOBILE | |
| 5.226 | 5.226 | |

ADD CAN/16A16/2

5.A116 The use of the frequency band 157.1875-157.2875 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix **18**.     (WRC‑15)

ADD CAN/16A16/3

5.B116 The use of the frequency band 161.7875-161.8875 MHz by the maritime mobile-satellite (space-to-Earth) service is limited to the systems which operate in accordance with Appendix **18**, and subject to the PFD limit below:



where θis the angle of arrival of the incident wave above the horizontal plane (degrees).     (WRC‑15)

**Reasons:** The above modifications to RR Article 5 identify a maritime mobile-satellite service allocation uplink and downlink for the VHF Data Exchange System which is described in the Recommendation ITU-R M.[VDES]. Further clarification is provided in the proposed new footnotes, which limit the use to systems which operate in accordance with Appendix 18 and imposes a pfd limit on the maritime mobile satellite service in the space-to-Earth direction.

MOD CAN/16A16/4

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 161.7875-161.8875 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-15)

MOD CAN/16A16/5

5.208B\* In the bands:

137-138 MHz,  
 161.7875-161.8875 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-15)

**Reasons:** Modifications to footnotes 5.208A and 5.208B would be required if a new secondary allocation is made to the maritime mobile-satellite service.

MOD CAN/16A16/6

APPENDIX 18 (REV.WRC‑12)

Table of transmitting frequencies in the  
VHF maritime mobile band

(See Article 52)

NOTE A – For assistance in understanding the Table, see Notes *a)* to *z)* below.     (WRC‑12)

NOTE B – The Table below defines the channel numbering for maritime VHF communications based on 25 kHz channel spacing and use of several duplex channels. The channel numbering and the conversion of two-frequency channels for single-frequency operation shall be in accordance with Recommendation ITU‑R M.1084‑4 Annex 4, Tables 1 and 3. The Table below also describes the harmonized channels where the digital technologies defined in the most recent version of Recommendation ITU‑R M.1842 could be deployed.     (WRC‑12)

| 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 |
| … |  |  |  |  |  |  |  |
| 1024 | *ww), vde1)* | 157.200 |  |  |  |  |  |
| 2024 | *ww), vde2)* |  | 161.800 |  |  |  |  |
| 84 | *w), ww), x), y)* | 157.225 | 161.825 |  | x | x | x |
| 1084 | *ww), vde1)* | 157.225 |  |  |  |  |  |
| 2084 | *ww), vde2)* |  | 161.825 |  |  |  |  |
| 25 | *w), ww), x), y)* | 157.250 | 161.850 |  | x | x | x |
| 1025 | *ww), vde1)* | 157.250 |  |  |  |  |  |
| 2025 | *ww), vde2)* |  | 161.850 |  |  |  |  |
| 85 | *w), ww), x), y)* | 157.275 | 161.875 |  | x | x | x |
| 1085 | *ww), vde1)* | 157.275 |  |  |  |  |  |
| 2085 | *ww), vde2)* |  | 161.875 |  |  |  |  |

**Reasons:** Lower leg channels (1024, 1084, 1025, 1085) used for VDES ship-to-shore and ship-to-satellite communications. Upper leg channels (2024, 2084, 2025, 2085) used for VDES shore-to-ship and satellite-to-ship communications.

**Notes referring to the Table**

*General notes*

MOD CAN/16A16/7

*ww)* In Region 2, the frequency bands 157.200-157.325 and 161.800-161.925 MHz (corresponding to channels: 24, 84, 25, 85, 26 and 86) are designated for digitally modulated emissions in accordance with the most recent version of Recommendation ITU‑R M.1842.

Until 31 December 2019, the frequency bands 157.200-157.275 and 161.800-161.875 MHz (corresponding to channels: 24, 84, 25 and 85) may be used for new technologies, or testing and experimentation of wideband digital channels, subject to coordination with affected administrations and should be in accordance with the most recent version of Recommendation ITU‑R M.[VDES].     (WRC‑15)

ADD CAN/16A16/8

*vde1)* Until 31 December 2019, the frequency band 157.200-157.275 MHz (corresponding to channels: 1024, 1084, 1025 and 1085), which is also allocated to the maritime mobile-satellite service (Earth-to-space) on a secondary basis, may be used for testing and experimentation of satellite reception of wideband digital channels such as those described in the most recent version of Recommendation ITU‑R M.[VDES].

ADD CAN/16A16/9

*vde2)* Until 31 December 2019, the frequency band 161.800-161.875 MHz (corresponding to channels: 2024, 2084, 2025 and 2085), which is also allocated to the maritime mobile-satellite service (space-to-Earth) on a secondary basis, may be used for testing and experimentation of satellite downlink of wideband digital channels such as those described in the most recent version of Recommendation ITU‑R M.[VDES].

**Reasons:** To allow further testing and experimentation of the VDES concept in order to optimize a channel plan for the terrestrial and satellite components. By identifying the frequency band rather than individual channels this will allow merging of channels to achieve up to 100 kHz of bandwidth.

RESOLUTION 739 (Rev.WRC-07)

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

MOD CAN/16A16/10

ANNEX 1 TO RESOLUTION 739 (Rev.WRC-15)

Unwanted emission threshold levels

TABLE 1-2     (Rev.wrc‑15)

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) | 161.7875-161.8875 | 150.05-153 | −238 | 2.95 | NA | NA | NA | NA | WRC-15 |
| 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 |

**Reasons:** Implementation of unwanted emission thresholds to protect the radio astronomy service.

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