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| **41 MEETING OF PERMANENT****CONSULTATIVE COMMITTEE II:****RADIOCOMMUNICATIONS****May 22 to 26, 2023****Mexico City, Mexico** | **OEA/Ser.L/XVII.4.2.41****CCP.II-RADIO /doc. /23****01 May 2023****Original: English** |
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|  | **PROPOSALS FOR THE WORK OF THE CONFERENCE****AGENDA ITEM 7 Topic j** |  |
|  | **(Item on the Agenda: 3.1 (SGT-4))** |  |
|  | **(Document submitted by the administration of the United States)** |  |

**Impact on the sector:**

This document supports the work of CITEL’s PCC.II Working Group for WRC under 3.1 of the agenda.

**Executive Summary:**

Under WRC-23 agenda item 7 Topic J, the United States proposes to modify and update Resolution **76 (Rev.WRC-15)** to further study the technical basis and means to support a consultation process for non-GSO FSS to ensure compliance with the aggregate epfd limits in Tables 1A to 1D of the revised Resolution. This proposal is based on CPM Method J5.

**UNITED STATES OF AMERICA**

**PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Agenda Item 7, Topic J**

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

7(J) Topic J - Modifications to Resolution **76 (Rev.WRC-15)**

**Background**:

Resolution **76 (Rev.WRC-15)** calls for the development of Recommendations on accurate modelling of interference as well as the procedures to be used amongst administrations to ensure that the aggregate equivalent power flux-density (epfd) limits are not exceeded. While the aggregate epfd limits are specified in Tables 1A to 1D of the Resolution, there is no clear methodology nor procedures outlined in Resolution **76 (Rev.WRC-15)** for the involved administrations to collaboratively determine whether these aggregate levels are exceeded. WRC-23 Agenda Item 7, Topic J calls for consideration of modifications to Resolution **76 (Rev.WRC-15)** to facilitate the development of a consultation process to ensure that operating non-GSO FSS systems do not exceed the aggregate epfd limits in Resolution **76 (Rev.WRC-15)**. Resolution **76 (WRC-15)** also invites the ITU-R to study and develop a suitable methodology for calculating the aggregate epfd produced from all non-GSO systems operating or planning to operate co-frequency in the relevant frequency bands.

It is recognized that whereas all administrations that operate or plan to operate non-GSO FSS should collaborate to ensure the aggregate epfd remains below the levels in Tables 1A to 1D, this is not simply a theoretical exercise whereby single-entry epfd levels from all satellite filings as verified by the Bureau would simply be aggregated, but rather, as recognized by Resolution 76, the aggregate calculations must be based on realistic parameters and, assumptions on accurate modelling of interference. As recognized in the CPM text for this agenda item, “there is no recent and comprehensive ITU-R Recommendation[[1]](#footnote-1) which takes into account accurate modelling of interference from multiple non-GSO systems for the purposes of assessing compliance with aggregate epfd limits, nor is there a methodology or procedures for the administrations involved to collaboratively determine whether these aggregate levels are exceeded.” Thus, a necessary prerequisite to the proper functioning of any consultation process is the establishment of an accurate technical foundation as proposed in CPM Method J5.

The concept of a “consultation process/meetings” has been established in other regulatory frameworks – specifically, in Resolutions **769 (WRC-19)** and **609 (Rev.WRC-07)** – to provide a means for administrations to evaluate aggregate interference and assure compliance with aggregate interference limits between multiple systems (non-GSO in the case of Resolution **769 (WRC-19)** and non-GSO and GSO in the case of Resolution **609 (Rev.WRC-07)**). It is noted that the sharing scenarios and challenges for the frequency bands identified in Resolution **76 (Rev.WRC-15)** differ from those included in the frequency bands identified in Resolution **769 (WRC‑19)** and Resolution **609 (Rev.WRC-07)**.

The proposals below modify and update Resolution **76 (Rev.WRC-15)** to call specifically for further study and development of a technical basis for a consultation process for non-GSO FSS systems operating in the frequency bands specified in *considering* a) of the Resolution to ensure compliance with the aggregate epfd limits in Tables 1A to 1D of the Resolution. This proposal is based on CPM Method J5.**Proposals**:

MOD USA-4/7J/1

RESOLUTION 76 (REV.WRC-23)

Protection of geostationary fixed-satellite service and geostationary broadcasting-satellite service networks from the maximum aggregate
equivalent power flux‑density produced by multiple non‑geostationary
fixed-satellite service systems in frequency bands where equivalent
power flux-density limits have been adopted

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that WRC‑97 adopted, in Article **22**, provisional equivalent power flux-density (epfd) limits to be met by non‑geostationary fixed-satellite service (non-GSO FSS) systems in order to protect GSO FSS and GSO broadcasting-satellite service (BSS) networks in parts of the frequency range 10.7-30 GHz;

*b)* that WRC‑2000 revised Article **22** to ensure the limits contained therein provide adequate protection to GSO systems without placing undue constraints on any of the systems and services sharing these frequency bands;

*c)* that WRC‑2000 decided that a combination of single-entry validation, single-entry operational and, for certain antenna sizes, single-entry additional operational epfd limits, contained in Article **22**, along with the aggregate limits in Tables 1A to 1D as contained in Annex 1 to this Resolution, which apply to non‑GSO FSS systems, protects GSO networks in these frequency bands;

*d)* that these single-entry validation limits have been derived from aggregate epfd masks contained in Tables 1A to 1D, assuming a maximum effective number of non-GSO FSS systems of 3.5;

*e)* that the aggregate interference caused by all co-frequency non‑GSO FSS systems in these frequency bands into GSO FSS systems should not exceed the aggregate epfd limits in Tables 1A to 1D;

*f)* that WRC‑97 decided, and WRC‑2000 confirmed, that non‑GSO FSS systems in the frequency bands in question are to mutually coordinate the use of frequencies in these frequency bands under the provisions of No. **9.12**;

*g)* that the orbital characteristics of such systems are likely to be inhomogeneous;

*h)* that, as a result of this likely inhomogeneity, the aggregate epfd levels from multiple non‑GSO FSS systems will not be directly related to the actual number of systems sharing a frequency band, and the number of such systems operating co-frequency is likely to be small;

*i)* that the possible misapplication of single-entry limits should be avoided,

recognizing

*a)* that non-GSO FSS systems are likely to need to implement interference mitigation techniques to mutually share frequencies;

*b)* that, on account of the use of such interference mitigation techniques, it is likely that the number of non‑GSO systems will remain small, as will the aggregate interference caused by non‑GSO FSS systems into GSO systems;

*c)* that, notwithstanding *considering d)* and *e)* and *recognizing b)*, there may be instances where the aggregate interference from non‑GSO systems could exceed the interference levels given in Tables 1A to 1D;

*d)* that administrations operating GSO systems may wish to ensure that the aggregate epfd produced by all operating co-frequency non‑GSO FSS systems in the frequency bands referred to in *considering a)* above into GSO FSS and/or GSO BSS networks does not exceed the aggregate interference levels given in Tables 1A to 1D;

*e)* that previous WRCs have adopted the use of a consultation meeting procedure in Resolutions **609 (Rev.WRC-07)** and **769 (WRC-19)** to ensure that non-GSO systems meet their obligations to not exceed limits on unacceptable aggregate interference to other services or applications,

noting

Recommendation ITU‑R S.1588 “Methodologies for calculating aggregate downlink equivalent power flux-density produced by multiple non-geostationary fixed-satellite service systems into a geostationary fixed-satellite service network”,

resolves

1 that administrations operating or planning to operate non‑GSO FSS systems, for which coordination or notification information, as appropriate, was received after 21 November 1997, in the frequency bands referred to in *considering a)* above, individually or in collaboration, shall take all possible steps, including, if necessary, by means of appropriate modifications to their systems, to ensure that the aggregate interference into GSO FSS and GSO BSS networks caused by such systems operating co-frequency in these frequency bands does not cause the aggregate power levels given in Tables 1A to 1D to be exceeded (see No. **22.5K**);

2 that, in the event that the aggregate interference levels in Tables 1A to 1D are exceeded, administrations operating non‑GSO FSS systems in these frequency bands shall take all necessary measures expeditiously to reduce the aggregate epfd levels to those given in Tables 1A to 1D, or to higher levels where those levels are acceptable to the affected GSO administration (see No. **22.5K**),

invites the ITU Radiocommunication Sector

1 to continue its studies and to develop, as a matter of urgency, a suitable methodology to calculate the aggregate epfd produced by all non‑GSO FSS systems operating or planning to operate co-frequency in the frequency bands referred to in *considering a)* above into GSO FSS and GSO BSS networks, which may be used to determine whether the systems are in compliance with the aggregate power levels given in Tables 1A to 1D;

2 to continue its studies and to develop, as a matter of urgency, a Recommendation on the accurate modelling to calculate the aggregate interference from non‑GSO FSS systems into GSO FSS and GSO BSS networks in the frequency bands referred to in *considering a)* above, and taking into account the coordination of frequency use among non-GSO systems, in order to assist administrations planning or operating non‑GSO FSS systems in their efforts to limit the aggregate epfd levels produced by their systems into GSO networks, and to provide guidance to GSO network designers on the maximum epfd↓ levels expected to be produced by all non‑GSO FSS systems when accurate modelling assumptions are used;

3 taking into account *recognizing e),* to continue its studies and develop, as a matter of urgency, a Recommendation and/or providing the basis for a processes or procedures to be used among administrations in order to ensure that the aggregate epfd limits given in Tables 1A to 1D are not exceeded by operators of non-GSO FSS systems;

4 to work on the development of measurement techniques to identify the interference levels from non-GSO systems in excess of the aggregate limits given in Tables 1A to 1D, and to confirm compliance with these limits,

instructs the Director of the Radiocommunication Bureau

1 to assist in the development of the methodology referred to in *invites the ITU Radiocommunication Sector*1above;

2 to report to WRC-27 on the results of studies in *invites the ITU Radiocommunication Sector* above.

invites the 2027 World Radiocommunication Conference

to establish a procedure or process, based on the results of studies in *invites the ITU Radiocommunication Sector* above, whereby administrations operating or planning to operate non-GSO FSS to ensure that operations of all non-GSO FSS networks do not exceed the aggregate level of protection for GSO networks.

**Reason:** This method proposes to modify and update Resolution **76 (Rev.WRC-15)** to call specifically for further study on a consultation process for non-GSO FSS systems operating in the frequency bands specified in considering a) of the Resolution to use to ensure compliance with the aggregate epfd limits in Tables 1A to 1D of the Resolution.

ANNEX 1 TO RESOLUTION 76 (REV.WRC-23)

ARTICLE 22

Space services1

Section II − Control of interference to geostationary-satellite systems

MOD USA-4/7J/2

**22.5K** 8) Administrations operating or planning to operate non-geostationary-satellite systems in the fixed-satellite service in the frequency bands listed in Tables **22-1A** to **22-1D** of No. **22.5C** will apply the provisions of Resolution **76 (Rev.WRC-23)** to ensure that the actual aggregate interference into geostationary fixed-satellite service and geostationary broadcasting-satellite service networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate power levels shown in Tables **1A** to **1D** of Resolution **76 (Rev.WRC-23)**. In the event that an administration operating a geostationary-satellite network in conformity with the Radio Regulations identifies equivalent power flux-density levels from nongeostationary-satellite systems in the fixed-satellite service which may be in excess of the aggregate limits contained in Tables **1A** to **1D** of Resolution **76 (Rev.WRC-23)**, the administrations responsible for the non-geostationary-satellite systems in the fixed-satellite service will apply the provisions contained in *resolves* 2 of Resolution **76 (Rev.WRC-23)**. (WRC-23)

**Reason:** Consequential

1. It is noted that Recommendation ITU-R S.1588, which calculates aggregate epfd levels, appears not to be sufficient for this purpose. [↑](#footnote-ref-1)