

**Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz
allocated exclusively to the maritime mobile service (continued)**

Band (MHz)	4	6	8	12	16	18/19	22	25/26
Limits (kHz)	4 202.25	6 300.25	8 376.25	12 476.75	16 683.25	18 870	22 284.25	25 172.75
Frequencies (paired) assignable to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 bauds for FSK and 200 bauds for PSK <i>d) j)</i>			8 376.5 to 8 378.5 <i>5 f.</i> <i>0.5 kHz</i>					
Limits (kHz)	4 202.25	6 300.25	8 378.75	12 476.75	16 683.25	18 870	22 284.25	25 172.75
Frequencies assignable to ship stations for data transmission <i>d) p) -cc) ii)</i>								
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 517.25	16 693.25	18 892.75	22 351.75	25 192.75
Frequencies (paired) assignable to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 bauds for FSK and 200 bauds for PSK <i>d) j)</i>				12 517.5 to 12 522 <i>10 f.</i> <i>0.5 kHz</i>	16 693.5 to 16 696.5 <i>7 f.</i> <i>0.5 kHz</i>			
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 522.25	16 696.75	18 892.75	22 351.75	25 192.75
Frequencies assignable to ship stations for data transmission <i>d) p) -cc)</i>								
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 549.75	16 733.75	18 892.75	22 351.75	25 192.75
Frequencies assignable to ship stations for data transmission <i>m) p)</i>								
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 554.75	16 738.75	18 892.75	22 351.75	25 192.75
Frequencies assignable to ship stations for data transmission -cc) <i>d) p)</i>								
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 559.75	16 784.75	18 892.75	22 351.75	25 192.75

**Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz
allocated exclusively to the maritime mobile service (continued)**

Limits (kHz)	4 202.25	6 300.25	8 396.25	12 559.75	16 784.75	18 892.75	22 351.75	25 192.75
Frequencies (non paired) assignable to ship stations for data transmission systems <i>b) p) dd) m) ii)</i>								
Limits (kHz)	4 207.25	6 311.75	8 414.25	12 576.75	16 804.25	18 898.25	22 374.25	25 208.25
Frequencies assignable to ship stations for digital selective calling <i>k) l)</i>	4 207.5 to 4 209 <i>4 f.</i> <i>0.5 kHz</i>	6 312 to 6 313.5 <i>4 f.</i> <i>0.5 kHz</i>	8 414.5 to 8 416 <i>4 f.</i> <i>0.5 kHz</i>	12 577 to 12 578.5 <i>4 f.</i> <i>0.5 kHz</i>	16 804.5 to 16 806 <i>4 f.</i> <i>0.5 kHz</i>	18 898.5 to 18 899.5 <i>3 f.</i> <i>0.5 kHz</i>	22 374.5 to 22 375.5 <i>3 f.</i> <i>0.5 kHz</i>	25 208.5 to 25 209.5 <i>3 f.</i> <i>0.5 kHz</i>
Limits (kHz)	4 209.25	6 313.75	8 416.25	12 578.75	16 806.25	18 899.75	22 375.75	25 210
Limits (kHz)	4 209.25	6 313.75	8 416.25	12 578.75	16 806.25	19 680.25	22 375.75	26 100.25
Frequencies assignable to coast stations for data transmission <i>n) o) p) cc)</i>								
Limits (kHz)	4 213.75	6 317.75	8 416.25	12 619.75	16 816.75	19 703.25	22 443.75	26 120.75
Frequencies (paired) assignable to coast stations for NBDP and data transmission systems, at speeds not exceeding 100 Bd for FSK and 200 Bd for PSK <i>d)</i>	4 214 to 4 215.5 <i>4 f.</i> <i>0.5 kHz</i>	6 318 to 6 319.5 <i>4 f.</i> <i>0.5 kHz</i>	8 416.5 to 8 418.5 <i>5 f.</i> <i>0.5 kHz</i>	12 620 to 12 624 <i>9 f.</i> <i>0.5 kHz</i>	16 817 to 16 819.5 <i>6 f.</i> <i>0.5 kHz</i>			
Limits (kHz)	4 215.75	6 319.75	8 418.75	12 624.25	16 819.75	19 703.25	22 443.75	26 120.75
Frequencies assignable to coast stations for data transmission <i>d) p) cc) ii)</i>								
Limits (kHz)	4 219.25	6 330.75	8 436.25	12 656.75	16 902.75	19 703.25	22 443.75	26 120.75
Frequencies assignable to coast stations for digital selective calling <i>l)</i>	4 219.5 to 4 220.5 <i>3 f.</i> <i>0.5 kHz</i>	6 331 to 6 332 <i>3 f.</i> <i>0.5 kHz</i>	8 436.5 to 8 437.5 <i>3 f.</i> <i>0.5 kHz</i>	12 657 to 12 658 <i>3 f.</i> <i>0.5 kHz</i>	16 903 to 16 904 <i>3 f.</i> <i>0.5 kHz</i>	19 703.5 to 19 704.5 <i>3 f.</i> <i>0.5 kHz</i>	22 444 to 22 445 <i>3 f.</i> <i>0.5 kHz</i>	26 121 to 26 122 <i>3 f.</i> <i>0.5 kHz</i>
Limits (kHz)	4 221	6 332.5	8 438	12 658.5	16 904.5	19 705	22 445.5	26 122.5

**Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz
allocated exclusively to the maritime mobile service (end)**

Band (MHz)	4	6	8	12	16	18/19	22	25/26
Limits (kHz)	4 221	6 332.5	8 438	12 658.5	16 904.5	19 705	22 445.5	26 122.5
Frequencies assignable to coast stations for wide-band, facsimile, special and data transmission systems and direct-printing telegraphy systems <i>m) p) ee) ff)</i>								
Limits (kHz)	4 351	6 501	8 707	13 077	17 242	19 755	22 696	26 145
Frequencies assignable to coast stations for telephony, duplex operation <i>a) hh)</i>	4 352.4 to 4 436.4 <i>29 f.</i> 3 kHz	6 502.4 to 6 523.4 <i>8 f.</i> 3 kHz	8 708.4 to 8 813.4 <i>36 f.</i> 3 kHz	13 078.4 to 13 198.4 <i>41 f.</i> 3 kHz	17 243.4 to 17 408.4 <i>56 f.</i> 3 kHz	19 756.4 to 19 798.4 <i>15 f.</i> 3 kHz	22 697.4 to 22 853.4 <i>53 f.</i> 3 kHz	26 146.4 to 26 173.4 <i>10 f.</i> 3 kHz
Limits (kHz)	4 438	6 525	8 815	13 200	17 410	19 800	22 855	26 175

NOC USA/AI 1.9/2

Note *a)*

Reasons: Maintains the frequency bands dedicated for the radiotelephony simplex operation.

SUP USA/AI 1.9/3

Note *b)*

Reasons: After the entry into force date of 1 January 2015, Section III, Part B this note will no longer be required.

NOC USA/AI 1.9/4

Note *c)* and *d)*.

Reasons: Maintains frequencies for transmission of oceanographic data and paired frequencies for NBDP.

SUP USA/AI 1.9/5

Note *e)*

Reasons: Maintains frequencies for ship stations using A1A Morse telegraphy not travelling faster than 40 Bd

SUP USA/AI 1.9/6

Note *f*)

Reasons: Part B, Section V is proposed for suppression.

SUP USA/AI 1.9/7

Note *g*)

Reasons: Part B, Section IV is proposed for suppression.

NOC USA/AI 1.9/8

Note *i*) to *l*)

Reasons: Maintains paired frequencies for digital selective calling.

MOD USA/AI 1.9/9

Note *m*) Frequencies from these frequency bands may also be used for A1A or A1B Morse telegraphy subject to not claiming protection from other stations, in the maritime mobile service .

Reasons: Assigns additional frequencies for A1A or A1B Morse telegraphy subject to protection of the maritime mobile service using new digital technologies.

NOC USA/AI 1.9/10

Note *n*) and *o*)

Reasons: No change is proposed to frequencies used for maritime safety information (MSI) and Navigational Telex (NAVTEX).

[REDACTED]

[REDACTED]

Reasons: Implements the channels for new digital technologies in the frequency bands designated for wide-band telegraphy, and facsimile without transition a period.

[REDACTED]

[REDACTED]

[REDACTED]

ADD USA/AI 1.9/14

Note *cc*) After 1 January 2015, the administrations who make assignments to stations using **digitally modulated emissions are encouraged to effect coordination with potentially affected administrations.**

Reasons: Removes the use of single channel NBDP after 1 January 2015 to allow the introduction of new HF data exchange technologies into the maritime mobile service.

ADD USA/AI 1.9/15

Note *dd*) These bands may be used by narrow-band direct printing applications by the administrations, subject to not claiming protection from other stations

Reasons: Removes the use of single channel NBDP after 1 January 2015 to allow the introduction of new HF data exchange technologies into the maritime mobile service.

ADD USA/AI 1.9/16

Note *ee*) Frequencies from these bands may be used for wide-band telegraphy, facsimile, A1A Morse telegraphy and special data transmission on condition that harmful interference is not caused to and protection is not claimed from stations, in the maritime mobile .

Reasons: Removes the use of single channel NBDP after 1 January 2015 to allow the introduction of new HF data exchange technologies into the maritime mobile service.

ADD USA/AI 1.9/17

Note *ff*) The bands 4 345 – 4 351 kHz, 6 495 – 6 501 kHz, 8 701 – 8 707 kHz may be used for simplex (single-sideband) telephone operation (regularly spaced by 3 kHz), in accordance with provision No. **52.177**, subject to not claiming protection from other stations in the maritime mobile service .

Reasons: Removes the use of single channel NBDP after 1 January 2015 to allow the introduction of new HF data exchange technologies into the maritime mobile service.

ADD USA/AI 1.9/18

Note *gg*) When assigning frequencies on the bands 4 202.25 – 4 207.25 kHz, 6 300.25 – 6 311.75 kHz, 8 396.25 – 8 414.25 kHz, 12 559.75 – 12 576.75 kHz and 16 784.75 – 16 804.25 kHz, administrations shall take all necessary precautions to not cause interference on the DSC distress frequencies 4 207.5 kHz, 6 312 kHz, 8 414.5 kHz, 12.577 kHz and 16 804.5 kHz.

Reasons: Provides protection for DSC distress frequencies.

ADD USA/AI 1.9/19

Note *hh*) The bands 4 066.4 – 4 150.4 kHz, 4 352.4 – 4 436.4 kHz, 6 201.4 – 6 231.4 kHz, 6 502.4 – 6 523.4 kHz, 8 196.4 – 8 298.4 kHz, 8 708.4 – 8 813.4 kHz, 12 231.4 – 12 366.4 kHz, 13 078.4 – 13 198.4 kHz, 16 361.4 – 16 574.4 kHz, 17 243.4 – 17 408.4 kHz, 18 781.4 – 18 844.4 kHz, 19 756.4 – 19 798.4 kHz, 22 001.4 – 22 178.4 kHz, 22 697.4 – 22 853.4 kHz, 25 071.4 – 25 119.4 kHz, 26 146.4 – 26 173.4 kHz may be used, in accordance with Appendix 25 allotment plan, for digitally modulated emissions on condition that harmful interference is not caused to and protection is not claimed from other stations in the maritime mobile service using radiotelephony operations. The digitally modulated emissions may be used provided that their occupied bandwidth does not exceed 2 800 Hz, it is situated wholly within one frequency channel and the peak envelope power of coast stations does not exceed 10 kW and the peak envelope power of ship stations does not exceed 1.5 kW for per channel.

Reasons: Allows additional use for digitally modulated emission in the RR Appendix 25 bands.

ADD USA/AI 1.9/20

Note *ii*) Peak envelope power for data transmission systems in these channels must not exceed 1.5kW for ships and 10kW for coast stations and their occupied bandwidth must not exceed 2800Hz.

Reasons: Allows continued NBDP operation and a degree of protection from interference.

PART B – Channelling arrangements (WRC-12)

Section II – Narrow-band direct-printing telegraphy (paired frequencies)

MOD USA/AI 1.9/20

TABLE 17a

Table of frequencies for two-frequency operation by coast stations (kHz)

Reasons: Providing a table number will help distinguish this table from new the table (17b) that comes into force after January 1, 2015.

NOC USA/AI 1.9/21

Channel	4 MHz band ¹	6 MHz band ³	8 MHz band ⁴
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No.	Transmit	Receive	Transmit	Receive	Transmit	Receive
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Reasons: There are no proposed changes to the table (17a).

ADD USA/AI 1.9/22

TABLE 17b (WRC-12)
Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	4 MHz band ¹		6 MHz band		8 MHz band	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
1					8 376.5 ²	8 376.5 ²
2					8 417	8 377
3					8 417.5	8 377.5
4					8 418	8 378
5					8 418.5	8 378.5
6						
7						
8	4 214	4 176	6 318	6 266.5		
9	4 214.5	4 176.5	6 318.5	6 267		
10	4 215	4 177	6 319	6 267.5		
11	4 177.5 ²	4 177.5 ²	6 268 ²	6 268 ²		
12	4 215.5	4 178	6 319.5	6 268.5		
13						

¹ Ship stations may use the coast station receiving frequencies for transmitting A1A or A1B Morse telegraphy (working), with the exception of channel No. 11 (see Appendix 15).

² For the conditions of use of this frequency, see Article 31.

TABLE 17b (end)

Channel No.	12 MHz band		16 MHz band	
	Transmit	Receive	Transmit	Receive
21			16 817	16 693.5
22			16 817.5	16 694
23			16 818	16 694.5
24			16 695 ²	16 695 ²
25			16 818.5	16 695.5
26			16 819	16 696
27			16 819.5	16 696.5
82	12 620	12 517.5		
83	12 620.5	12 518		
84	12 621	12 518.5		
85	12 621.5	12 519		
86	12 622	12 519.5		
87	12 520 ²	12 520 ²		
88	12 622.5	12 520.5		
89	12 623	12 521		
90	12 623.5	12 521.5		
91	12 624	12 522		

Reasons: New Table 17b allows for introduction of new HF data exchange technologies into the maritime mobile service. Numbering for the other table (17a) in Section II Part B helps distinguish between the two tables in Appendix 17.

SUP USA/AI 1.9/23

Section III – Narrow-band direct-printing telegraphy (non-paired frequencies)

Reasons: After the entry into force date of 1 January 2015, this section will no longer be needed and will be suppressed. Article 59 references the new Resolution XYZ.NBDP, which abrogates this suppression.

SUP USA/AI 1.9/24

Section IV – Morse telegraphy (calling)

Reasons: Removes the use of Morse telegraphy to allow the introduction of new HF data exchange technologies into the maritime mobile service.

SUP USA/AI 1.9/25

Section V – Morse telegraphy (working)

Reasons: Removes the use of Morse telegraphy to allow the introduction of new HF data exchange technologies into the maritime mobile service.

ADD USA/AI 1.9/26

RESOLUTION XYZ.NBDP (WRC-12)

Application and abrogation of certain provisions of the Radio Regulations as revised by WRC-12

The World Radiocommunication Conference (Geneva, 2012),

considering

- a) that this conference has adopted a partial revision to the Radio Regulations (RR) in accordance with its terms of reference which will enter into force on 1 January 2014;
- b) that some of the provisions, as amended by this conference, need to apply as of a later date;
- c) that as a general rule, new and revised Resolutions and Recommendations enter into force at the time of signing of the Final Acts of a conference;
- d) that as a general rule, Resolutions and Recommendations which a WRC has decided to suppress are abrogated at the time of the signing of the Final Acts of the conference,

resolves

- 1 that, as of 1 January 2015, the following provisions of the RR, which are suppressed by this Conference, shall be abrogated: Table 17a of Appendix 17, Section III of Part B of Appendix 17;
- 2 that, as of 1 January 2015, the following provisions, as established by this Conference, shall enter into force: Table 17b of Appendix 17;

Reasons: The Resolution XYZ.NBDP allows for provisions in Appendix 17 to enter into force on the agreed date of 1 January, 2015.

MOD USA/AI 1.9/27

ARTICLE 59

Entry into force and provisional application of the Radio Regulations (WRC-2000)

- 59.XX** The other provisions of these Regulations, as revised by WRC-12, shall enter into force on 1 January 2014, with the following exceptions: (WRC-12)
- 59.YY** – the revised provisions for which other effective dates of application are stipulated in Resolutions:
XYZ.NBDP (WRC-12)

Reasons: This reference to Resolution XYZ.NBDP allows for the transition date for the entry into force of provisions in Appendix 17 and suppress other provisions.

| **SUP** USA/AI 1.9/28

RESOLUTION 351 (Rev.WRC-07)

Review of the frequency and channel arrangements in the HF bands allocated to the maritime mobile service contained in Appendix 17 with a view to improving efficiency through the use of new digital technology by the maritime mobile service

Reasons: All of the work related to this Resolution is complete.

WAC Informal Working Group (IWG)-1

UNITED STATES OF AMERICA

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.15: *to consider possible allocations in the range 3-50 MHz to the radiolocation service for oceanographic radar applications, taking into account the results of ITUR studies, in accordance with Resolution 612 (WRC07);*

Resolution 612 (WRC07): *Use of the radiolocation service between 3 and 50 MHz to support high-frequency oceanographic radar operations*

Background Information: WRC-12 Agenda item 1.15 calls for the consideration of the creation of radiolocation allocations in the 3 to 50 MHz range. These allocations will be used for the operation of oceanographic radars that map ocean surface currents, monitor the sea state and wave heights, and track large objects. These radars will have an operational range which will not be greater than 300 km.

Oceanographic radars have been operating in the 3 to 50 MHz range since the 1970s under Radio Regulations No. 4.4 in the United States, Germany, France, Australia, Korea, India, Japan, China, and the United Kingdom. Experimental use has allowed development of radar technology to identify suitable spectrum in terms of both compatibility with other users and effectiveness for ocean measurements. The need for data to mitigate the effects of disasters, including tsunamis, to understand climate change, and to ensure safe maritime travel has led to the consideration of operational use of oceanographic radar networks on a global basis. Increased reliance on the data from these systems for maritime safety, search and rescue, oil spill disaster response, oceanographic, climatological, meteorological research has driven the need to improve the regulatory status of the spectrum which is used by oceanographic radars while taking into account the protection of existing allocated services.

Summary of technical and operational studies and relevant ITU-R Recommendations:

Existing relevant ITU-R Recommendations and Reports: :

Recommendation ITU-R P.368 Ground-wave curves for frequencies between 10 kHz and 30 MHz
Recommendation ITU-R P.372 Radio noise

Recommendation ITU-R P.533 Method for the prediction of the performance of HF circuits

Recommendation ITU-R P.1546 Method for point-to-area predictions for terrestrial services in the frequency range 30 MHz to 3 000 MHz

New relevant ITU-R Recommendations and Reports:

Draft new Recommendation ITU-R M.1874

Preliminary Draft New Report ITUR M.[RLS 3-50 MHz Sharing].

Multiple sub-bands are required within the range of 3 to 50 MHz for providing long range data as well as high resolution data. Manufacturers and researchers have settled on frequencies for experimental licenses near 4.5 MHz \pm 1 MHz, 8.5 MHz \pm 1 MHz, 13 MHz \pm 1 MHz, 26 MHz \pm 4 MHz and 43 MHz \pm 4 MHz to meet scientific and operational requirements. This does not imply that 2 to 6 MHz are required in each range; actual spectrum requirements are much lower, as discussed below.

Sharing studies have focused on compatibility in the bands used by fixed service and/or land mobile service only for the following reasons:

- Sharing with Amateur, Broadcasting Services, and Radio Astronomy seems to be difficult due to their protection criteria requirements.
- Sharing with Maritime Mobile, Aeronautical Mobile (R) and Standard Time and Frequency Services should be avoided due to the safety aspects of their operations.

The bands, considered most suitable fall in the Fixed and Land Mobile bands. Based on prior experience, Table 1 below lists bands that have been utilized most frequently in the past, and are therefore proposed for primary radiolocation licensing.

Table 1

Band	Operational Needs Proposed for Oceanographic Radars (resolution)	Most Suitable Band	Services
4.5 \pm 1 MHz	2 * 25 + 10 kHz [60 kHz total] (25 kHz for 6 km)	4 440 – 4 500 kHz	FIXED, MOBILE exc. AM(R)
13 \pm 1 MHz	1 * 100 + 10 kHz [2*110 kHz total] (100 kHz for 1.5 km)	13 410-13 530 kHz 13 870-13 990 kHz	FIXED, Mobile exc AM(R) FIXED, Mobile exc AM(R)
26 \pm 4 MHz	2 * 200 + 30 kHz [430 kHz total] (200 kHz for 750 m)	25 330-25 550 kHz 26 200-26 420 kHz	FIXED, MOBILE exc AM
43 \pm 4 MHz	2 * 375 + 50 kHz [800 kHz total] (375 kHz for 400 m)	41 600-42 400 kHz	FIXED, MOBILE

An oceanographic radar installation may use one or more of the frequency bands listed in Table 1, and it is possible to share the same bandwidth by oceanographic radar systems.

Analysis of the Results of Sharing Studies

PDN Report M.[RLS 3-50 MHz Sharing] contains sharing studies between oceanographic radiolocation systems and the fixed service and the land mobile service in the bands listed in Table 1. Refer to that Report for results.

HF Oceanographic Radars for 40 Years Operating Under Experimental Licenses

Starting with one or two HF radars in 1970 that first measured current and waves, and increasing in number to over 300 worldwide today (most operating continuously in real time), this evolving experience under experimental licenses has produced much information about impacts regarding interference to others. All of these radars have radiated on fixed frequencies. In the U.S. alone, there are approximately 25 approved HF radar frequencies licensed for experimental use. The signals employ bandwidths from 18 kHz to 500 kHz, depending on the band of operation (from 4 to 45 MHz). At frequencies above 10 MHz, there have never been any complaints of interference to other users over a 30-year period, except when an operator set a wrong frequency by mistake. At lower frequencies, there have been complaints from one or two primary license holders who heard the signals in a skywave mode; as a remedy, the HF radar ceased operating on that frequency. In those cases, the licensing agency assigned the experimental licenses unaware of another active primary license holder on that channel. At two or three of the lower HF frequencies, operation has continued for years with no interference complaints.

Under a future proposed primary licensing arrangement, the number of these 25 HF frequencies could be reduced (rather than increased), even as the number of radars grows, so that there might be two channels per each of the four/five bands. Each channel, with adequate bandwidth for the signal's required range resolution, could accommodate many HF radars, using newly developed and proven modulation synchronization and sharing methods.

Four decades' experience has also shown that distances at which the HF radar interference is received are always significantly less than those predicted in modeling studies. This is attributed primarily to two factors:

1. External noise seen in practice is always higher than that predicted from surveys, such as CCIR Report 322-3. Often reality is 25 dB higher than predictions, and always at least 5 dB higher. This means that the noise into a receiver will mask any interfering signal below that level.

2. The assumption of flat ground behind the HF radar antenna used in studies is never the situation seen in practice. Trees and other foliage, terrain and hills higher than the coastal radar's elevation, and buildings attenuate the potentially interfering signal significantly, beyond that of the idealized flat or smooth spherical earth models that have formed the basis of sharing studies.

Proposal:

Article 5
Section IV – Table of Frequency Allocations
(See No. 2.1)

MOD USA/AI 1.15/1

3 230 – 5 003 kHz

Allocation to services		
Region 1	Region 2	Region 3
<u>4 438-4 6504 400</u> FIXED MOBILE except aeronautical mobile (R)		<u>4 438-4 6504 400</u> FIXED MOBILE except aeronautical mobile
<u>4 440-4 500</u> FIXED MOBILE except aeronautical mobile (R) <u>RADIOLOCATION 5.XXX</u>		<u>4 440-4 500</u> FIXED MOBILE except aeronautical mobile <u>RADIOLOCATION 5.XXX</u>
<u>4 4384 500-4 650</u> FIXED MOBILE except aeronautical mobile (R)		<u>4 4384 500-4 650</u> FIXED MOBILE except aeronautical mobile

ADD USA/AI 1.15/2

5.XXX Stations in the radiolocation service shall not claim protection from existing stations in other primary services and RESOLUTION 612 (REV. WRC-12) shall apply.

Reason: Allocations to the Radiolocation (oceanographic radars) service are proposed because previous experience under experimental licenses (No. 4.4) has demonstrated compatibility with other services.

Allocation to services		
Region 1	Region 2	Region 3
13 360-13 410	FIXED RADIO ASTRONOMY 5.149	
13 410-13 570 <u>13 530</u>	FIXED Mobile except aeronautical mobile (R), 5.150 RADIOLOCATION 5.XXX	
<u>13 530</u> -13 570	FIXED Mobile except aeronautical mobile (R) 5.150	
13 570-13 600	BROADCASTING 5.134 5.151	
13 600-13 800	BROADCASTING	
13 800-13 870	BROADCASTING 5.134 5.151	
13 870-14 000 <u>13 990</u>	FIXED Mobile except aeronautical mobile (R) RADIOLOCATION 5.XXX	
<u>13 990</u> -14 000	FIXED Mobile except aeronautical mobile (R)	

23 350-27 500 kHz

Allocation to services		
Region 1	Region 2	Region 3
<u>25 210-25 550</u> <u>25 330</u>	FIXED MOBILE except aeronautical mobile	
<u>25 330-25 550</u>	FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.XXX	
<u>25 550-25 670</u>	RADIO ASTRONOMY 5.149	
<u>25 670-26 100</u>	BROADCASTING	
<u>26 100-26 175</u>	MARITIME MOBILE 5.132	
<u>26 175-27 500</u> <u>26 200</u>	FIXED MOBILE except aeronautical mobile 5.150	
<u>26 200-26 420</u>	FIXED MOBILE except aeronautical mobile, 5.150 RADIOLOCATION 5.XXX	
<u>26 420-27 500</u>	FIXED MOBILE except aeronautical mobile 5.150	

Allocation to services		
Region 1	Region 2	Region 3
<u>41.015-4441.6</u>	FIXED MOBILE 5.160 5.161	
<u>41.6-42.4</u>	FIXED MOBILE 5.160 5.161 RADIOLOCATION 5.XXX	
<u>42.4-44</u>	FIXED MOBILE 5.160 5.161	

RESOLUTION 612 (REV. WRC-07-12)

Use of the radiolocation service between 3 and 50 MHz to support high-frequency oceanographic radar operations

The World Radiocommunication Conference (Geneva, ~~2007~~2012),

considering

- a) that there is increasing interest, on a global basis, in the operation of ~~high-frequency~~ oceanographic radars for measurement of coastal sea surface conditions to support environmental, oceanographic, meteorological, climatological, maritime and disaster mitigation operations;
- b) that ~~high-frequency~~ oceanographic radars are also known in parts of the world as HF ocean radars, HF wave height sensing radars or HF surface wave radars;
- c) that ~~high-frequency~~ oceanographic radars operate through the use of ground-wave propagation;
- d) that ~~high-frequency~~ oceanographic radar technology has applications in global maritime domain awareness by allowing the long-range sensing of surface vessels, which provides a benefit to the global safety and security of shipping and ports;
- e) that operation of ~~high-frequency~~ oceanographic radars provides benefits to society through environmental protection, disaster preparedness, public health protection, improved meteorological operations, increased coastal and maritime safety and enhancement of national economies;
- f) that ~~high-frequency~~ oceanographic radars have been operated on an experimental basis around the world over several decades, providing ~~an~~ understanding of spectrum needs and spectrum sharing considerations, as well as an understanding of the benefits these systems provide;
- g) that ~~between 3 and 50 MHz, no radiolocation allocations exist;~~
- h) ~~that~~ experience, performance, and data requirements dictate the regions of spectrum that can be used by ~~high-frequency~~ oceanographic radar systems for ocean observations,

recognizing

- a) that high-frequency-oceanographic radars have been operated on an experimental basis for more than 30 years since the 1970s by several administrations;
- b) that developers of the experimental systems have implemented techniques to make the most efficient use of the spectrum and mitigate interference to other radio services;
- e) that the objective of Question ITU-R 240/8 is to study the most appropriate frequency bands for operation of high-frequency-oceanographic radars considering both radar system requirements and the protection of existing services;
- d) that high-frequency-oceanographic radars operate with peak power levels on the order of 50 W;
- c) that for the purpose of protecting existing services from interference, oceanographic radars shall not exceed a power flux-density at interfering points with an I/N ratio of -6 dB when referred to Recommendation ITU-R P.372-9 radio noise for quiet rural and rural;
- d) that for the purpose of protecting existing services from interference, oceanographic radars' impact via ground-wave propagation can be checked by Report ITU-R M.[RLS 3-50MHz SHARING] based on Recommendation ITU-R P.368-9 and P.1546-3,

resolves

- 1 to invite ITU-R to identify high-frequency-oceanographic radar system applications between 3 and 50 MHz, including bandwidth requirements, appropriate portions of this band for these applications, and other characteristics necessary to conduct sharing studies;
 - 2 to invite ITU-R to conduct sharing analyses between the radiolocation service applications identified under *resolves* 1 and incumbent services in the bands identified to be suitable for the operation of high-frequency-oceanographic radar systems;
 - 3 that, if compatibility with existing services is confirmed under *resolves* 2, to recommend that WRC-11 consider allocations to the radiolocation service in several suitable bands between 3 and 50 MHz, as determined in the ITU-R studies, each band not exceeding 600 kHz, for the operation of oceanographic radars;
- invites

1 that oceanographic radars shall be notified to the Bureau in accordance with No 11.2 of the Radio Regulations and that each station requires transmission of the station identification (call sign);

2 that oceanographic radars shall not operate with a peak EIRP of more than 25 dBW;

3 that oceanographic radars shall operate at the distances from the international borders as specified in the Table 1 below:

Table 1: Distances from International Borders for Placement of Oceanographic Radars

<u>Frequency band</u>	<u>Land path</u>	<u>Sea path or mixed</u>
<u>4 – 16 MHz</u>	<u>120 km</u>	<u>300 km</u>
<u>22 – 29 MHz</u>	<u>100 km</u>	<u>160 km</u>
<u>40 – 50 MHz</u>	<u>60 km</u>	<u>110 km</u>

invites ITU-R

~~to complete the necessary studies, as a matter of urgency, taking into account the present use of the allocated band, with a view to presenting, at the appropriate time, the technical information likely to be required as a basis for the work of WRC-11,~~

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization (IMO), World Meteorological Organization (WMO) and other international and regional organizations concerned.

Reason: The Resolution was revised to reflect completion of ITU-R studies and to establish regulatory reference for the operation of the oceanographic radar between 3 and 50 MHz.

WAC Informal Working Group (IWG)-1

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 8.2: *to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution 806 (WRC 07).*

Introduction

The aerospace industry is developing the future generation of commercial aircraft to provide airlines and the flying public more cost-efficient, safe, and reliable aircraft. One important way of accomplishing these aims is to reduce aircraft weight while providing multiple and redundant methods to transmit information on an aircraft. Wireless technologies can be employed to accomplish these goals while also providing environmental benefits and cost savings to manufacturers and operators.

Installed Wireless Avionics Intra-Communications (WAIC) systems are one way to derive these benefits. WAIC systems consist of radiocommunications between two or more transmitters and receivers on a single aircraft. Both the transmitter and receiver will be integrated with or installed on the aircraft. In all cases, communication is part of a closed, exclusive network required for aircraft operation. WAIC systems will not provide air-to-ground or air-to-air communications, and will only be used for safety-related applications.

ITU-R Working Party 5B has developed a Draft New Report (ITU-R M.[WAIC], Document SG05/212) that provides findings on the technical characteristics and operational requirements of WAIC systems for a single aircraft.

Because WAIC systems may impact the safety and regularity of flight of an aircraft, the International Civil Aviation Organization (ICAO) has indicated that WAIC systems should operate in a safety service allocation, which could include the Aeronautical Mobile (Route) Service or another service with similar regulatory treatment.

Because of the ICAO recommendation and anticipated WAIC bandwidth requirements, the United States believes that current AM(R)S spectrum allocations may not be sufficient to permit the introduction of WAIC systems. Accordingly, a WRC-15 agenda item is sought to conduct studies and take appropriate regulatory action to accommodate WAIC systems.

Therefore, the United States is proposing a new item for the preliminary agenda for the next World Radiocommunication Conference together with a draft resolution as shown in the attachment.

Attachment: 1

ATTACHMENT

ADD USA/5BXX/1

RESOLUTION 806 (WRC-07)

Preliminary agenda for the 2015 World Radiocommunication Conference

2.WAIC to consider spectrum requirements and possible regulatory actions, including allocations, to support wireless avionics intra-communications (WAIC) systems, based on ITU-R studies in accordance with Resolution [WAIC-X] (WRC-12);

Reasons: Agenda item 8.2. WAIC is submitted as an agenda item for WRC-15 to enable the appropriate studies on the spectrum requirements and regulatory actions for wireless avionics intra-communications (WAIC) systems.

ADD USA/XX/2

RESOLUTION [WAIC-X] (WRC-12)

Consideration of regulatory actions, including allocations, for Wireless Avionics Intra-Communications (WAIC)

The World Radiocommunication Conference (Geneva, 2012),

considering

- a)* that the future generation of commercial aircraft is being designed to be more cost-efficient, safe, and reliable as well as environmentally friendly;
- b)* that WAIC systems are restricted to radiocommunications between two or more points integrated into or installed on a single aircraft;
- c)* that WAIC systems will be operated onboard aircraft on the ground and during all phases of flight;
- d)* that because WAIC systems may impact the safety and regularity of flight of an aircraft, such systems may need to operate in spectrum allocated for aeronautical mobile (route) services;
- e)* the potential bandwidth requirements of WAIC systems, there is a possible need for additional aeronautical mobile (route) service spectrum to support the implementation of WAIC systems;
- f)* that in identifying any spectrum for use by WAIC systems, there is a need to protect and not unduly constrain existing services,

recognizing

- a) that WAIC systems are being developed to operate safely and efficiently in one or more non-contiguous radio frequency bands, with emphasis on those currently allocated to the aeronautical mobile service and aeronautical radionavigation service;
- b) that WAIC systems operating inside an aircraft will obtain the benefits of fuselage attenuation and other aircraft surface attenuation in order to facilitate sharing with other services;
- c) that studies will be required to provide a basis for considering regulatory changes, including additional allocations, designed to accommodate justified spectrum requirements of WAIC systems consistent with the protection of incumbent services,

resolves

that WRC-15 consider, based on the results of ITU-R studies, spectrum requirements and possible regulatory provisions to support the implementation of WAIC systems, including the possibility of specific allocations, without placing undue constraints on existing services in the considered bands.

invites ITU-R

- 1 to conduct in time for WRC-15 the necessary studies to determine the spectrum requirements and regulatory actions needed to support WAIC systems,
- 2 in conducting the studies in *invites 1*, to first consider spectrum within existing aeronautical mobile service and aeronautical radionavigation service allocations
- 3 in conducting the studies referred to in *invites 1* and *invites 2*, to include sharing and compatibility studies with services already having allocations in potential frequency bands identified in the *resolves*,

further invites

all members of the Radiocommunication Sector and the International Civil Aviation Organization (ICAO) to contribute to these studies.

Reasons: This resolution details the scope and required studies related to future spectrum requirements of wireless avionics intra-communications systems. This resolution will enable the required analysis to determine the spectrum requirements and potential frequency bands to take place in the appropriate ITU-R Study Group(s).

Terrestrial Services

United States of America

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

WRC-12 Agenda Item: 1.8 *to consider the progress of ITU-R studies concerning the technical and regulatory issues relative to the fixed service in the bands between 71 GHz and 238 GHz, taking into account Resolutions 731 (WRC-2000) and 732 (WRC-2000);*

Resolution 731 (WRC-2000): *Consideration by a future competent world radiocommunication conference of issues dealing with sharing and adjacent-band compatibility between passive and active services above 71 GHz*

Resolution 732 (WRC-2000): *Consideration by a future competent world radiocommunication conference of issues dealing with sharing between active services above 71 GHz*

Background information:

WRC-2000 adopted Resolutions 731 and 732 as part of the conference decisions on the allocation of frequency bands above 71 GHz to the Earth exploration-satellite (passive) and radio astronomy services resulting in an overall rearrangement of the allocation tables in Article 5 of the Radio Regulations. These resolutions became necessary because the ITU-R was not able to fully evaluate for the active services (e.g., fixed, mobile, radiolocation, etc.), the new arrangement of their allocations vis-à-vis the passive allocations or each other. Therefore, the conference decided to adopt these two resolutions providing for further study and possible action in the future when active services technology and emerging requirements become better known. Since that time, millimeter wave spectrum above 71 GHz has become the subject of increasing interest for commercial use due to its unique propagation characteristics and the wide bandwidth available for carrying telecommunications traffic. New technologies are now emerging that offer the possibility of using these higher frequency bands for fixed wireless applications, taking advantage of the wide bandwidths available to support applications such as extremely high speed data transmission (e.g., data rates in the 1 to 10 Gbps range) for short distance (e.g., < 1-2 km). Several administrations have made or are making provisions for such wideband terrestrial fixed wireless applications. In particular, in the United States, the Fixed Service has operational links in the frequency bands 71-76 GHz, 81-86 GHz, 92-94 GHz and 94.1-95 GHz.

In a somewhat unique set of circumstances, WRC-07 did not adopt a Resolution to define this agenda item. Therefore, the definition and scope of the agenda item is unclear. Studies of out-of-band aggregate interference from FS into EESS systems in the band 86-92 GHz have been carried out in ETSI and the results of these studies have been reported to the ITU-R. The results of these studies are critically dependent on the assumed characteristics of the FS systems and their deployment. The assumed characteristics may not be representative of the current or the future deployment in many administrations. The CPM text proposes two methods for satisfying agenda item 1.8.

Method A consists of no change to the Radio Regulations at this time but with two approaches (Approach A1 – NOC Resolutions 731 and 732 (WRC-2000); Approach A2 – SUP Resolutions 731 and 732 (WRC-2000) and develop new Resolutions as appropriate in the future) to allow continuation of technical and operational considerations related to FS between 71-238 GHz to be addressed in ITU-R