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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 182-E** |
|  | **30 October 2023** |
|  | **Original: English** |
| China (People's Republic of)/Thailand |
| Proposals for the work of the conference |
|  |
| 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

This proposal is based on CPM Report, Method J2, Option 2, which proposes amending Resolution **76 (Rev.WRC-15)**.

It supports the introduction of the concept of multilateral consultation for the evaluation of aggregate epfd generated by non-GSO systems. At the same time, both the method used to calculate aggregate epfd and the process and procedure of consultation meetings need to be further discussed. With regard to the criteria for non-GSO system participation in the consultation, it includes both the operating or starting to operate non-GSO systems within the next 18 months into the calculation.

Proposal

China and Thailand propose the main modifications as follows:

1. The non-GSO systems that can be added to the calculation are operational or starting to operate within the next 18 months;

2. No. 196 of the ITU Constitution (Article 44) is added. And it emphasizes the equitable and reasonable use of spectrum and orbit resources, noting that no single non-GSO system shall be permitted to use up the entire interference allowance;

3. There is a situation where large-scale constellations are divided into multiple filings to meet the epfd limits specified in RR Article**22**, and China and Thailand hope to resolve this rule vulnerability which will cause the potential risk of the aggregate epfd exceeding the limits in RR Article **22**;

4. Some editorial modifications.

MOD CHN/THA/182/1#2159

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 in 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 levels in Tables 1A to 1D in 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 starting to operate non-GSO FSS systems will need to agree cooperatively through consultation meetings on sharing the aggregate epfd to ensure that the operations of those non-GSO systems do not exceed the aggregate level of protection for GSO FSS and BSS 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 starts to operate within a limited time in the future;

*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 No. 196 of the ITU Constitution (Article 44) states that “radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries”;

*n)* 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 equitable and reasonable use of spectrum and orbit resources of non-GSO systems,

Note: Some views were expressed that the connection between Resolution 219 (Bucharest, 2022) of the Plenipotentiary Conference and Resolution **76 (Rev.WRC‑15)** is still to be reviewed.

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 in Annex 1;

*d)* that administrations operating or starting to operate non-GSO FSS 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 in Annex 1;

e) that there is a practice of splitting a non-GSO satellite system into several filed systems, which may affect the effectiveness of single-entry epfd limits contained in Article 22 to protect geostationary systems or have an impact in the implementation of this Resolution,

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 starting 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 in Annex 1 to be exceeded (see No. **22.5K**);

2 that, in the event that the aggregate interference levels in Tables 1A to 1D in Annex 1 are exceeded, administrations operating or starting to operate within the next 18 months 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 in 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 starting to operate within the next 18 months as per *resolves*1 in the frequency bands covered in Tables 1A to 1D in 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 aggregate epfd calculation, have been provided to the consultation meetings referred to in *considering g)*;

4 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 not entirely occupied by a single non-GSO FSS system and is shared equitably among non-GSO FSS systems operating co-frequency in the frequency bands covered in Tables 1A to 1D in Annex 1,

5 that those participating in this process of epfd calculation should hold consultation meetings on a regular basis (e.g. yearly) but not before the methodology mentioned in *invites the ITU Radiocommunication Sector*1 is approved and made available to the membership;

6 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 2;

7 that a non-GSO FSS system using multiple satellite network filings shall be considered as a single system in the aggregate epfd calculation,

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 starting 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 in 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*5 and to observe carefully the results of the epfd calculation mentioned in *resolves*2;

2 to publish in the International Frequency Information Circular (BR IFIC) the information referred to in *resolves*6 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* 2.

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 epfd 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 for the application of *resolves* 3

A Satellite system information

1) Name/Identification of the satellite system;

2) Name of all notifying administration;

3) Country symbol;

4) Reference to the request for coordination, the notification and Resolution 35 information if available;

5) Total number of space stations deployed 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.

B Launch information of space station to be provided for each deployed or starting to deploy within the next 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;

5) Evidence of a binding agreement for the manufacture or procurement of its satellites;

6) Evidence of a binding agreement to launch its satellites.

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.

The information required under this criterion may be submitted in the form of a written commitment by the responsible administration.

C Space station characteristics for each space station deployed

1) Frequency bands as per 4) under section A 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.

**Reasons:** China and Thailand support the introduction of the concept of a “consultation meeting process” with regards to evaluate the aggregate epfd produced by all non-GSO satellite systems.

China and Thailand are also of the view that some aspects, such as methodologies to be used to evaluate aggregate epfd limit compliance, as well as the process and procedures for the consultation meeting, needs to be addressed.

It is noted that the developing countries have limited capacity of launching and developing satellites. With regard to the criteria defined for the participation of notifying administrations of non-GSO systems, China and Thailand propose that both operating and starting to operate non-GSO systems within the next 18 months should be included in calculation of the aggregate epfd. It can provide more development space for the developing countries and ensure the equitable use of spectrum and orbit resources.

At the same time, considering that the constellation systems need to determine the design plan in advance, if the non-GSO systems starting to operate are not included in the consultation calculation, it will cause an impact on the design and development of the entire constellation systems. In addition, the operability and feasibility of the constellation construction will be greatly reduced. What’s more, the 18 month period is the precedent provided by the Terms of Reference document of Resolution **609**, which can be an appropriate reference.

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