|  |  |
| --- | --- |
| **World Radiocommunication Conference (WRC-15)Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 16 toDocument 86-E** |
|  | **19 October 2015** |
|  | **Original: Arabic** |
|  |
| Sudan (Republic of the) |
| 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)**;

Introduction

With regard to *resolves* 1 of Resolution 360 (WRC-12)

Carriage of the shipborne AIS is mandatory for safety of navigation under Chapter V of the International Convention for the Safety of Life at Sea (SOLAS) and has become well accepted by the maritime community. It is also being used by ships not subject to the SOLAS Convention.

AIS is used in the ship movement service for safety of navigation. It enables the identification of stations using this system, provides information about a ship and its cargo. It provides a means for ships to exchange ship data, including identification, position, course and speed, with other nearby ships and coast stations.

The outcome of the maritime agenda item from WRC-12 was as follows:

– Identification of channels 75 and 76 of RR Appendix **18** for AIS and secondary allocation to the MSS (Earth-to-space) for these frequency bands in order to improve satellite detection of AIS Message 27 (long-range AIS broadcast).

– Improvement of the communication environment for port operations and ship movement including VHF data transmission capability, including identificationofsix channels (24, 25, 26, and 84, 85, 86) for worldwide use as potential data exchange systems. In addition a number of others channels have been identified for regional usage (see RR Appendix **18**).

AIS is supported by a terrestrial-based VHF component as well as being detectable by satellite, but its effectiveness is unacceptably limited where VHF data link (VDL) loading is high. The need for separate dedicated channels was recognized by WRC-12 and two additional channels were designated. This new designation solves the problem for satellite detection.

AIS VDL loading remains an issue to an increasing degree in many parts of the world due to the proliferation of AIS applications, message types, services and equipment types plus the unanticipated increase in user volume.

In order to protect the integrity of the AIS VDL, it is considered beneficial to move ASM to two of the four channels identified for data exchange in RR Appendix **18** by WRC-12. The AIS VDL is designed mainly for safety of navigation, and assists with vessel collision avoidance. The ship’s position is continuously transmitted on the VDL and the other vessels in close proximity to the ship have the highest probability of reception. This ensures that, even during high VDL loading, the ship will receive all position reports from the other closest vessels but fewer position reports from the more distant vessels.

When the AIS VDL is used for data communications, it performs poorly with higher loads of VDL message traffic resulting in higher loss of AIS messages, and a higher number of retransmissions. This situation culminates with the breakdown of data communications on the AIS VDL.

An increasing number of ASM will also reduce the available time slots for the intended AIS messages. With increasing demand for maritime VHF data communications, AIS will become more heavily used which will lead to an overloading of the existing AIS1 and AIS2 channels.

The decision of WRC-12 to assign new channels of the RR Appendix **18** to digital communication makes the implementation and use of new digital communication means possible. The establishment of the maritime AIS technology, the VHF data exchange and certain satellite communication components on these new frequencies offers potential enhancements to VHF maritime safety communications on a global basis to satisfy the increasing need for maritime radiocommunications for enhanced maritime safety.

Taking into account the channels identified by WRC-12 as described above, new digitalized channels could be used with modulation techniques described in Recommendation [ITU‑R M.1842](http://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.1842-1-200906-I%21%21MSW-E.doc), and could be used for future VHF digital data, and ship-to-shore data exchange.

Where a number of the 25 kHz channels are combined, a typical scheme might have a 100 kHz bandwidth, allowing a much higher data throughput than a single 25 kHz channel. The use of the six VHF data channels plus two further channels (which have been identified for “possible testing of future AIS applications”) for an international scheme to be known as VDES.

With regard to *resolves* 2 of Resolution 360 (WRC-12)

“Increased traffic, the need to adapt to technological changes in the maritime sector (e.g. professional mariners demanding greater access to electronic navigation information), climate change impacts such as fluctuating water levels and the extension of shipping seasons, are expected to place increasing demands on Coast Guard programs.”

Traditional communication methods (i.e. voice) have been shown to be inadequate for the transfer of the information required to improve the safety of navigation particularly in adverse conditions. More information (such as weather, ice charts, status of aids to navigation, water levels and rapid changes of port status) is required in real-time to improve operational decisions on land and on ship that will lead to safer and more efficient voyages.

Shore authorities have also demonstrated interest in increasing the quantity of information retrieved from ships in real-time (such as voyage information, passenger manifest and pre-arrival reports) in a more efficient way to transmit and process this information as digital information. Similar projects with similar requirements have been initiated around the world, such as the Mona Lisa and Mona Lisa2 projects and the EfficienSea project. As a result of these additional requirements on maritime communications, the channels identified by WRC-12 would be used by maritime authorities across the world to respond to increased data transfer and improve maritime safety and efficiency in the growing maritime environment.

Increasing use of satellite networks has resulted in the development of new applications which can support and enhance safety and navigation.

Issue A – Application specific message designation

The Sudanese Administration supports splitting Channels 27 and 28 of RR Appendix **18** into four simplex channels, channels 1027, 1028, 2027 and 2028. Channels 2027 and 2028 will be identified for the ASM application. This will be achieved through a transitional period and an effective implementation date.

To prevent blocking of the reception of the channels AIS1, AIS 2, 2027 and 2028, the transmission from ship on channels 2078, 2019, 2079 and 2020 will not be permitted.

Issue B – New applications for maritime radiocommunication – terrestrial component

The Sudanese Administration supports using Channels 24, 84, 25, 85, 26 and 86 in RR Appendix **18** for testing and experiments of global harmonized terrestrial component of the VDE.

Issue C – New application for maritime radiocommunication – satellite component

The Sudanese Administration supports a new secondary allocation for the maritime mobile-satellite service (Earth‑to-space) for frequency band 161.9375-161.9625 MHz (channel 2027) and frequency band 161.9875-162.0125 MHz (channel 2028) for improved ASM communication capacity and coverage. The usage of these frequencies enables that the same equipment as for the terrestrial VDES communication can be used.

The Method proposes a new secondary 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).

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.

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)** would be revised to include MMSS in the frequency band 161.7875-161.9375 MHz.

The Method proposes to use an ITU‑R Recommendation describing the concept and characteristics of VDES.

Issue D – VDES regional solution

The Sudanese Administration supports the following:

− Channels 80, 21, 81 and 22 can be used using multiple 25 kHz contiguous channels for both ship and coast station transmission as regional use.

− Channel 82 can be used for both ship and coast station transmission as regional use.

− Channels 23 and 83 can be used using multiple 25 kHz contiguous channels for both ship and coast station transmission as regional use.

Proposals

Issue A – Application specific message designation

MOD SDN/86A16/1

APPENDIX 18 (REV.WRC‑15)

Table of transmitting frequencies in the
VHF maritime mobile band

(See Article 52)

.../...

| Channeldesignator | Notes | Transmittingfrequencies (MHz) | Inter-ship | Port operations and ship movement | Publiccorres-pondence |
| --- | --- | --- | --- | --- | --- |
| From ship stations | From coast stations | Single frequency | Two frequency |
| 15 | *g)* | 156.750 | 156.750 | x | x |  |  |
| 75 | *n), s)* | 156.775 | 156.775 |  | x |  |  |
| 16 | *f)* | 156.800 | 156.800 | DISTRESS, SAFETY AND CALLING |
| 76 | *n), s)* | 156.825 | 156.825 |  | x |  |  |
| 17 | *g)* | 156.850 | 156.850 | x | x |  |  |
| 77 |  | 156.875 |  | x |  |  |  |
| 18 | *m)* | 156.900 | 161.500 |  | x | x | x |
| 78 | *t), u), v)* | 156.925 | 161.525 |  | x | x | x |
| 1078 |  | 156.925 | 156.925 |  | x |  |  |
| 2078 | *t), u), v)* | 161.525 | 161.525 |  | x |  |  |
| 19 | *t), u), v)* | 156.950 | 161.550 |  | x | x | x |
| 1019 |  | 156.950 | 156.950 |  | x |  |  |
| 2019 | *t), u), v)* | 161.550 | 161.550 |  | x |  |  |
| 79 | *t), u), v)* | 156.975 | 161.575 |  | x | x | x |
| 1079 |  | 156.975 | 156.975 |  | x |  |  |
| 2079 | *t), u), v)* | 161.575 | 161.575 |  | x |  |  |
| 20 | *t), u), v)* | 157.000 | 161.600 |  | x | x | x |
| 1020 |  | 157.000 | 157.000 |  | x |  |  |
| 2020 | *t), u), v)* | 161.600 | 161.600 |  | x |  |  |
| ... |  |  |  |  |  |  |  |
| 27 | *z)* | 157.350 | 161.950 |  |  | x | x |
| 1027 |  | 157.350 | 157.350 |  | x |  |  |
| 2027 | *d)* | 161.950 | 161.950 |  | x |  |  |
| 87 | *z)* | 157.375 | 157.375 |  | x |  |  |
| 28 | *z)* | 157.400 | 162.000 |  |  | x | x |
| 1028 |  | 157.400 | 157.400 |  | x |  |  |
| 2028 | *d)* | 162.000 | 162.000 |  | x |  |  |
| 88 | *z)* | 157.425 | 157.425 |  | x |  |  |
| AIS 1 | *f), l), p)* | 161.975 | 161.975 |  |  |  |  |
| AIS 2 | *f), l), p)* | 162.025 | 162.025 |  |  |  |  |

MOD SDN/86A16/2

*t)* In Regions 1 and 3, the existing duplex channels 78, 19, 79 and 20 can continue to be assigned. These channels may be operated as single-frequency channels, subject to coordination with affected administrations. Administrations should take appropriate actions, including not allowing channels 2078, 2019, 2079 and 2020 to transmit from ships, to prevent blocking of the reception of the channels AIS 1, AIS 2, 2027 and 2028.     (WRC‑15)

MOD SDN/86A16/3

*z)* These channels may be used for possible testing of future AIS applications without causing harmful interference to, or claiming protection from, existing applications and stations operating in the fixed and mobile services.

 These channels are split into two simplex channels. The upper legs, 2027 and 2028, respectively designated as ASM 1 and ASM 2, are used for non-navigation ASM (application specific messages) as described in the most recent version of Recommendation ITU‑R M.[VDES].

 The channels 2027 and 2028 are also allocated to the maritime mobile-satellite service (Earth-to-space) for the reception of ASM messages from ships, as described in the most recent version of Recommendation ITU‑R M.[VDES], in which they are denominated respectively as SAT Up1 and SAT Up2.     (WRC‑15)

Issue B – New applications for maritime radiocommunication – terrestrial component

MOD SDN/86A16/4

APPENDIX 18 (REV.WRC‑15)

Table of transmitting frequencies in the
VHF maritime mobile band

(See Article 52)

.../...

| Channeldesignator | Notes | Transmittingfrequencies (MHz) | Inter-ship | Port operations and ship movement | Publiccorres-pondence |
| --- | --- | --- | --- | --- | --- |
| From ship stations | From coast stations | Single frequency | Two frequency |
| ... |  |  |  |  |  |  |  |
| 80 | *w), y)* | 157.025 | 161.625 |  | x | x | x |
| 21 | *w), y)* | 157.050 | 161.650 |  | x | x | x |
| 81 | *w), y)* | 157.075 | 161.675 |  | x | x | x |
| 22 | *w), y)* | 157.100 | 161.700 |  | x | x | x |
| 82 | *w), x), y)* | 157.125 | 161.725 |  | x | x | x |
| 23 | *w), x), y)* | 157.150 | 161.750 |  | x | x | x |
| 83 | *w), x), y)* | 157.175 | 161.775 |  | x | x | x |
| 24 | *w), ww), x), y), dddd)* | 157.200 | 161.800 |  | x | x | x |
| 84 | *w), ww), x), y), dddd)* | 157.225 | 161.825 |  | x | x | x |
| 25 | *w), ww), x), y), dddd)* | 157.250 | 161.850 |  | x | x | x |
| 85 | *w), ww), x), y), dddd)* | 157.275 | 161.875 |  | x | x | x |
| 26 | *w), ww), x), y), dddd)* | 157.300 | 161.900 |  | x | x | x |
| 86 | *w), ww), x), y), dddd)* | 157.325 | 161.925 |  | x | x | x |
| ... |  |  |  |  |  |  |  |

MOD SDN/86A16/5

*w)* In Regions 1 and 3 (except China):

 Until 1 January 2017, the frequency bands 157.025-157.325 MHz and 161.625-161.925 MHz (corresponding to channels: 80, 21, 81, 22, 82, 23, 83, 24, 84, 25, 85, 26, 86) may be used for new technologies, or testing and experiment of the VDE terrestrial component, subject to coordination with affected administrations. Stations using these channels or frequency bands for new technologies shall not cause harmful interference to, or claim protection from, other stations operating in accordance with Article **5**.

 From 1 January 2017, the frequency bands 157.025‑157.325 MHz and 161.625-161.925 MHz (corresponding to channels: 80, 21, 81, 22, 82, 23, 83, 24, 84, 25, 85, 26, 86) are identified for the utilization of the digital systems described in the most recent version of Recommendation ITU‑R M.1842. These frequency bands could 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‑15)

NOC

Notes *ww)*, *x)*, *y)* and *z)*

ADD SDN/86A16/6

*dddd)* [From 1 January 2019,] 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.     (WRC‑15)

Issue C – New application for maritime radiocommunication – satellite component

ARTICLE 5

Frequency allocations

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

MOD SDN/86A16/7

148-223 MHz

| Allocation to services |
| --- |
| Region 1 | Region 2 | Region 3 |
| 156.8375-157.1875FIXEDMOBILE except aeronauticalmobile | 156.8375-157.1875 FIXED MOBILE |
| 5.226 |  5.226 |
| 157.3375-157.1875FIXEDMOBILE except aeronauticalmobileMaritime mobile-satellite(Earth-to-space) | 157.1875-**157.3375** FIXED MOBILE Maritime mobile-satellite (Earth-to-space) |
| 5.226 ADD .5226A |  5.226 ADD .5226A |
| 157.3375-161.7875FIXEDMOBILE except aeronauticalmobile | 157.3375-161.7875 FIXED MOBILE |
| 5.226 |  5.226 |
| 161.7875-161.9375FIXEDMOBILE except aeronauticalmobileMARITIME MOBILE-SATELLITE(space-to-Earth)MOD 5.520B MOD 208A | 161.7875-161.9375 FIXED MOBILE MARITIME MOBILE-SATELLITE (space-to-Earth)MOD 5.520B MOD 208A |
| 5.226 ADD 5.226B |  5.226 ADD 5.226B |
| 161.9375-161.9625FIXEDMOBILE except aeronauticalmobileMaritime mobile-satellite(Earth-to-space) | 161.9375-161.9625 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) |
| 5.226 ADD 5.226A |  5.226 ADD 5.226A |
| 161.9625-161.9875FIXEDMOBILE except aeronauticalmobileMobile-satellite (Earth-to-space) 5.228F | 161.9625-161.9875AERONAUTICAL MOBILE (OR)MARITIME MOBILEMOBILE-SATELITE (Earth-to-space) | 161.9625-161.9875MARITIME MOBILEAeronautical mobile (OR) 5.228EMobile-satellite (Earth-to-space) 5.228F |
| 5.226 5.228A 5.228B | 5.228C 5.228D | 5.226 |
| 161.9875-162.0125FIXEDMOBILE except aeronauticalmobileMaritime mobile-satellite(Earth-to-space) | 161.9875-162.0125 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) |
| 5.226 ADD 5.226A 5.229 |  5.226 ADD 5.226A |
| 162.0125-162.0375FIXEDMOBILE except aeronauticalmobileMobile-satellite (Earth-to-space) 5.228F | 162.0125-162.0375AERONAUTICAL MOBILE (OR)MARITIME MOBILEMOBILE-SATELITE (Earth-to-space) | 162.0125-162.0375MARITIME MOBILEAeronautical mobile (OR) 5.228EMobile-satellite (Earth-to-space) 5.228F |
| 5.226 5.228A 5.228B 5.229 | 5.228C 5.228D | 5.226 |

ADD SDN/86A16/8

5.226A The use of the frequency bands 157.1875-157.3375 MHz, 161.9375-161.9625 MHz and 161.9875-162.0125 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 SDN/86A16/9

5.226B The use of the frequency band 161.7875-161.9375 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‑15)

**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 Recommendation ITU‑R M.[VDES]. 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 SDN/86A16/10

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-15)

**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 SDN/86A16/11

5.208B\* In the bands:

 137-138 MHz,
 387-390 MHz,
 161.7875-161.9375 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)

MOD SDN/86A16/12

RESOLUTION 739 (Rev.WRC-15)

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

MOD SDN/86A16/13

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

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 serviceband | Radio astronomyband | 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-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 |
|  |

MOD SDN/86A16/14

APPENDIX 5 (REV.WRC‑15)

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

ANNEX 1

MOD SDN/86A16/15

# 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 servicesin the same frequency bands and between RDSS (space-to-Earth) and terrestrial services in the same frequency bands     (WRC‑15)

MOD SDN/86A16/16

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

...

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 this new defined mask.

Issue D – VDES regional solution

MOD SDN/86A16/17

APPENDIX 18 (REV.WRC‑15)

Table of transmitting frequencies in the
VHF maritime mobile band

(See Article 52)

.../...

| Channeldesignator | Notes | Transmittingfrequencies (MHz) | Inter-ship | Port operations and ship movement | Publiccorres-pondence |
| --- | --- | --- | --- | --- | --- |
| From ship stations | From coast stations | Single frequency | Two frequency |
| ... |  |  |  |  |  |  |  |
| 80 | *w), y), xx)* | 157.025 | 161.625 |  | x | x | x |
| 1080 | *w), y), xx)* | 157.025 | 157.025 | x | x |  |  |
| 2080 | *w), y), xx)* | 161.625 | 161.625 | x | x |  |  |
| 21 | *w), y), xx)* | 157.050 | 161.650 |  | x | x | x |
| 1021 | *w), y), xx)* | 157.050 | 157.050 | x | x |  |  |
| 2021 | *w), y), xx)* | 161.650 | 161.650 | x | x |  |  |
| 81 | *w), y), xx)* | 157.075 | 161.675 |  | x | x | x |
| 1081 | *w), y), xx)* | 157.075 | 157.075 | x | x |  |  |
| 2081 | *w), y), xx)* | 161.675 | 161.675 | x | x |  |  |
| 22 | *w), y), xx)* | 157.100 | 161.700 |  | x | x | x |
| 1022 | *w), y), xx)* | 157.100 | 157.100 | x | x |  |  |
| 2022 | *w), y), xx)* | 161.700 | 161.700 | x | x |  |  |
| 82 | *w), x), y)* | 157.125 | 161.725 |  | x | x | x |
| 1082 | *w), x), y)* | 157.125 | 157.125 | x | x |  |  |
| 2082 | *w), x), y)* | 161.725 | 161.725 | x | x |  |  |
| 23 | *w), x), y), xxx)* | 157.150 | 161.750 |  | x | x | x |
| 1023 | *w), x), y), xxx)* | 157.150 | 157.150 | x | x |  |  |
| 2023 | *w), x), y), xxx)* | 161.750 | 161.750 | x | x |  |  |
| 83 | *w), x), y), xxx)* | 157.175 | 161.775 |  | x | x | x |
| 1083 | *w), x), y), xxx)* | 157.175 | 161.175 | x | x |  |  |
| 2083 | *w), x), y), xxx)* | 161.775 | 161.775 | x | x |  |  |
| ... |  |  |  |  |  |  |  |

**Notes referring to the Table**

*General notes*

NOC

Notes *a)* to *e)*

*Specific notes*

NOC

Notes *f)* to *z)*

ADD SDN/86A16/18

*xx)* Assignable for wideband digital system operation using multiple 25 kHz contiguous channels.

ADD SDN/86A16/19

*xxx)* Assignable for 50 kHz bandwidth digital system operation using two 25 kHz contiguous channels.

**Reasons:** The channels are identified for regional use of the VDES.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \* These provisions apply only to the MSS. [↑](#footnote-ref-1)