

WAC Informal Working Group (IWG)-1

UNITED STATES OF AMERICA

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.10: to examine the frequency allocation requirements with regard to operation of safety systems for ships and ports and associated regulatory provisions, in accordance with Resolution 357 (WRC-07)

Background Information:

Simplex Use of Duplex Channels

The Radio Regulations Board approved a Rule of Procedure after WRC-07 regarding simplex use in Appendix 18, effectively implementing this part of the enclosed proposal. WRC-07 revised Appendix 18 to allow simplex use of channels 01, 07, 19, 20, 21, 60, 66, 78, 79, 80, and 81 subject to coordination with affected administrations (Note *m*). However, WRC-07 omitted placing an "x" in the "Single frequency" column against affected channels in Appendix 18, thereby unintentionally omitting this from the Radio Regulations.

Expansion of optional simplex use of duplex channels (add more "x" designations to duplex channels) in Appendix 18 will provide further benefits to maritime radiocommunications by relieving current congestion in the VHF maritime mobile bands in accordance with Recommendation ITU-R M.1084-4. Report ITU-R M.2010-1, a study on efficiency in the VHF maritime mobile band, concluded that this spectrum efficiency option expands the number of usable communications channels with the minimum of compatibility issues. The analogue VHF radio on board vessels that travel internationally would have access to both the original two-frequency channels and their single-frequency derivatives, thus allowing port operations on two or single frequency channels.

Channels for E-Navigation (e-Nav)

Designating in Appendix 18 six channels for E-Navigation (eNAV)* data exchange responds to the International Maritime Organization's (IMO) E-Navigation initiatives for future VHF data exchange. Technical studies are ongoing within the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) E-Navigation Committee with close coordination between IALA and the ITU-R. Recommendation ITU-R M.1842-1 provides examples of potential VHF E-Navigation systems and recommends the use of Appendix 18 channels for the exchange of data for E-Navigation to support future digital technologies in the maritime mobile service VHF bands. The ITU-R summarizes E-Navigation spectrum requirements in a liaison statement to IALA (5B/417 Annex 28) and proposes continued cooperative efforts between the two maritime organizations. Adding a new Note *s*) to the table of Appendix 18 and to the

* eNAV – From IMO: "E-Navigation is the harmonised creation, collection, integration, exchange and presentation of maritime information onboard and ashore by electronic means to enhance berth to berth navigation and related services, for safety and security at sea and protection of the marine environment".

section “Notes referring to the Table” supports the identification six channels (24, 25, 26, and 27) for potential E-Navigation systems.

Protection of Channels AIS 1 and AIS 2

Protecting the Automatic Identification System channels (AIS 1 and AIS 2) from harmful interference would ensure the future safety of maritime mobile radiocommunications for these channels. Report ITU-R M.2122 “EMC assessment of shore-based electronic navigation (eNAV) infrastructure and new draft standards for data exchange in the VHF maritime mobile band (156-174 MHz)” describes the susceptibility of AIS 1 and AIS 2 to interference from the adjacent duplex channels. This Report also provides technical guidelines for the electromagnetic compatibility between AIS and systems that use channels 27 and 28. Thus, modifying Note *c*) in the section “Notes referring to the Table” of Appendix 18 is necessary for protecting AIS.

Non-Application of Channel Interleaving

Recommendation ITU-R M.1084-4 describes the advantages of increased spectrum efficiency by channel interleaving 12.5 kHz channels with 25 kHz channels. The current Appendix 18 excludes maritime mobile service safety channels from 12.5 kHz channel interleaving (See Note *e*). By modifying Note *e*) in the section “Notes referring to the Table” of Appendix 18, the non-application of channel interleaving extends to the exclusion of AIS 1 and AIS 2, and the proposed channels for E-Navigation discussed above.

Long-Range Detection of AIS

Taking into account the studies performed within ITU-R, especially the Report ITU-R M.2169 and the Recommendation ITU-R M. 1371-4, it is proposed to identify the channels 75 and 76 of the Appendix 18 for the purpose of improving the satellite detection of AIS Message 27. To do so, a primary allocation to the mobile satellite service (Earth-to-space) is proposed via a footnote in regards to the frequencies of channels 75 and 76 in Article 5. Additionally, modifying Note *n*) in the section “Notes referring to the Table” of Appendix 18 identifies the use of AIS for long-range detection for channels 75 and 76 and ensures the protection of these channels from harmful interference.

These revisions will provide spectrum for the implementation of the latest version of Recommendation ITU-R M.1371-4 for improved satellite detection, increasing reliability for greater probability of vessel tracking. The frequencies used are already allocated to the Maritime mobile service

A primary allocation in the maritime mobile service and a secondary allocation for aeronautical mobile service in the bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz are proposed. A secondary allocation to the mobile-satellite service (Earth-to-space) in the Table of Frequency Allocations (Article 5) is also proposed. Consequentially, Footnote No. 5.227A will be suppressed. This will provide additional protection for AIS frequencies which are used for search and rescue, safety of navigation, ship movement and tracking of vessels, as well as use by search and rescue aircraft authorized by Appendix 18 of the Radio Regulations and the latest version of Recommendation ITU-R M.1371-4.

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Article 5 of the Radio Regulations (REV.WRC-12)

Section IV – Table of Frequency Allocations

148-223 MHz

<u>Allocation to services</u>		
<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>
<u>156.7625-156.8375</u> MARITIME MOBILE (distress and calling) <u>5.111 5.226 5.MMM</u>		
<u>156.8375-161.9625</u> FIXED MOBILE except aeronautical mobile <u>5.226, 5.229</u>	<u>156.8375-161.9625</u> FIXED MOBILE <u>5.226, 5.230, 5.231, 5.232</u>	
<u>161.9625-161.9875</u> MARITIME MOBILE Mobile-satellite (Earth-to-space) Aeronautical mobile (OR) <u>5.NNN</u>		
<u>161.9875-162.0125</u> FIXED MOBILE except aeronautical mobile <u>5.226, 5.229</u>	<u>161.9875-162.0125</u> FIXED MOBILE <u>5.226,</u>	
<u>162.0125-162.0375</u> MARITIME MOBILE Mobile-satellite (Earth-to-space) Aeronautical mobile (OR) <u>5.229, 5.NNN</u>		
<u>162.0375-174</u> FIXED MOBILE except aeronautical mobile <u>5.226 5.229</u>	<u>162.0375-174</u> FIXED MOBILE <u>5.226 5.230 5.231 5.232</u>	

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Additional allocation: the bands 156.7625-156.7875 MHz and 156.8125-156.8375 MHz are also allocated to the mobile-satellite service (Earth-to-space) on a primary basis for the reception of automatic identification system (AIS) emissions, broadcasting long range AIS message (Message 27, see the most recent version of Recommendation ITU-R M.1371), from stations operating in the maritime-mobile service (see Appendix 18). (WRC-12)

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The use of the bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the mobile satellite service (Earth-to-space) and the aeronautical mobile (OR) service is limited to automatic identification system (AIS) emissions operating in accordance with Appendix 18.

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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 *q*) below. (WRC-07)

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, and also allows the simplex use of duplex channels. The channel numbering for single-frequency operation of duplex channels shall be in accordance with Recommendations ITU-R M.493 and 1084 (Latest versions). (WRC-12)

Reasons: Proposed changes to NOTE B will allow for more flexibility for simplex (single-channel) use of duplex channels.

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Channel designator	Notes	Transmitting frequencies (MHz)		Inter-ship	Port operations and ship movement		Public correspondence
		From ship stations	From coast stations		Single frequency	Two frequency	
60	<i>m), o)</i>	156.025	160.625		x	x	x
01	<i>m), o)</i>	156.050	160.650		x	x	x
61	<i>m), o)</i>	156.075	160.675		x	x	x
02	<i>m), o)</i>	156.100	160.700		x	x	x
62	<i>m), o)</i>	156.125	160.725		x	x	x
03	<i>m), o)</i>	156.150	160.750		x	x	x
63	<i>m), o)</i>	156.175	160.775		x	x	x
04	<i>m), o)</i>	156.200	160.800		x	x	x
64	<i>m), o)</i>	156.225	160.825		x	x	x

05	<i>m), o)</i>	156.250	160.850		x	x	x
65	<i>m), o)</i>	156.275	160.875		x	x	x
06	<i>f)</i>	156.300		x			
66	<i>m), o)</i>	156.325	160.925		x	x	x
07	<i>m), o)</i>	156.350	160.950		x	x	x
67	<i>h)</i>	156.375	156.375	x	x		
08		156.400		x			
68		156.425	156.425		x		
09	<i>i)</i>	156.450	156.450	x	x		
69		156.475	156.475	x	x		
10	<i>h), q)</i>	156.500	156.500	x	x		
70	<i>f), j)</i>	156.525	156.525	Digital selective calling for distress, safety and calling			
11	<i>q)</i>	156.550	156.550		x		
71		156.575	156.575		x		
12		156.600	156.600		x		
72	<i>i)</i>	156.625		x			
13	<i>k)</i>	156.650	156.650	x	x		
73	<i>h), i)</i>	156.675	156.675	x	x		
14		156.700	156.700		x		
74		156.725	156.725		x		
15	<i>g)</i>	156.750	156.750	x	x		
75	<i>n)</i>	156.775	156.775		x		

Channel designator	Notes	Transmitting frequencies (MHz)		Inter-ship	Port operations and ship movement		Public correspondence
		From ship stations	From coast stations		Single frequency	Two frequency	
16	<i>f)</i>	156.800	156.800	DISTRESS, SAFETY AND CALLING			
76	<i>n)</i>	156.825	156.825		x		
17	<i>g)</i>	156.850	156.850	x	x		
77		156.875		x			
18	<i>m)</i>	156.900	161.500		x	x	x
78	<i>m)</i>	156.925	161.525		x	x	x
19	<i>m)</i>	156.950	161.550		x	x	x
79	<i>m)</i>	156.975	161.575		x	x	x
20	<i>m)</i>	157.000	161.600		x	x	x
80	<i>m)</i>	157.025	161.625		x	x	x
21	<i>m)</i>	157.050	161.650		x	x	x
81	<i>m)</i>	157.075	161.675		x	x	x
22	<i>m)</i>	157.100	161.700		x	x	x
82	<i>m), o)</i>	157.125	161.725		x	x	x

23	<i>m), o)</i>	157.150	161.750		x	x	x
83	<i>m), o)</i>	157.175	161.775		x	x	x
24	<i>m), , s</i>	157.200	161.800		x	x	x
84	<i>m), , s</i>	157.225	161.825		x	x	x
25	<i>m), , s</i>	157.250	161.850		x	x	x
85	<i>m), , s</i>	157.275	161.875		x	x	x
26	<i>m), , s</i>	157.300	161.900		x	x	x
86	<i>m), , s</i>	157.325	161.925		x	x	x
27	<i>r)</i>	157.350	161.950			x	x
87		157.375	157.375		x		
28	<i>r)</i>	157.400	162.000			x	x
88		157.425	157.425		x		
AIS 1	<i>f), l), p)</i>	161.975	161.975				
AIS 2	<i>f), l), p)</i>	162.025	162.025				

Reasons: Proposed changes to the Table will allow for more flexibility for simplex (single-channel) use of duplex channels. Additional notes are added to identify channels for E-Navigation and protection of AIS 1 and AIS 2.

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Notes referring to the Table

General notes

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c) The channels of the present Appendix, with the exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may be used for direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.

Reasons: Proposed change reflects the need to protect AIS 1 and AIS 2 from adjacent band interference from channel 28.

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e) Administrations may apply 12.5 kHz channel interleaving on a non-interference basis to 25 kHz channels, in accordance with the most recent version of Recommendation ITU-R M.1084, provided:

- it shall not affect the 25 kHz channels of the present Appendix maritime mobile distress and safety, AIS, and E-Navigation data exchange frequencies, especially the channels 06,

13, 15, 16, 17, 70, 24, 25, 26, 84, 85, 86, AIS 1 and AIS 2, nor the technical characteristics set forth in Recommendation ITU-R M.489-2 for those channels;

- implementation of 12.5 kHz channel interleaving and consequential national requirements shall be subject to coordination with affected administrations. (WRC-07)

Reasons: Proposed changes to Note *e*) identify AIS and E-Navigation channels as additional channels requiring protection from channel interleaving.

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n) The use of these channels (75 and 76) should be restricted to navigation-related communications only and all precautions should be taken to avoid harmful interference to channel 16, e.g. by limiting the output power to 1 W or by means of geographical separation. These channels are also used for long range detection of AIS in accordance with recommendation ITU-R M.1371.

Reasons: Proposed change protects the channels intended to be used for long-range detection of AIS from harmful interference.

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r) When using these channels (27 and 28), all precautions should be taken to avoid harmful interference to AIS 1 and AIS 2. (WRC-12)

Reasons: Proposed change protects AIS 1 and AIS 2 from harmful interference.

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s) These channels are designated for the exchange of data for E-Navigation (operations of safety systems for ships and ports) in accordance with Recommendation ITU-R M.1842. (WRC-12)

Reasons: Proposed Note *s*) identifies channels for E-Navigation in Appendix 18.