Ms. Mindel De La Torre
Chief of the International Bureau
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Dear Ms. De La Torre:

The National Telecommunications and Information Administration (NTIA) on behalf of the Executive Branch agencies, approves the release of the draft Executive Branch proposal for WRC-15 which address agenda items 1.9.1 (FSS downlink in the 7/8 GHz range, 7 (Satellite Regulatory Procedures Issue E), and 9.1.2 (Coordination Arc Reduction). NTIA proposes no change to Radio Regulation (RR) Article 5 for agenda item 1.9.1. Under agenda item 7 (Issue E), NTIA also proposes no change to RR Article 11. With regard to agenda item 9.1, Issue 9.1.2, NTIA proposes changes to RR Appendix 5 to address the coordination arc for the 6/4 and 14/10/11/12 GHz frequency bands, while also proposing no change to the RR Appendix 5 coordination arc for the 30/20 GHz frequency bands. In addition, NTIA proposes no change to RR Article 9, Article 11, and Appendix 8 in addressing the current criterion ($\Delta T/T > 6\%$) used in the application of RR No. 9.41.

NTIA considered the federal agencies' input toward the development of U.S. proposals for WRC-15. NTIA forwards this package for your consideration and review by your WRC-15 Advisory Committee. Mr. Charles Glass is the primary contact from my staff.

Sincerely,

(Original Signed November 21, 2014)

Paige R. Atkins
Acting Associate Administrator
Office of Spectrum Management

UNITED STATES OF AMERICA

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.9.1: *to consider, in accordance with Resolution **758 (WRC-12)**, possible new allocations to the fixed-satellite service in the frequency bands 7 150-7 250 MHz (space-to-Earth) and 8 400-8 500 MHz (Earth-to-space), subject to appropriate sharing conditions;*

Bacckground Information:

7-GHz band

ITU-R has studied the interference from a potential constellation of 90 fixed satellite service (FSS) geostationary (GSO) satellites into space research service (SRS) missions in the 7150-7250 MHz band.

In the 7 150-7 190 MHz deep space SRS band, during the near Earth operations of the SRS mission, there is a region around the GSO orbit that the interference received by SRS spacecraft from the FSS satellites would exceed the ITU protection criterion of the SRS spacecraft. The extent of this region depends on the gain of the SRS spacecraft antenna, the transmitter power density of the FSS satellites, and the location of the FSS GSO satellites. The interference region below the GSO orbit is determined by the low gain antenna and medium gain antenna of the SRS spacecraft, whereas above the GSO orbit it is determined by the high gain antenna of the SRS spacecraft. The studies concluded that sharing the 7 150-7 190 MHz band between SRS and FSS is not feasible without specific regulatory provisions, mitigation techniques, or operational coordination during near-Earth operations of deep-space SRS missions. Operational coordination would be very difficult and an undue burden for SRS operators, noting that such operational coordination agreement would have to be reached with all FSS operators and the responsible administrations around the world and that the SRS operators may need to execute the terms of the operational coordination agreement with multiple FSS satellites from the relevant administrations during the near-Earth critical events of SRS missions. The operational coordination is further complicated by the fact that the launch of deep-space SRS missions is frequently delayed due to weather or technical reasons.

In the 7 190-7 235 MHz near-Earth SRS band, based on the studies, sharing between FSS (space-to-Earth) and SRS (Earth-to-space) could result in excessive interference into the SRS receiver when the SRS satellite orbit is close to the GSO orbit. Since it would not be possible to coordinate the transmissions of a global FSS network to avoid interference into an SRS mission with an orbit of this type, it is concluded that FSS operations would not be compatible with SRS (near-Earth) missions in the 7 190 – 7 235 MHz band.

8 GHz band

For the 8 400-8 500 MHz band, a future allocation to the FSS (Earth-to-space) in this band may create a potential for harmful interference to the SRS earth stations operating near FSS earth stations transmitting to FSS satellites. The level of interference depends on the distance between the FSS and SRS earth stations. Thus, to avoid interference, separation distances ranging from 84 km to 675 km between FSS and SRS earth stations are required. These required separation

distances are based on the presence of a single FSS terminal operating on a single channel around the deep-space SRS earth station. In case of multiple FSS terminals operating on multiple channels, the required distances may grow accordingly depending on the channel width. The required separation distance may extend into the territory of another administration and, therefore, would require that international coordination be carried out.

Conclusion

In the 7150-7235 MHz band, the studies have concluded that sharing between FSS (space-to-Earth) and SRS (Earth-to-space) would not be feasible without very difficult operational coordination. This would impose undue burden on SRS and would require that the FSS satellites terminate their operation in the affected frequency channels.
In the 8400-8500 MHz band, the results show that SRS earth stations can be protected from FSS earth station transmissions by coordination, but large separation distances are required around SRS earth stations.

In view of the foregoing, the United States proposes/supports no changes to the Article 5 Table of Allocations for the 7150-7250 MHz and 8400-8500 MHz bands.

Proposal:

NOC USA/1.9.1/1

ARTICLE 5

Frequency allocations

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

Reasons: No change to the Table of Allocations would avoid any impact to existing services and would ensure the continued operation of these services within their existing environment. It would also avoid the required operational coordination between SRS and potentially many FSS operators from different administrations that would need to disrupt the FSS satellite transmissions during the near-Earth operations of deep-space SRS missions. For the band 7 150-7 190 MHz band, no other practical solution exists.

SUP USA/1.9.1/2

RESOLUTION **758 (WRC-12)**:
Allocation to the fixed-satellite service and the maritime-mobile satellite service in the 7/8 GHz range

Reasons: Suppression of Resolution **758 (WRC-12)** is consequential to the completion of work under WRC-15 agenda item 1.9.1.

UNITED STATES OF AMERICA

PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 7: *to consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution* ***86 (Rev. WRC-07)*** *to facilitate rational efficient, and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit*

Issue E: Failure of a satellite during the ninety-day bringing into use period

Background Information: WRC-12 introduced the additional provisions No. **11.44.2** and No. **11.44B** in the Radio Regulations (RR) in order to better define the bringing into use of a frequency assignment to a space station in the geostationary satellite orbit. According to RR No. **11.44B**, "*A frequency assignment to a space station in the geostationary-satellite orbit shall be considered as having been brought into use when a space station in the geostationary-satellite orbit with the capability of transmitting or receiving that frequency assignment has been deployed and maintained at the notified orbital position for a continuous period of ninety days* …". However, the current provisions regarding the bringing into use do not address a possible scenario of a satellite failure during the above-mentioned period of ninety days. WRC-12 discussed the issue of a satellite failure, especially that of a newly launched satellite, during the ninety-day bringing into use period that renders the satellite technically incapable of operating in a given frequency band. WRC-12 invited the ITU-R to study the issue, as a matter of urgency, to determine what regulatory changes, if any, should be made to the RR under WRC-15 agenda item 7 to address this issue. Furthermore, WRC-12 decided that in case of such failure, the notifying administration may submit the case to the Radio Regulations Board (RRB) for its consideration and decision on a case-by-case basis.

Method A in the Draft Conference Preparatory Meeting (CPM) text proposes to allow a frequency assignment to be considered as having been brought into use in accordance with RR No. **11.44B,** in cases for which a frequency assignment could not be brought into use due to a failure of a newly launched satellite during the ninety-day bringing into use period. However, after consideration of the discussions within the ITU-R of this issue, it would be better to continue to apply the current procedures in the Radio Regulations since the failure of any satellite during a 90-day BIU or bringing back into use (BBIU) period is considered to be extremely rare. In the case of a newly-launched or on-orbit satellite failure during the 90-day BIU or BBIU period, Administrations already have the possibility of petitioning the RRB for relief under the current procedures. If not successful at the RRB, then Administrations may petition a WRC. There is no regulatory difference between a newly launched satellite or an on-orbit satellite, and adding provisions giving special treatment to a newly launched satellite could penalize operators conducting legitimate satellite fleet movements. Additionally, Method A in the draft CPM text could encourage abuse of the newly proposed BIU provisions by unintentionally sanctioning the movement of aging and older satellites from one orbital location

to another for the purpose of bringing into use orbital slots without worry about potential satellite failure. Since there have not been any demonstrable events of a satellite failure during the BIU period, it is premature and unnecessary to modify the current regulatory procedures. Therefore, the United States proposes No Change to Article **11** of the Radio Regulations for this Issue under WRC-15 agenda item 7.

Proposal:

NOC USA/AI 7/1

ARTICLE 11

Notification and recording of frequency assignments[1, 2, 3, 4, 5, 6, 7] (WRC-07)

Reason: There have not been any demonstrable events of a satellite failure during the BIU period so it is premature and unnecessary to modify the current regulatory procedures.

UNITED STATES OF AMERICA

PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 9: *to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:*

Agenda Item 9.1: *on the activities of the Radiocommunication Sector since WRC-12;*

Issue 9.1.2: *Studies on possible reduction of the coordination arc and technical criteria used in application of No. 9.41 in respect of coordination under No. 9.7 (Resolution **756** (WRC-12))*

Background Information: The ITU-R has sought improved ways to accommodate new satellite networks and facilitate more efficient use of the spectrum resources while at the same time ensuring adequate protection of networks operating in accordance with the Radio Regulations. WRC-12 agreed to reduce the coordination arc in the 6/4, 14/10/11/12 and 21.4-22 GHz frequency bands, but did not come to a decision regarding the 30/20 GHz frequency bands. To continue studies, WRC-12 adopted Resolution **756 (WRC-12)**, which *resolves to invite ITU-R:*

> *1 to carry out studies to examine the effectiveness and appropriateness of the current criterion (ΔT/T > 6%) used in the application of No. **9.41** and consider any other possible alternatives (including the alternatives outlined in Annexes 1 and 2 to this Resolution), as appropriate, for the bands referred to in recognizing e);*
>
> *2 to study whether additional reductions in the coordination arcs in RR Appendix **5 (Rev.WRC-12)** are appropriate for the 6/4 GHz and 14/10/11/12 GHz frequency bands, and whether it is appropriate to reduce the coordination arc in the 30/20 GHz band,*

The ITU-R has conducted studies related to *resolves* 1 and 2 for the 6/4, 14/10/11/12, 21.4-22, and 30/20 GHz frequency bands.

<u>*Resolves* 1</u>

It is recognized that *resolves* 1 considers the effects of changing both the criterion itself (currently ΔT/T) and the equivalent criterion threshold (currently 6%). In the draft Conference Preparatory Meeting (CPM) text for this issue, Options 1A and 1B propose changes to both the criterion and the equivalent criterion threshold. Option 1C proposes changing the criterion, but not the equivalent criterion threshold. Option 1D proposes no change to either to the criterion or the criterion threshold. The United States supports Option 1D.

With regard to Options 1A and 1B:

- There is general concern that changing two items simultaneously may result in unforeseen consequences / difficulties in implementation.

- With regard to Options 1A and 1B, the ΔT/T value of 6 % is justified based on the fact that satellite links have typical interference margins of 1dB. This is particularly relevant for coordination of networks with larger orbital separations than the coordination arc value. The figures of ΔT/T for networks within the coordination arc are not relevant as ΔT/T is a parameter used to launch the coordination process but not for conducting detailed coordination between networks.

With regard to Options 1A, 1B, and 1C:

- It is noted that the ITU-R WP 4A Chairman's Report (4A/591) states, "this draft CPM text calls for, in part, converting the existing Rule of Procedure on RR No. 11.32A into regulatory text, and this could prove to be a very challenging task."

- Studies submitted to the ITU have shown that changing the criterion from ΔT/T to C/I (while not changing the equivalent criterion threshold) does not significantly reduce the number of Affected Administrations that must be dealt with in order to complete coordination of a satellite network. The United States' experience is that the number of Affected Administrations is a more important qualitative determinant of how difficult it will be to complete coordination, more so than the number of networks.

- It is noted the Radiocommunication Bureau (BR) Director's contribution (4A/579) supports ΔT/T as the criterion, stating,

> *The Bureau concludes that the C/I criterion alone for identifying potentially affected administrations / networks under RR Nos. 9.7 and 9.41 would not significantly reduce coordination requirement. Results of simulation demonstrate that the orbital separation required establishing coordination requirement using C/I criterion would not significantly improve the situation in the absence of any other mechanism.*
>
> *The Bureau considers that simple transition to C/I would not address the problem of "effectiveness and appropriateness" of the existing and proposed criteria while increasing the workload of the Bureau to implement the changes and the process.*

<u>*Resolves* 2</u>

In the draft CPM text for this issue, Option 2A proposes changes to the coordination arc for the 6/4 and 14/10/11/12 GHz frequency bands. Option 2B proposes changes to the coordination arc for the 6/4, 14/10/11/12 and 30/20 GHz frequency bands. Option 2C proposes no changes. The United States supports Option 2A, noting that the content of Option 2A (i.e., reducing the 6/4 GHz coordination arc to 6° and reducing the 14/10/11/12 GHz coordination arc to 5°) was originally studied and proposed during the WRC-12 cycle but was not implemented.

With regard to Option 2B, an ITU-R study evaluated the density of GSO FSS space stations using the 29.5-30.0 GHz/19.7-20.2 GHz bands that have actually been brought into use (active) or placed into construction (planned) according to publicly available publications. The analysis indicated that the current deployment of Ka-band networks is not uniformly dense throughout the GSO. While the average orbital separation between stations was on the order of 5 degrees, its standard deviation was greater than 5 degrees and the maximum separation was at least 27 degrees when taken both active and planned networks into account. This reveals that it is not yet appropriate for the protection of incumbent Ka-band networks to reduce the coordination arc in the 29.5-30.0 GHz / 19.7-20.2 GHz bands from its current value as contained in Appendix **5** of the Radio Regulations.

With regard to Option 2C, the United States notes that changes to the coordination arc were studied prior to WRC-12 and that some of the changes proposed in Options 2A and 2B (i.e., reducing the 6/4 GHz coordination arc to 6° and reducing the 14/10/11/12 GHz coordination arc to 5°) were originally proposed during the WRC-12 cycle.

Summary

Based on studies conducted within the ITU-R related to *resolves* 1 and 2 for the 6/4, 14/10/11/12 and 30/20 GHz frequency bands, the United States supports draft CPM text Options 1D and 2A, as shown in the summary chart below.

		Res 756 (WRC-12)		
		Resolves 1		Resolves 2
		Criterion	Criterion Threshold	Coord Arc
Band	6/4	NOC (ΔT/T)	NOC (6%)	8° → 6°
	14/10/11/12	NOC (ΔT/T)	NOC (6%)	7° → 5°
	30/20	NOC (ΔT/T)	NOC (6%)	NOC (8°)

The No Change aspects of the proposal are reflected in Articles **9** and **11** and Appendices **5** and **8**. The changes made by this proposal are in Appendix **5**.

Proposals:

NOC USA/9.1.2/1

ARTICLE 9

Procedure for effecting coordination with or obtaining agreement of other administrations[1, 2, 3, 4, 5, 6, 7, 8, 8*bis*] (WRC-12)

Reasons: No changes to the provisions of RR Articles **9** in respect of *resolves* 1.

NOC USA/9.1.2/2

ARTICLE 11

Notification and recording of frequency assignments[1, 2, 3, 4, 5, 6, 7, 7bis] (WRC-12)

Reasons: No changes to the provisions of RR **11** in respect of *resolves* 1.

MOD USA/9.1.2/3

APPENDIX 5 (REV.WRC-12)

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

TABLE 5-1 (REV.WRC-~~12~~15)

Technical conditions for coordination
(see Article **9**)

Reference of Article 9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. 9.7 GSO/GSO	A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission	1) 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 7 025-7 075 MHz 2) 10.95-11.2 GHz 11.45-11.7 GHz 11.7-12.2 GHz (Region 2) 12.2-12.5 GHz (Region 3) 12.5-12.75 GHz (Regions 1 and 3) 12.7-12.75 GHz (Region 2) and 13.75-14.5 GHz	i) Bandwidth overlap, and ii) any network in the fixed-satellite service (FSS) and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of ±~~8~~6° of the nominal orbital position of a proposed network in the FSS i) Bandwidth overlap, and ii) any network in the FSS or broadcasting-satellite service (BSS), not subject to a Plan, and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of ±~~7~~5° of the nominal orbital position of a proposed network in the FSS or BSS, not subject to a Plan		With respect to the space services listed in the threshold/condition column in the bands in 1), 2), 3), 4), 5), 6), 7) and 8), an administration may request, pursuant to No. 9.41, to be included in requests for coordination, indicating the networks for which the value of $\Delta T/T$ calculated by the method in § 2.2.1.2 and 3.2 of Appendix **8** exceeds 6%. When the Bureau, on request by an affected administration, studies this information pursuant to No. 9.42, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **8** shall be used

Reason: No changes with respect to *resolves* 1 (in the Remarks column); change the coordination arc in 6/4, 14/10/11/12 GHz frequency bands (*resolves* 2)

NOC USA/9.1.2/4

APPENDIX 5 (REV.WRC-12)

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

TABLE 5-1 (*continued*) (REV.WRC-12)

Reference of Article 9	Case	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Calculation method	Remarks
No. 9.7 GSO/GSO (*cont.*)		3) 17.7-20.2 GHz, (Regions 2 and 3), 17.3-20.2 GHz (Region 1) and 27.5-30 GHz	i) Bandwidth overlap, and ii) any network in the FSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS		
		4) 17.3-17.7 GHz (Regions 1 and 2)	i) Bandwidth overlap, and ii) a) any network in the FSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the BSS, or b) any network in the BSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS		

TABLE 5-1 (*continued*) (REV.WRC-12)

Reference of Article 9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. 9.7 GSO/GSO (*cont.*)		5) 17.7-17.8 GHz	i) Bandwidth overlap, and ii) a) any network in the FSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the BSS, or b) any network in the BSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS NOTE – No. **5.517** applies in Region 2.		
		6) 18.0-18.3 GHz (Region 2) 18.1-18.4 GHz (Regions 1 and 3)	i) Bandwidth overlap, and ii) any network in the FSS or meteorological-satellite service and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS or the meteorological-satellite service		

TABLE 5-1 (*continued*) (REV.WRC-12)

Reference of	**Case**	**Frequency bands (and Region) of the service**	**Threshold/condition**	**Calculation method**	**Remarks**

Article 9		**for which coordination is sought**			
No. 9.7 GSO/GSO (*cont.*)		6*bis*) 21.4-22 GHz (Regions 1 and 3)	i) Bandwidth overlap; and ii) any network in the BSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±12° of the nominal orbital position of a proposed network in the BSS (see also Resolutions **554 (WRC-12)** and **553 (WRC-12)**).		No. **9.41** does not apply.
		7) Bands above 17.3 GHz, except those defined in § 3) and 6)	i) Bandwidth overlap, and ii) any network in the FSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS (see also Resolution **901 (Rev.WRC-07)**)		
		8) Bands above 17.3 GHz except those defined in § 4), 5) and 6*bis*)	i) Bandwidth overlap, and ii) any network in the FSS or BSS, not subject to a Plan, and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±16° of the nominal orbital position of a proposed network in the FSS or BSS, not subject to a Plan, except in the case of a network in the FSS with respect to a network in the FSS (see also Resolution **901 (Rev.WRC-07)**)		

Reason: No changes with respect to resolves 1 (in the Remarks column). No change in 30/20 GHz frequency band (resolves 2).

NOC USA/9.1.2/5

APPENDIX 8 (Rev.WRC-03)

Method of calculation for determining if coordination is required between geostationary-satellite networks sharing the same frequency bands

Reason: No changes to RR Appendix **8** with respect to *resolves* 1.

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