

The Honorable Philip L. Verveer  
Coordinator  
International Communications and Information Policy  
Department of State  
Washington, DC 20520

Dear Ambassador Verveer:

The National Telecommunications and Information Administration of the United States Department of Commerce and the Federal Communications Commission transmit to you the enclosed third set of draft U.S. proposals for the upcoming World Radiocommunication Conference 2012 (WRC-12). We respectfully request that you send these proposals forward to the International Telecommunication Union.

The results of the WRC-12 will have significant implications for the U.S. Government, as well as for U.S. industry and consumers that use radiocommunications. We are pleased to provide you with the attached reconciled proposals covering many of the issues to be addressed at WRC-12.

With your assistance, we will continue our efforts to resolve any outstanding WRC-12 issues. We look forward to working with you to ensure a successful conference.

  
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Enclosure

## Attachments

### U.S. WRC-12 Proposals – 3<sup>rd</sup> Tranche

19 September 2011

<b>Agenda Item</b>	<b>Short Title</b>	<b>Description</b>
<b>1.4</b>	Aeronautical Mobile (R) Service at VHF/UHF/SHF Resolution 417	U.S. proposal to modify Resolution 417
<b>1.20</b>	High Altitude Platform Stations (HAPS)	U.S. proposal for No Change to the Radio Regulations
<b>7</b>	Satellite Network Filings (Res. 86)	Bringing into Use 11.44J – Issue 4B Modification to 11.44J
<b>7</b>	Satellite Network Filings (Res. 86)	NOC Resolution 49 Due Diligence
<b>8.2</b>	Future Agenda Items	Earth Stations on Board Vessels (ESV)
<b>8.2</b>	Future Agenda Items	Space Research Service (SRS)

## UNITED STATES OF AMERICA

### PROPOSALS FOR THE WORK AT THE CONFERENCE

**Agenda Item 1.4:** *to consider, based on the results of ITU-R studies, any further regulatory measures to facilitate introduction of new aeronautical mobile (R) service (AM(R)S) systems in the bands 112-117.975 MHz, 960-1 164 MHz, and 5 000-5 030 MHz in accordance with Resolutions 413 (Rev. WRC-07), 417 (WRC-07) and 420 (WRC-07)*

#### **Resolution 417**

**Background Information:** ITU-R studies indicate the need to modify Resolution 417 (WRC-07) on the use of the band 960-1 164 MHz by the aeronautical mobile (R) service to ensure coexistence with the incumbent safety of life systems. Aeronautical mobile (route) service (AM(R)S) systems are critical for various air traffic and flight safety communications. Some of the communications systems and services in the 960-1 164 MHz band include traffic information, automatic dependent surveillance-broadcast, and flight information. These systems provide easily accessible air traffic information to multiple air traffic managers at the same time, thus allowing for more efficient airspace use by allowing more planes to fly in closer routes.

International Civil Aviation Organization (ICAO) aeronautical radionavigation service (ARNS) systems, as well as ARNS systems that are not standardized by ICAO, operate in this band and are critical to safety of life operations. These systems allow for aircraft to fly safely by accurately determining flight paths during all phases of flight including take off and landing, and increase the pilot's awareness of close aircraft by scanning the area surrounding the plane. Radionavigation-satellite service (RNSS) systems, which operate in the adjacent band 1 164-1 215 MHz, must also operate in an environment free of harmful interference from emissions in the 960-1 164 MHz band.

Given the importance of both AM(R)S and ARNS systems for safety of life operations in the 960-1 164 MHz band and the need to safeguard the RNSS systems in the adjacent 1 164-1 215 MHz band, this proposal advocates placing equivalent isotropically radiated power (e.i.r.p) limits on AM(R)S systems below 1 164 MHz to ensure compatibility and protection from harmful interference among the various safety of life systems. This proposal supports Method B from Section 1/1.4/2.6.1 of the CPM Report.

**Proposal:**

**MOD** USA/AI 1.4/1

RESOLUTION 417 (Rev. WRC-0712)

**Use of the band 960-1 164 MHz by the aeronautical mobile (R) service**

The World Radiocommunication Conference (Geneva, 200712),

*considering*

- a) that WRC-07~~this Conference~~ has allocated the band 960 to 1 164 MHz to the aeronautical mobile (R) service (AM(R)S) in order to make available this frequency band for new AM(R)S systems, and in doing so enabled further technical developments, investments and deployment;
- b) the current allocation of the frequency band 960-1 164 MHz to the aeronautical radionavigation service (ARNS);
- ~~c) — the use of the band 960-1 215 MHz by the ARNS is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities per No. 5.328;~~
- d~~c~~) that new technologies are being developed to support communications and air navigation, including airborne and ground surveillance applications;
- ed) that the this new allocation of the frequency band 960-1 164 MHz to the aeronautical mobile (R) service is intended to support the introduction of applications and concepts in air traffic management which are data intensive and which could support data links that carry safety critical aeronautical data;
- fe) that in countries listed in No. 5.312 the frequency band 960-1 164 MHz is also used by systems in the ARNS for which standards and recommended practices (SARPs) have not been developed nor published by the International Civil Aviation Organization (ICAO);
- gf) that, furthermore, the frequency band 960-1 164 MHz is also used by a non-ICAO system operating in the ARNS that has characteristics similar to those of ICAO standard distance measuring equipment;
- ~~h) — that this allocation was made knowing that studies are ongoing with respect to the technical characteristics, sharing criteria and sharing capabilities;~~
- ~~i) — that the frequency band 117.975-137 MHz currently allocated to the AM(R)S is reaching saturation within certain areas of the world, therefore that band would not be available to support additional medium- and long-range data communications;~~
- ~~j) — that, additional information is needed on the new technologies which will be used, other than the AM(R)S system identified in recognizing c), the amount of spectrum required, and the characteristics and sharing capabilities/conditions. Therefore, studies are urgently required on which AM(R)S systems will be used, the amount of spectrum required and the characteristics and conditions for sharing with ARNS systems;~~

*recognizing*

- ~~a) — that precedence must be given to the ARNS operating in the frequency band 960-1 164 MHz;~~

~~ba)~~ that Annex 10 ~~of~~to the Convention ~~of the ICAO~~on International Civil Aviation contains SARPs for aeronautical radionavigation and radiocommunication systems used by international civil aviation;

~~eb)~~ that all compatibility issues between the ICAO Standard Universal Access Transceiver (UAT) operating under an AM(R)S allocation and other systems which operate in the same frequency range ~~excluding the system identified in considering f)~~, have been addressed;

~~dc)~~ that in the frequency band 1 024-1 164 MHz the sharing conditions are more complex than in the band 960-1 024 MHz,

*noting*

~~a)~~ that, ~~excluding the system identified in recognizing c)~~, no compatibility criteria ~~currently exist~~ between AM(R)S systems proposed for operations in the frequency band 960-1 164 MHz and ICAO-standardized ~~the existing~~ aeronautical systems in the band will be developed in ICAO;

~~b)~~ that compatibility criteria between AM(R)S systems operating in the frequency band 960-1 164 MHz and RNSS receivers on the same aircraft will be developed by ICAO,

*resolves*

1 that any AM(R)S system operating in the frequency band 960-1 164 MHz shall meet SARPs requirements published in Annex 10 ~~of~~to the ~~ICAO~~Convention on International Civil Aviation;

2 that any operation of AM(R)S systems ~~operating~~ in the band 960-1 164 MHz with aircraft stations operating within 934 km and/or ground stations operating within 465 km from the border of the territory of countries mentioned in No. 5.312 shall not cause harmful interference to, nor claim protection is subject to the coordination agreement to be obtained from, ~~and shall not impose constraints on the operation and planned development~~ the concerned administrations mentioned in No. 5.312 for the protection of aeronautical radionavigation systems (see *considering e*) operating in the same band in these countries, No. 9.21 does not apply;

~~3~~ ~~that compatibility studies between AM(R)S systems operating in the band 960-1 164 MHz and ARNS systems in considering f) and g) need to be conducted to develop sharing conditions to ensure that the conditions of resolves 2 are satisfied, and that ITU-R Recommendations are developed as appropriate;~~

3 that administrations authorizing AM(R)S systems in the band 960-1 164 MHz, shall take into account the sharing conditions on the coexistence with the non-ICAO Tactical Air Navigation (TACAN) systems in the ARNS, as identified in recommends 1 and Annex A to Recommendation ITU-R M.[CHARLIE], Technical characteristics of, and protection criteria for non-ICAO ARNS systems operating around 1 GHz;

*Ed. Note: This proposal for resolves 3 is contingent upon the current Preliminary Draft New Recommendation ITU-R M.[CHARLIE] being finalized within the ITU-R prior to the start of WRC-12. If that does not happen, then an alternative would be to include the relevant information on coexistence with systems in the ARNS identified under considering f) and the AM(R)S in the band 960-1164 MHz in an annex to this resolution.*

4 that compatibility between any AM(R)S systems in the band 960-1 164 MHz and systems in considering f) is a matter to be dealt with in ICAO;

~~4~~ ~~that the result of the studies pursuant to resolves 3 shall be reported to WRC-11 and the decision should be taken by WRC-11 to review, if appropriate, regulatory provisions in resolves 2 taking into account protection requirements of ARNS systems identified in~~

*considering f) and g) and the need for global facilitation of AM(R)S operating in accordance with ICAO standards;*

5 that administrations intending to implement AM(R)S in the band 960-1 164 MHz in order not to cause harmful interference to the radionavigation-satellite service in the band 1 164-1 215 MHz shall utilize the criteria set forth below:

– any ground station operating under the AM(R)S allocation in the band 960-1 164 MHz, shall limit its maximum equivalent isotropically radiated power (e.i.r.p.) to the values presented in the following table:

<u>Emissions in the band 960-1164 MHz</u> <u>(Maximum allowable e.i.r.p. in the band 960-1 164 MHz as a function of the carrier central frequency) for non pulsed AM(R)S ground station transmissions</u>				<u>Emissions in the band 1164-1215 MHz</u>	
<u>AM(R)S centre frequency &lt; 1091 MHz</u>	<u>AM(R)S centre frequency 1091 - 1 119 MHz</u>	<u>AM(R)S centre frequency 1 119 - 1 135 MHz</u>	<u>AM(R)S centre frequency 1135 - 1 164 MHz</u>	<u>1 164-1 197.6 MHz</u>	<u>1 197.6-1 215 MHz</u>
<u>51.6 dBW</u>	<u>Linearly decreasing from 51.6 to 23.6 dBW</u>	<u>Linearly decreasing from 23.6 to -2.4 dBW</u>	<u>Linearly decreasing from -2.4 to -68.4 dBW</u>	<u>-90.8 dBW in any 1 MHz of the band 1 164-1 197.6 MHz</u>	<u>-90.8 dBW in any 1 MHz of the band 1 197.6-1 215 MHz</u>

– any airborne station operating under the AM(R)S allocation in the band 960-1 164 MHz, shall limit its maximum equivalent isotropically radiated power (e.i.r.p.) to the values presented in the following table:

<u>Emissions in the band 960-1164 MHz</u> <u>(Maximum allowable e.i.r.p. in the band 960-1 164 MHz as a function of the carrier central frequency) for non pulsed AM(R)S airborne station transmissions</u>				<u>Emissions in the band 1164-1215 MHz</u>	
<u>AM(R)S centre frequency &lt; 1091 MHz</u>	<u>AM(R)S centre frequency 1091 - 1 119 MHz</u>	<u>AM(R)S centre frequency 1 119 - 1 135 MHz</u>	<u>AM(R)S centre frequency 1135 - 1 164 MHz</u>	<u>1 164-1 197.6 MHz</u>	<u>1 197.6-1 215 MHz</u>
<u>55.3 dBW</u>	<u>Linearly decreasing from 55.3 to 27.3 dBW</u>	<u>Linearly decreasing from 27.3 to -1.3 dBW</u>	<u>Linearly decreasing from -1.3 to -64.7 dBW</u>	<u>-84 dBW in any 1 MHz of the band 1 164 - 1 197.6 MHz</u>	<u>-92.4 dBW in any 1 MHz of the band 1 197.6 - 1 215 MHz</u>

6 that future AM(R)S systems operating in the 960-1 164 MHz band with pulsed emissions shall demonstrate that they limit AM(R)S ground and airborne station emission characteristics in order to provide protection to RNSS systems equivalent to the protection provided by non pulsed emission AM(R)S ground and airborne stations operating in the 960-1 164 MHz band at the maximum e.i.r.p. levels in resolves 5 above.

~~5 — that frequencies in the band 960-1 164 MHz shall not be used by an AM(R)S system, except for the AM(R)S system identified in *recognizing c*), until all potential compatibility issues with the ARNS and, as necessary, the radionavigation satellite service (RNSS) in the adjacent band have been resolved, also taking into account *recognizing d*),~~

~~invites~~

~~administrations and ICAO, for the purposes of conducting the ITU-R studies mentioned in *resolves 3 and 5*, to provide to ITU-R the technical and operational characteristics of systems involved,~~

~~invites ITU-R~~

~~1 — to conduct studies in accordance with *resolves 3 and 5* on operational and technical means to facilitate sharing between AM(R)S systems operating in the band 960-1 164 MHz and ARNS systems identified in *considering f*) and *g*);~~

~~2 — to conduct studies in accordance with *resolves 5* on operational and technical means to facilitate sharing between AM(R)S systems operating in the band 960-1 164 MHz and the RNSS operating in the band 1 164-1 215 MHz;~~

~~3 — to report the results of the studies to WRC-11,~~

~~*instructs the Secretary-General*~~

~~to bring this Resolution to the attention of ICAO.~~

**Reasons:** This proposal enables AM(R)S and ARNS systems, critical to flight safety and human life, to operate compatibly in the 960-1 164 MHz band. Finally, requiring e.i.r.p limits protects RNSS in bands above 1 164 MHz from potential harmful interference from AM(R)S in bands below 1 164 MHz.

## UNITED STATES OF AMERICA

### PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.20:** *To consider the results of ITU-R studies and spectrum identification for gateway links for high altitude platform stations (HAPS) in the range between 5 850-7 075 MHz in order to support operations in the fixed and mobile services, in accordance with Resolution 734 (Rev.WRC-07)*

**Background Information:** Resolution **734 (WRC-07)** invites the ITU-R to study spectrum identification for gateway links for high-altitude platform stations in the range from 5 850 to 7 075 MHz. The study effort is to identify two channels of 80 MHz each for gateway links for HAPS in the range from 5 850 to 7 075 MHz, in bands already allocated to the fixed service, while ensuring the protection of existing services.

Previous WRC efforts (WRC-97, WRC-2000) had undertaken initiatives to examine HAPS types of applications in various frequency bands. Previously, the ITU-R studied frequency bands significantly higher than 5 850-7 075 MHz for HAPS systems. Consequently, the ITU-R conducted new electromagnetic compatibility (EMC) studies for the band 5 850 – 7 075 MHz. The EMC studies addressed HAPS ability to coexist with mobile and fixed-satellite services. Studies also considered radiolocation service sharing in adjacent frequency bands. These sharing studies indicate that it is not feasible to share with HAPS gateway links in the 5850-7075 MHz band.

The proposal below is for Method A of the CPM Report. Method A proposes no change to the band 5850-7 075 MHz. Under this method, it is envisaged that HAPS gateway links may be able to make use of the existing identified spectrum in the bands 47.2-47.5 GHz and 47.9-48.2 GHz in No. **5.552A** (and the bands 27.9-28.2 GHz and 31.0-31.3 GHz for the countries listed in No. **5.537A** and **5.543A**).

#### **Proposal:**

**NOC**      USA/1.20/1

**5 570-7 250 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>5 850-5 925</b> FIXED FIXED-SATELLITE (Earth-to-space) MOBILE  5.150	<b>5 850-5 925</b> FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation  5.150	<b>5 850-5 925</b> FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation  5.150
<b>5 925-6 700</b>	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 5.149 5.440 5.458	
<b>6 700-7 075</b>	FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B 5.458C	
...		

**Reasons:** In the bands indicated, regulatory identification would be difficult to achieve and sustain without causing constraint on the development of the services allocated to the bands of concern. Under this method, it is envisaged that HAPS gateway links may be able to make use of the existing identified spectrum in the bands 47.2-47.5 GHz and 47.9-48.2 GHz in No. 5.552A, which indicates that the use of these bands by HAPS is subject to the provisions of Resolution 122 (Rev.WRC-07). Resolution 122 (Rev. WRC-07), recognizing a), states that these bands are expected to be required for both gateway and ubiquitous terminal applications. It is therefore clear that there is already spectrum designated for gateway operations for HAPS.

In addition, the bands 27.9-28.2 GHz and 31.0-31.3 GHz are also available for use by HAPS in the countries listed in No. 5.537A and 5.543A. Added flexibility with respect to spectrum to be used by gateway links could be achieved by administrations by adding their name to these footnotes (in case their names were not yet in these provisions).

**SUP**      USA/1.20/2

**RESOLUTION 734 (Rev.WRC-07)**

**Studies for spectrum identification for gateway links for high-altitude platform stations in the range from 5 850 to 7 075 MHz**

**Reasons:** Sharing studies concluded that sharing is not possible, therefore no further studies are required.

## UNITED STATES OF AMERICA

### PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 7:** *to consider possible changes in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference: “Advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks”, in accordance with Resolution 86 (Rev. WRC-07)*

**Issue 4B:** Clarification of bringing into use of assignments to satellite networks

**Background Information:** The Workshops on the Efficient Use of the Spectrum/Orbit Resource, held in Geneva (May 2009) and in Singapore (June 2010), have triggered a lot of discussion on the requirements to characterize that a frequency assignment associated with a given space station has been brought into use, or has been brought back into use after suspension in accordance with No. **11.49** of the Radio Regulations. Moreover, the Radiocommunication Bureau (BR) Circular CR/301 of 1 May 2009 and actions taken by the BR in this connection have drawn more attention to the matter.

It is important for administrations to clearly declare when a frequency assignment to a geostationary orbit (GSO) space station has been brought into use, or as having been brought back into use after a suspension in accordance with No. **11.49**.

It is proposed to introduce a new provision to the Radio Regulations stating explicitly that a frequency assignment to a GSO space station will be considered as having been brought into use, or as having been brought back into use, when the notifying administration confirms a GSO space station with the capability of transmitting or receiving, as applicable, this frequency assignment has been deployed at the associated orbital location. A consequential change to Appendix 4, Item A.2.a is also proposed.

The United States notes that the Preliminary Draft Report of the Director on the Activities of the Radiocommunication Sector, Conference Preparatory Meeting document 11-2/34, reflected that a period of around 3-4 months during which a geostationary satellite is continuously present and operating at an orbital location may be considered to constitute bringing into use/regular operation, and views this as an appropriate framework for future studies.

**Proposal:**

**ADD USA/7/4B/1**

**11.44J** A frequency assignment to a GSO space station can be considered as having been brought into use (Nos. **11.44** and **11.47**), or as having been brought back into use (No. **11.49**), when the notifying administration confirms a GSO space station, with the capability of transmitting or receiving that frequency assignment, is deployed at the notified orbital location. The notifying administration shall have the responsibility to inform the Bureau that the frequency assignment has been brought into use.

**Reasons:** To eliminate the current ambiguity in the definitions of “bringing into use” or “bringing back into use”.

**MOD USA/7/4B/2**

**Appendix 4, Item A.2.a**

A.2.a	<p>the date (actual or foreseen, as appropriate) of bringing the frequency assignment (new or modified) into use</p> <p><u>For a frequency assignment to a GSO space station</u> <del>the date of bringing into use is as defined in No. 11.44J use denotes the date at which the frequency assignment is brought into regular operation* to provide the published radiocommunication service with the technical parameters within the technical characteristics notified to the Bureau</del></p> <p>Whenever the assignment is changed in any of its basic characteristics (except in the case of a change under A.1.a, the date to be given shall be that of the latest change (actual or foreseen, as appropriate)</p> <p><del>*-Pending further studies by ITU-R on the applicability of the term “regular operation” to non-geostationary satellite networks, the condition of regular operation shall be limited to geostationary satellite networks</del></p>
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**Reasons:** Introduce changes that are a consequence of the new No. 11.44J.

**UNITED STATES OF AMERICA**  
**PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Agenda Item 7:** *to consider possible changes in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference: “Advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks”, in accordance with Resolution 86 (Rev.WRC-07)*

**Issue 4D:** Resolution **49 (Rev. WRC-07)**

**Background Information:** WRC-97 first adopted administrative due diligence applicable to some satellite services to address the problem of reserving orbit and spectrum capacity without actual use (i.e. “paper” satellites). The Radio Regulations and Resolution **49 (Rev. WRC-07)** on administrative due diligence contain provisions on disclosure of data for the implementation of a satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service with frequency assignments that are subject to coordination under Nos. **9.7, 9.11, 9.12, 9.12A** and **9.13** and Resolution **33 (Rev.WRC-03)** as well as to any such satellite network not yet recorded in the Master International Frequency Register by 22 November 1997. Resolution **49 (Rev. WRC-07)** also applies to certain provisions of Appendices **30 (Rev.WRC-07), 30A (Rev.WRC-07),** and **30B (Rev.WRC-07).**

Many administrations consider due diligence information to be a valuable requirement to present how frequency assignments of a satellite network were brought into use. Administrations have also been updating due diligence information and submitting updates to the Bureau for already recorded assignments either during the period of operation of specific satellite network assignments due to e.g. a change of the spacecraft, or at the time of bringing into use modified recorded assignments under No. **11.43A**, or for the resumption of use of frequency assignments suspended under No. **11. 47**. Although not covered in Resolution **49 (Rev.WRC-07)**, the Bureau publishes such updates in RES49 Special Sections accordingly.

Every conference since WRC-97 extensively discussed the usefulness and adequacy of the information submitted to the ITU in accordance with Resolution **49 (Rev.WRC-07)** and discussed various options to improve the resolution. Ultimately, each conference maintained the data elements and basic structure. This resolution in its current form contains adequate and appropriate due diligence procedures. Therefore, WRC-12 should not modify this resolution.

**Proposal:**

**NOC** USA/AI7\_RES49/1

RESOLUTION 49 (Rev. WRC-07)

**Administrative due diligence applicable to some satellite  
radiocommunication services**

**Reasons:** Administrations wishing to update their due diligence information may do so under the current procedures and there is no need for additional regulatory requirements.

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# UNITED STATES OF AMERICA

## 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)*

**Background Information:** Resolution 902 (WRC-03) details provisions relating to earth stations located on board vessels, which operate in fixed-satellite service networks in the uplink bands 5925-6425 MHz and 14-14.5 GHz. Specifically Annex 1 of the Resolution specifies minimum distances from the low-water mark as officially recognized by the coastal State beyond which ESVs can operate without prior agreement of any administration. These distances are 300 km in the 5925-6425 MHz band and 125 km in the 14-14.5 GHz band. Annex 2 of the Resolution defines the technical limitations applying to ESVs operating in these bands.

Since the Resolution was first adopted in 2003, there have been many successful deployments of ESV systems. Technological developments allow that ESVs operate today with much lower transmit e.i.r.p. densities towards terrestrial stations than those derived from the technical limitations described in Annex 2. These reduced e.i.r.p. densities result in much lower interference potential into other co-frequency terrestrial services. It is therefore proposed that Resolution 902 (WRC-03) be reviewed and studied for consideration at WRC-15 to more accurately reflect current ESV operations

### Proposals:

MOD USA/8.2 /1

RESOLUTION 806 (WRC-~~07~~12)

### ~~Preliminary~~ Agenda for the 2015 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 20~~07~~12),

**Reasons:** To modify the agenda for WRC-15 to add a new item

ADD USA/8.2 /2

**1.XX** to review the provisions relating to earth stations located on board vessels (ESVs), based on studies conducted in accordance with Resolution [ESV].

**Reasons:** ESVs operate within a wide range of e.i.r.p. levels and some of the current provisions assume operation at the highest levels in this range. As a result, potential for interference generated by ESVs is often overestimated.

**ADD** USA/8.2 /1

## RESOLUTION [ESV]

### **Provisions relating to earth stations located on board vessels (ESVs) which operate in fixed-satellite service networks**

The World Radiocommunications Conference (WRC-12),

*considering,*

- a) that WRC-03 introduced provisions relating to the use of earth stations on board vessels (ESVs) in certain bands allocated to the fixed-satellite service;
- b) that the technology used by ESVs has advanced considerably since their introduction, including the use of spread-spectrum modulation and other techniques which may improve compatibility with terrestrial co-frequency services;
- c) that ESV applications can provide high-bandwidth connectivity in areas where no alternative exists;
- d) that ESVs may have the potential to cause unacceptable interference to terrestrial services operating in the same bands;
- e) that earlier ITU-R studies, using technical criteria appropriate at the time, resulted in a set of limitations on the operation of ESVs contained in Resolution 902 (WRC-03), in order to protect terrestrial services operating in the same bands;
- f) that these limitations and restrictions need to be reviewed in light of the new technologies being deployed;
- g) that since the adoption of Resolution 902 (WRC-03), new satellite services have been implemented in higher frequency bands, such as 27.5-30 GHz, where applications similar to ESVs are also contemplated;
- h) that there are situations where there is no potential for unacceptable interference but current rules still require that an agreement be obtained from concerned administrations

*resolves to invite ITU-R*

1. to review the provisions relating to ESVs which operate in the fixed-satellite service and consider possible modifications to Resolution 902 (WRC-03) in order to:
  - reflect current ESV technologies and technical characteristics that are being used or planned to be used, and

- develop regulatory and operational provisions for ESV transmissions in the band 27.5-30.0 GHz or in portions thereof,
2. to complete the referenced studies in time for WRC-15.

**Reasons:** A resolution will support the ITU-R studies needed under the relevant WRC-15 agenda item.

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## ATTACHMENT

### PROPOSAL FOR AGENDA ITEM TO STUDY EARTH STATION ON BOARD VESSELS (ESV) CHARACTERISTICS AIMING AT POSSIBLE REVISION OF RESOLUTION 902 (WRC-03)

**Subject:** 2012 World Radiocommunication Conference Agenda Item 8.2 proposing studies on ESV characteristics and the consideration of possible modifications to Resolution 902 (WRC-03).

**Origin:** United States of America

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**Proposal:** To include an item in the agenda of WRC-15 aiming the review of provisions applicable to the operation of ESVs, based on studies to be conducted in accordance to a new Resolution also being proposed.

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**Background/reason:** Since the adoption of Resolution 902 in 2003, there have been many successful deployments of ESV systems. Technological developments allow that ESVs operate today with much lower transmit e.i.r.p. densities towards terrestrial stations than those given in Annex 2 of Resolution 902. These reduced e.i.r.p. densities result in much lower interference potential into other co-frequency terrestrial services. It is therefore proposed that, in order to more accurately reflect current ESV operations, Resolution **902 (WRC-03)** be reviewed and studied by the ITU-R and be considered for modification at WRC-15. Also, given the successful operation of ESVs in the bands 5 925-6 425 MHz and 14.0-14.5 GHz, it is proposed that the possibility of ESV operation in the band 27.5-30.0 GHz, or portions thereof, be also examined.

**Radiocommunication services concerned:** fixed-satellite service, fixed service, mobile service, radionavigation service, mobile satellite service

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**Indication of possible difficulties:** None foreseen.

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**Previous/ongoing studies on the issue:** Several studies were conducted previous to WRC-03. Relevant IUT-R Recommendations include: ITU-R S.1587-2 (“Technical Characteristics for Earth Stations on Board Vessels Communicating with FSS Satellites in the Frequency Bands 5,925-6,425 MHz and 14.0-14.5 GHz Which Are Allocated to the Fixed-satellite Service”); Recommendation ITU-R SF.1650-1 (“The Minimum Distance from the Baseline Which In-Motion Earth Stations Located on Board Vessels Would Not Cause Unacceptable Interference to the Terrestrial Service in The Bands 5,925-6,425 MHz and 14.0-14.5 GHz”); ITU-R SF.1648 (“Use of Frequencies by Earth Stations on Board Vessels Transmitting in Certain Bands Allocated to the Fixed-satellite Service”)

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<b>Studies to be carried out by:</b> ITU-R Working Party 4A and Working Party 5C.
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<b>with the participation of:</b> -
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**ITU-R Study Groups concerned:** Study Groups 4 and 5

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**ITU resource implications, including financial implications (refer to CV126):** -- Minimal.

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*Common regional proposal:* No

*Multicountry proposal:* No

*Number of countries:* -

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*Remarks* -

## UNITED STATES OF AMERICA

### 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)*

**Background Information:** WARC-92 allocated the band 410-420 MHz to the space research service on a secondary basis to allow for extra-vehicular communications in the vicinity of Earth orbiting manned space vehicles. No. **651A (WARC-92)** was applied to the SRS allocation specifying that use of the band by the SRS is limited to within 5 km of orbiting manned space vehicles. WRC-97 upgraded the allocation to the SRS in the band 410-420 MHz to primary status with the conditions given in No. **5.268**, which include a set of power flux-density (PFD) limits to assure protection of the fixed and mobile services based on ITU studies and the previously agreed No. **651A** distance limitation.

The band 410-420 MHz is used today for communications by astronauts conducting extra-vehicular activities (EVA) operations in the immediate vicinity of the International Space Station (ISS). Use of the band for proximity operations by vehicles approaching the ISS or other manned space vehicles would be advantageous as the propagation and physical properties of this frequency range enable comparable coverage performance in the highly multipath environment of the ISS. The 5 km limit was agreed during WARC-92 when the envisioned use of the band was seen as being limited to free floating astronauts working in the near vicinity of a manned space vehicle. The addition of PFD limits by WRC-97 assures the protection of systems operating in the fixed and mobile services and technically rendered the distance limit unnecessary. Vehicles approaching the ISS, whether manned or robotic, need to communicate over somewhat longer distances to ensure safe operations and docking maneuvers. It is therefore necessary to modify No. **5.268** to remove the 5 km limitation while maintaining the current PFD limits. Similarly, to allow for proximity operations with orbiting vehicles and not solely limit the use of the band for extra-vehicular activities, it is also necessary to modify No. **5.268** in such a manner to remove the EVA limitation.

**Proposal:**

**MOD** USA/8.2 /1

RESOLUTION 806 (Rev. WRC-~~07~~12)

~~Preliminary a~~**Agenda for the 2015 World Radiocommunication Conference**

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

**Reasons:** To modify the agenda for WRC-15 to add a new item.

**ADD** USA/8.2 /2

**2.XX** to review No. **5.268** with a view to examining the possibility for removing the 5 km distance limitation and allowing space research service (space-to-space) use for proximity operations by space vehicles communicating with an orbiting manned space vehicles, in accordance with Resolution [USA-YYY] (WRC-12).

**Reasons:** To conduct studies to demonstrate feasibility of using the band 410-420 MHz for communications between space vehicles operating in proximity to orbiting manned space vehicles with a view to possible modification of No. 5.268.

**ADD** USA/8.2/3

## RESOLUTION USA-YYY (WRC-12)

### Use of the band 410-420 MHz by the space research service (space-to-space)

The World Radiocommunication Conference (Geneva, 2012),

*considering*

- a) that the band 410-420 MHz is allocated to the fixed, mobile (except aeronautical mobile) and space research (space-to-space) services on a primary basis subject to No. **5.268**;
- b) that No. **5.268** restricts space research service (space-to-space) to operations within 5 km of an orbiting manned space vehicle;
- c) that No. **5.268** further identifies use of the band 410-420 MHz by space research service (space-to-space) for extra-vehicular activities (EVA),

*recognizing*

- a) that use of the band 410-420 MHz for proximity operations by space vehicles approaching orbiting manned space vehicles, such as the International Space Station, would be advantageous as the propagation and physical properties of this frequency range enable comparable coverage performance in the highly multipath environment of the ISS;
- b) that space vehicles, whether manned or robotic, operating in the vicinity or approaching the International Space Station or other orbiting manned space vehicles, need to communicate over distances greater than 5 km to ensure safe operations and docking manoeuvres;
- c) that power flux-density limits contained in No. **5.268** ensure the protection of terrestrial stations operating in the fixed and mobile services independent of the distance from, or the source of, space-to-space communications in the space research service,

*further recognizing*

- a) that administrations who operate orbiting manned space vehicles carefully coordinate frequency usage on and in the vicinity of the manned space vehicle to ensure safe operation;

b) that EVA operations would not be conducted simultaneously with visiting vehicle approach and docking maneuvers,

*resolves to invite ITU-R*

1 to conduct sharing studies between space research service (space-to-space) systems communicating in proximity with orbiting manned space vehicles and systems operating in the fixed and mobile (except aeronautical mobile) services in the band 410-420 MHz;

2 to complete the 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 basis for the work of WRC-15,

*resolves to invite WRC-15*

1 to consider modifications to No. **5.268**, taking into account the results of ITU-R studies, including the possible removal of the 5 km distance limitation without modifying the current PFD limits;

2 to consider modifications to No. **5.268** to allow the more general use of the 410-420 MHz band for space research service (space-to-space) systems beyond extra-vehicular activities,

*invites administrations*

to participate actively in the studies by submitting contributions to ITU-R,

*instructs the Secretary-General*

to bring this resolution to the attention of the Space Frequency Coordination Group (SFCG) and other international and regional organizations concerned.

**Reasons:** A resolution will support the ITU-R studies needed under the relevant WRC-15 agenda item.

## ATTACHMENT

### PROPOSAL FOR AGENDA ITEM STUDYING THE USE OF THE BAND 410-420 MHZ BY THE SPACE RESEARCH SERVICE (SPACE-TO-SPACE).

*Subject:* Proposed Future WRC Agenda Item for WRC-2015 studying the use of the band 410-420 MHz by the space research service (space-to-space) and sharing between the fixed and mobile (except aeronautical mobile) services with a view to allowing a more general use of the band for space research service applications.

*Origin:* United States of America

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Proposal: ***to review No. 5.268 with a view to examining the possibility for removing the 5 km distance limitation without modifying the current PFD limits and allowing space research service (space-to-space) use for proximity operations by space vehicles communicating with an orbiting manned space vehicles, in accordance with Resolution [USA-YYY] (WRC-12).***

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***Background/reason:*** WARC-92 allocated the band 410-420 MHz to the space research service on a secondary basis to allow for extra vehicular communications in the vicinity of Earth orbiting manned space vehicles. No. **651A** was applied to the SRS allocation specifying that use of the band by the SRS is limited to within 5 km of orbiting manned space vehicles. WRC-97 upgraded the allocation to the SRS in the band 410-420 MHz to primary status with the conditions given in No. **5.268** which include a set of power flux-density (pfd) limits to assure protection of the fixed and mobile services based on ITU studies and the previously agreed No. **651A (WARC-92)** distance limitation.

The band 410-420 MHz is used today for communications by astronauts conducting extra-vehicular activities (EVA) operations in the immediate vicinity of the International Space Station (ISS). Use of the band for proximity operations by vehicles approaching the ISS or other manned space vehicles would be advantageous as the propagation and physical properties of this frequency range enable comparable coverage performance in the highly multipath environment of the ISS. The 5 km limit was assigned during WARC-92 when the envisioned use of the band was seen as being limited to free floating astronauts working in the near vicinity of a manned space vehicle. The addition of PFD limits by WRC-97 assures the protection of systems operating in the fixed and mobile services and technically rendered the distance limit unnecessary. Vehicles approaching the ISS, whether manned or robotic, need to communicate over somewhat longer distances to ensure safe operations and docking maneuvers. It is therefore necessary to modify No. **5.268** to remove the 5 km limitation while maintaining the current PFD limits. Similarly, to allow for proximity operations with orbiting vehicles and not solely limit the use of the band for extra-vehicular activities, it is also necessary to modify No. **5.268** in such a manner to remove the EVA limitation.

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***Radiocommunication services concerned:*** fixed, mobile, space research (space-to-space)

*Indication of possible difficulties:* none foreseen

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*Previous/ongoing studies on the issue:* TBD

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*Studies to be carried out by:* WP 7B

with the participation of: **WPs 5A, 5C**

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*ITU-R Study Groups concerned:* SG7

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ITU resource implications, including financial implications (refer to CV126): **minimal**

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*Common regional proposal:* No

*Multicountry proposal:* No

Number of countries:

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*Remarks*