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| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23)Dubai, 20 November - 15 December 2023** |  |
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| PLENARY MEETING | **Document 118-E** |
|  | **29 October 2023** |
|  | **Original: English** |
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| Brazil (Federative Republic of) |
| PROPOSALS FOR THE WORK OF THE CONFERENCE |
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| Agenda item 7(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)**

Introduction

Resolution **76 (Rev.WRC‑15)** addresses the 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 in RR Article **22**.

This proposal from Brazil for amending Resolution **76** is based on CPM Report Method J2, harmonized with elements from Method J3 and further improvements. Among other aspects, it is proposed that:

– The consultation meetings in order to assess the aggregate epfd levels included in Resolution **76** **(Rev.WRC‑15)** will take place after the approval of recommendations with methodologies for calculating the combined epfd produced by all non-GSO FSS systems and adapting the operation of all non-GSO FSS systems to ensure that the combined power levels listed in Tables 1A to 1D of Annex 1 are met;

– In case the referred methodologies are not approved in reasonable time, a trigger mechanism is defined to start the consultation meetings after 16 December 2026 and once at least 4 non-GSO systems in each frequency band indicated in Tables 1A to 1D of Annex 1 satisfy the applicable criteria;

– The aggregate epfd calculations performed in the scope of the consultation meetings shall undertake two assessment outputs, one considering operational non-GSO systems and another one, for information only, considering operational and also non-GSO systems starting to operate within the next 18 months;

– A new version of Annex 3 with a list of criteria and information to be provided, in a combined approach between Methods J2 and J3, including criteria for the participation of notifying administrations of GSO networks and the possibility of making comments with respect to the results of the computations.

Proposal

MOD B/118/1#2160

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 of Annex 1, assuming a maximum effective number of non-GSO FSS systems of 3.5;

*e)* that the effective number of non-GSO FSS systems is not the same as the actual number of systems since each operational system may cause an epfd curve which is well below, at least in certain portions of the cumulative distribution curve, the curve of the epfd limits;

*f)* 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 of Annex 1;

*g)* that, in case the aggregate epfd limits are exceeded and in order to achieve the objective in *considering f)*, administrations operating or planning to operate non-GSO FSS systems will need to agree cooperatively through consultation meetings on sharing the aggregate epfd and by implementing measures to ensure that the operations of those non-GSO systems do not exceed the aggregate epfd limits for the protection of GSO FSS networks;

*h)* that administrations planning to operate non-GSO FSS systems may also participate in such meetings, but their system would only be considered in the aggregate calculations once it meets the criteria of Annex 3;

*i)* 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**;

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

*k)* 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;

*l)* that the possible misapplication of single-entry limits should be avoided;

*m)* that Resolution 219 (Bucharest, 2022) of the Plenipotentiary Conference on sustainability of the radio-frequency spectrum and associated satellite-orbit resources used by space services noted the urgency of addressing the continued and expanded launch and operation of a large number of non-GSO systems in outer space before they are launched and operational,

recognizing

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

*b)* that coordination amongst systems will prevent simultaneous transmissions from several such systems into the main beam of a GSO earth station;

*c)* that, notwithstanding *considering d)*, *e)* and *f)* 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 of Annex 1;

*d)* that administrations operating or planning to operate 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 of Annex 1;

*e)* that there is no suitable methodology for calculating the aggregate epfd produced by non-GSO FSS systems that meet the applicable criteria indicated in Annex 2 operating co-frequency in the frequency bands referred to in *considering a)* above into GSO FSS and GSO BSS networks;

*f)* that there is no existing methodology to adapt the operation of all non-GSO FSS systems that meet the applicable criteria indicated in Annex 2 operating co-frequency in the frequency bands referred to in *considering a)* above to ensure that the aggregate epfd limits given in Tables 1A to 1D of Annex 1 are met,

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 within the next 18 months, 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 of Annex 1 to be exceeded (see No. **22.5K**);

2 that, in the event that the aggregate interference levels in Tables 1A to 1D of Annex 1 are exceeded, administrations operating or planning to operate as per *resolves*1 non‑GSO FSS systems in these frequency bands and for which the relevant information as per Annex 3 has been provided shall take all necessary measures expeditiously to reduce the aggregate epfd levels to those given in Tables 1A to 1D of Annex 1, or to higher levels where those levels are acceptable to the affected GSO administration (see No. **22.5K**);

3 that administrations, in carrying out their obligations under *resolves*1 and 2 above, shall take into account all the non-GSO FSS systems operating or planning to operate as per *resolves*1 in the frequency bands covered in Tables 1A to 1D of Annex 1 that have met all the criteria listed in Annex 3 of this Resolution with the relevant information, as well as any other relevant technical and operational parameters required for the epfd calculation, have been provided to the consultation meetings referred to in *considering g)*;

4 that administrations engaged in consultation meetings, in developing agreements to carry out their obligations under *resolves*1 and 2 above, shall establish mechanisms to ensure that all administrations are given full visibility of the process;

5 that the aggregate epfd calculations performed in the scope of the consultation meetings shall undertake two assessment outputs, one considering operational non-GSO systems and another considering operational and planned non-GSO systems as per *resolves*1 included in the criteria defined in Annex 3;

6 that the aggregate epfd calculations referred to in *resolves*5 considering operational and planned non-GSO systems as per *resolves*1 included in the criteria defined in Annex 3 are for information only;

7 that administrations, in carrying out their obligations under *resolves*1 and 2 above, shall ensure that the aggregate interference allowance into GSO FSS and BSS networks is shared equitably among non-GSO systems operating co-frequency in the frequency bands covered in Tables 1A to 1D of Annex 1;

8 that, since the limits of Tables 1A to 1D of Annex 1 were based on the assumption that 3.5 non-GSO FSS systems would operate simultaneously, once at least 4 non-GSO systems in each frequency bands indicated in Tables 1A to 1D of Annex 1 satisfy the applicable criteria included in Annex 3, the concerned administrations participating in this process of epfd calculation should hold consultation meetings on a regular basis (e.g. yearly) once the methodologies mentioned in *invites the ITU Radiocommunication Sector*1 and 2 are approved and made available to the membership or after 16 December 2026, whichever comes first;

9 that administrations notifying GSO networks that meet the applicable criteria indicated in Annex 3 and operating in the frequency bands indicated in Tables 1A to 1D of Annex 1 can participate in the process mentioned in *resolves*8 above and make comments with respect to the results of the computations;

10 that the administrations participating in the consultation meeting shall designate one administration to:

i) communicate to the Bureau the results of any aggregate sharing determinations made in application of *resolves*2 above, without regard to whether such determinations result in any modifications to the published characteristics of their respective systems or networks;

ii) provide a draft record of each consultation meeting; and

iii) provide the Radiocommunication Bureau (BR) with the approved record as per Annex 1,

invites the ITU Radiocommunication Sector

1 to continue its studies on the subject and develop, as a matter of urgency and taking into account existing and relevant ITU‑R Recommendations, a Recommendation on a suitable methodology for calculating the aggregate epfd produced by all non‑GSO FSS systems operating or planning to operate as per *resolves*1 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 of Annex 1,

2 to develop, as a matter of urgency, a Recommendation containing procedures to be used by administrations in cases referred to *resolves*2,

instructs the Radiocommunication Bureau

1 to participate in consultation meetings mentioned under *resolves*8 and to observe carefully the results of the epfd calculation mentioned in *resolves*5;

2 to publish in the International Frequency Information Circular (BR IFIC) the information referred to in *resolves*10 and *instructs the Radiocommunication Bureau*1;

3 to develop aggregate epfd calculation tools based on relevant ITU‑R Recommendations,

invites administrations

1 to participate in the discussions and determinations mentioned under *resolves*5, as appropriate;

2 to address non-GSO FSS intersystem matters, as required;

3 to provide to the Bureau, and to all participants in the consultation meetings, access to software developed, taking into consideration the methodology referred to in *invites the ITU Radiocommunication Sector* 1, to calculate the epfd level mentioned under *resolves* 1.

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

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ANNEX 2 TO RESOLUTION 76 (REV.WRC‑23)

Results of the aggregate epfd calculation

− Summary record of the meeting;

– detailed description of methodology used to calculate the aggregate interference;

− all input materials submitted to the meeting; and

− studies conducted prior to or at the meeting as well as any other materials deemed necessary for demonstrating compliance with Tables 1A to 1D in Annex 1.

ANNEX 3 TO RESOLUTION 76 (REV.WRC‑23)

List of criteria, and information from non-GSO systems,
for the application of *resolves*3

# A) Criteria for non-GSO systems to be considered under *resolves*3

1) Submission of appropriate coordination and/or notification information for non-GSO FSS systems.

2) Entry into satellite manufacturing or procurement agreement, and entry into satellite launch agreement.

3) Initial launch date to occur within the period of 18 months.

4) The non-geostationary FSS system operator should possess:

i) evidence of a binding agreement for the manufacture or procurement of its satellites; and

ii) evidence of a binding agreement to launch its satellites.

5) The manufacturing or procurement agreement should identify the contract milestones leading to the completion of manufacture or procurement of satellites required for the service provision, and the launch agreement should identify the launch date, launch site and launch service provider. The notifying administration is responsible for authenticating the evidence of an agreement.

6) The information required under this criterion may be submitted in the form of a written commitment by the responsible administration including the information indicated in sections B, C and D.

# B) Non-GSO satellite system information to be provided

1) Name/Identification of the satellite system;

2) name of the notifying administration;

3) country symbol;

4) reference to the request for coordination, or the notification information, if available;

5) total number of space stations deployed (or to be deployed within the period of 18 months) into each notified orbital plane of the satellite system with the capability of transmitting or receiving the frequency assignments;

6) orbital plane number indicated in the latest notification information published in Part I‑S of the BR IFIC for the frequency assignments into which each space station is deployed.

# C) Launch information to be provided for each non-GSO space station deployed (or to be deployed within the period of 18 months)

1) Name of the launch vehicle provider;

2) name of the launch vehicle;

3) name and location of the launch facility;

4) launch date (for space stations already deployed or planned to be deployed within the period of 18 months).

# D) Non-GSO space station characteristics to be provided for each space station deployed (or to be deployed within the period of 18 months)

1) Frequency bands as per 4) under section B above in which the space station can transmit or receive;

2) orbital characteristics of the space station (altitude of the apogee and perigee, inclination, and argument of the perigee);

3) name of the space station.

# E) Criteria for GSO networks to be considered under *resolves* 9

1) Submission of appropriate Notification information under No. **11.2** of the Radio Regulations; and,

2) Submission of the information referred to in No. **11.44B** of the Radio Regulations.

**Reasons:** Brazil understands that the evaluation of the aggregate epfd produced by all non-GSO satellite systems in the scope of Resolution **76** **(Rev.WRC‑15)** is crucial and urgent, and the introduction of the concept of a “consultation/meeting process” is needed.

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