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| **World Radiocommunication Conference (WRC-19)Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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| PLENARY MEETING | **Addendum 6 toDocument 68-E** |
|  | **6 October 2019** |
|  | **Original: Arabic** |
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| Qatar (State of) |
| Proposals for the work of the conference |
|  |
| Agenda item 1.6 |

1.6 to consider the development of a regulatory framework for non-GSO FSS satellite systems that may operate in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space), in accordance with Resolution **159 (WRC-15)**;

Resolution **159 (WRC‑15)** – *Studies of technical, operational issues and regulatory provisions for non-geostationary fixed-satellite services satellite systems in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2‑50.2 GHz (Earth-to-space) and 50.4‑51.4 GHz (Earth-to-space).*

Introduction

WRC-19 agenda item 1.6 addresses the development of technical, operational and regulatory provisions in the 50/40 GHz frequency bands to facilitate sharing between non-GSO and GSO fixed-satellite services (FSS)/broadcasting-satellite service (BSS)/mobile-satellite service (MSS) systems.

There are currently no regulatory provisions for sharing between non-GSO systems and GSO networks in the 50/40 GHz frequency bands. In addition, there are no mechanisms in the Radio Regulations (RR) establishing coordination procedures applicable to non-GSO systems operating within the FSS and BSS allocations in frequency bands in the 37.5 to 51.4 GHz frequency range.

ITU-R studies in the 50/40 GHz frequency bands have been conducted on sharing between non-GSO systems and GSO FSS and BSS networks. These studies concluded that developing epfd limits based on the operational parameters for a single, specific, non-GSO system results in spectrum inefficiencies for other non-GSO systems.

Two methods are proposed in the CPM Report to address WRC-19 agenda item 1.6. These methods are described below.

There are two issues within WRC-19 agenda item 1.6:

**Issue 1:** Developing a regulatory framework for non-GSO FSS satellite systems that may operate in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2‑50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space). There are two methods to address this issue.

One method (Method A) proposes to add footnotes to RR Article **5** that subjects non-GSO FSS and MSS systems to coordination provisions, add provisions to RR Article **22** in order to protect GSO satellite networks, and establishes a consultation group to coordinate aggregate interference in order to protect GSO satellite networks.

The other method (Method B) is to carry forward the studies to ensure the protection of GSO satellite networks under WRC-19 agenda item 1.6 to a new WRC‑23 agenda item towards the development of epfd limits.

Issue 2: Modifying Resolution 750 (Rev.WRC-15)

For the method that proposes to revise Resolution **750 (Rev.WRC-15)** for the protection of EESS (passive) in the band 50.2-50.4 GHz, 2 general options are considered (see section 3/1.6/5.3 of the CPM Report):

– OPTION A: Revision of limits for non-GSO systems only;

– OPTION B: Revision of limits for both GSO networks and non-GSO systems.

Proposals

The Qatari Administration proposes using Method A of issue 1 to satisfy this agenda item.

Issue 1 Method A

ARTICLE 5

Frequency allocations

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

MOD QAT/68A6/1#49996

34.2-40 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) ADD 5.A16 MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 |
| 38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) ADD 5.A16 MOBILE Earth exploration-satellite (space-to-Earth) 5.547 |
| 39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B ADD 5.A16 MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 ADD 5.B16 |

MOD QAT/68A6/2#49997

40-47.5 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B ADD 5.A16 MOBILE MOBILE-SATELLITE (space-to-Earth)  SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) ADD 5.B16 |
| 40.5-41FIXEDFIXED-SATELLITE (space-to-Earth) ADD 5.A16BROADCASTINGBROADCASTING-SATELLITEMobile5.547 | 40.5-41FIXEDFIXED-SATELLITE (space-to-Earth) 5.516B ADD 5.A16BROADCASTINGBROADCASTING-SATELLITEMobileMobile-satellite (space-to-Earth)5.547 | 40.5-41FIXEDFIXED-SATELLITE (space-to-Earth) ADD 5.A16BROADCASTINGBROADCASTING-SATELLITEMobile5.547 |
| 41-42.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B ADD 5.A16 BROADCASTING BROADCASTING-SATELLITE Mobile 5.547 5.551F 5.551H 5.551I |
| ... |
| 47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 ADD 5.A16 MOBILE 5.552A |

MOD QAT/68A6/3#49998

47.5-51.4 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 47.5-47.9FIXEDFIXED-SATELLITE(Earth-to-space) 5.552 ADD 5.A16 (space-to-Earth) 5.516B 5.554A MOBILE | 47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 ADD 5.A16 MOBILE |
| 47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 ADD 5.A16 MOBILE 5.552A |
| 48.2-48.54FIXEDFIXED-SATELLITE(Earth-to-space) 5.552 ADD 5.A16(space-to-Earth) 5.516B5.554A 5.555BMOBILE | 48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B MOD 5.338A 5.552 ADD 5.A16 MOBILE |
| 48.54-49.44FIXEDFIXED-SATELLITE(Earth-to-space) 5.552 ADD 5.A16MOBILE5.149 5.340 5.555 |  |
| 49.44-50.2FIXEDFIXED-SATELLITE(Earth-to-space) MOD 5.338A 5.552 ADD 5.A16(space-to-Earth) 5.516B5.554A 5.555BMOBILE |  5.149 5.340 5.555 |
| ... |
| 50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOD 5.338A ADD 5.A16 MOBILE Mobile-satellite (Earth-to-space) |

Option 1:

ADD QAT/68A6/4#49999

5.A16The use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space‑to‑Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by a non‑geostationary‑satellite system in the fixed-satellite service is subject to the application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed‑satellite service, but not with non-geostationary systems in other services. Draft new Resolution **[QAT/A16] (WRC‑19)** shall also apply, and No.**22.2** shall continue to apply.     (WRC‑19)

Option 2:

ADD QAT/68A6/5#50000

5.A16The use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space‑to‑Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by a non‑geostationary-satellite system in the fixed-satellite service for which complete coordination information is received by the Bureau after 1 January 2021, is subject to the application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service, but not with non-geostationary systems in other services. Non-GSO systems in the fixed-satellite service in these frequency bands shall operate in accordance with draft new Resolution **[QAT/A16] (WRC‑19)**. No.**22.2** shall continue to apply.     (WRC‑19)

Option 3:

ADD QAT/68A6/6#50001

5.A16The use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space‑to‑Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to the application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service.     (WRC‑19)

Option 4:

ADD QAT/68A6/7#50002

5.A16The use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space‑to‑Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by a non‑geostationary-satellite system in the fixed-satellite service is subject to the application of the provisions of No. **9.12**.     (WRC‑19)

Option 1:

ADD QAT/68A6/8#50003

5.B16The use of the frequency bands 39.5-40 and 40-40.5 GHz by the mobile-satellite service (space-to-Earth) and non‑geostationary-satellite systems in the fixed-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**.     (WRC‑19)

Option 2:

ADD QAT/68A6/9#50004

5.B16The use of the frequency bands 39.5-40 and 40-40.5 GHz by non-geostationary-satellite systems in the mobile-satellite service (space-to-Earth) and non‑geostationary-satellite systems in the fixed-satellite service (space-to-Earth) for which complete coordination information is received by the Bureau after 1 January 2021, is subject to coordination underNo.**9.12**.     (WRC‑19)

Option 3:

ADD QAT/68A6/10#50005

5.B16 In the frequency bands 39.5-40 GHz and 40-40.5 GHz, the provisions No. **22.2** also applies to non-geostationary systems in the fixed-satellite service with respect to geostationary-satellite networks in the mobile-satellite service.     (WRC‑19)

Method A *(continued)*

MOD QAT/68A6/11#50006

5.338AIn the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, 51.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution **750 (Rev.WRC-19)** applies.     (WRC-19)

ARTICLE 22

Space services1

Section II − Control of interference to geostationary-satellite systems

ADD QAT/68A6/12#50007

22.5L9) A non-geostationary system in the fixed-satellite servicein the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space‑to‑Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) shall not exceed:

– a single entry of 3% of the time allowance for the *C*/*N* value specified in the short-term performance objective associated with the shortest percentage of time (lowest *C*/*N*) for each GSO reference link; and

Option 1:

– a 3%reduction in time-averaged spectral efficiency as associated with the long-term performance objective for each GSO reference link using adaptive coding and modulation.

Note: The term “time-averaged” means averaged over a period of a year, in accordance with Recommendation ITU-R P.618. A view was expressed that further clarification may be required on the reference point for which the reduction in spectral efficiency is considered.

Option 2:

– a 3%reduction in reserve capacity as associated with the long-term performance objective defined over one year for each GSO reference link using adaptive coding and modulation.

Note: The term “reserve capacity” is used in Recommendation ITU-R S.1323, but for which there are no examples for calculation and would require further clarification in Option 2. To date, Option 2 has not been studied in the ITU-R, but considers the same principle as in Recommendation ITU‑R S.1323.

These calculations shall be performed using the GSO reference links contained in WD towards a PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS] and the methodology provided in PDN Recommendation ITU‑R S.[50/40 GHz FSS SHARING METHODOLOGY]. The epfd levels from the non-GSO FSS system should be derived using the most recent version of Recommendation ITU‑R S.1503.     (WRC‑19)

ADD QAT/68A6/13#50008

22.5M 10) Administrations operating or planning to operate non-geostationary-satellite systems in the fixed-satellite service in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2‑50.2 GHz and 50.4‑51.4 GHz shall ensure that the aggregate interference to GSO FSS, MSS and BSS networks does not exceed 10% of the short- and long-term performance objectives by applying the provisions of draft new Resolution **[QAT/A16] (WRC-19)**.     (WRC‑19).

ARTICLE 9

Procedure for effecting coordination with or obtaining agreement of other administrations1, 2, 3, 4, 5, 6, 7, 8, 9    (WRC‑15)

Section II − Procedure for effecting coordination12, 13

Sub-Section IIA − Requirement and request for coordination

MOD QAT/68A6/14#50009

9.35 *a)* examine that information with respect to its conformity with No. 11.31MOD 19;     (WRC‑19)

MOD QAT/68A6/15#50010

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19 9.35.1The Bureau shall include the detailed results of its examination under No. 11.31 of compliance with the limits in Tables **22‑1** to **22‑3** or the applicable single-entry limits in No. **22.5L** of Article **22** in the publication under No. **9.38**.     (WRC‑19)

ADD QAT/68A6/16#50011

draft new RESOLUTION [QAT/A16] (WRC‑19)

Protection of geostationary FSS, BSS and MSS networks from unacceptable interference from non-GSO FSS systems in the 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz frequency bands

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

*a)* that the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz are allocated, *inter alia*, on a primary basis to the fixed-satellite service (FSS) in all Regions;

*b)* that the frequency bands 40.5-41 GHz and 41-42.5 GHz are allocated, on a primary basis to the broadcasting-satellite service (BSS) in all regions;

*c)* that the frequency bands 39.5-40 GHz and 40-40.5 GHz are allocated, on a primary basis to the mobile-satellite service (MSS) in all regions;

*d)* that Article **22** contains regulatory and technical provisions on sharing between GSO and non-GSO FSS systems in these bands in *considering* *a)*;

*e)* that, in accordance with No. **22.2**, non-geostationary-satellite orbit (non-GSO) systems shall not cause unacceptable interference to geostationary-satellite orbit (GSO) FSS and broadcasting-satellite service (BSS) networks and, unless otherwise specified in the Radio Regulations, shall not claim protection from GSO FSS and BSS satellite networks;

*f)* that non-GSO FSS systems would benefit from increased certainty that would result from the quantification of technical regulatory measures required for protection of GSO satellite networks operating in the bands referred to in *considering* *a)*, *b)* and *c)* above;

*g)* that GSO FSS, MSS, and BSS networks can be protected without placing undue constraints on non-GSO FSS systems in the bands in *considering a)*, *b)* and *c)* above;

*h)* that WRC‑19 modified Article **22** to limit single-entry and aggregate permissible time allowance for degradation in terms of *C*/*N* by non-GSO FSS systems to GSO satellite networks, based on WD PDN Recommendation ITU‑R S.[50/40 Reference Links and PDN Recommendation ITU‑R S.[50/40 GHz FSS SHARING METHODOLOGY] in the bands in *considering* *a)*;

*i)* that the operating parameters and orbital characteristics on non-GSO FSS systems are usually inhomogeneous;

*j)* that, as a result of this inhomogeneity, the time allowance for the *C*/*N* value specified in the short-term performance objective associated with the shortest percentage of time (lowest *C*/*N*) or decrease of the long-term throughput (spectral efficiency) caused to reference GSO FSS links by non-GSO FSS systems is likely to vary between such systems;

*k)* that the aggregate interference levels from multiple non‑geostationary FSS systems will be related to the actual number of systems sharing a frequency band based on the single-entry operational use of each system;

*l)* that to protect GSO FSS, MSS, and BSS networks in the frequency bands listed in *considering* *a)* from unacceptable interference, the aggregate impact of interference caused by all co-frequency non-GSO FSS systems should not exceed the maximum aggregate impact specified in No. **22.5M** of the Radio Regulations;

*m)* that to achieve the level of protection of GSO reference links given in PDN Recommendation ITU‑R S.[50/40 GHz FSS SHARING METHODOLOGY], administrations operating or planning to operate non-GSO FSS systems will need to agree cooperatively through consultation meetings;

*n)* that the aggregate level of the time allowance for the *C*/*N* value specified in the short-term performance objective associated with the shortest percentage of time (lowest *C*/*N*) of GSO reference link is likely to be the summation of single-entry levels caused by non-GSO FSS systems,

recognizing

*a)* that non-GSO FSS systems may need to implement interference mitigation techniques, such as orbital avoidance angles, earth station site diversity, and GSO arc avoidance, to facilitate sharing of frequencies among non-GSO FSS systems and to protect GSO networks;

*b)* that administrations operating or planning to operate non-GSO FSS systems will need to agree cooperatively through consultation meetings to share the aggregate interference impact allowance for all non-GSO FSS systems operating in the frequency bands listed in *considering* *a)* in a manner that achieves the level of protection for GSO FSS, MSS and BSS networks that is stated in No. **22.5M** of the Radio Regulations;

*c)* that, taking into account the single-entry allowance in No. **22.5L**,the aggregated impact of all non-GSO FSS systems can be computed without the need for specialized software tools based on the results of the single-entry impact for each system;

*d)*the need for administrations operating non-GSO FSS systems in the frequency bands listed in *considering* *a)* to agree cooperatively through consultation meetings takes on particular urgency whenever there could be aggregate interference at levels higher than the aggregate impact allowance from operational non-GSO FSS systems;

*e)* that representatives of administrations operating or planning to operate GSO FSS, MSS and BSS networks are encouraged to be involved in the determinations made pursuant to *recognizing* *b)*;

*f)* that in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space‑to‑Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space), signals experience high levels of attenuation due to atmospheric effects such as rain, cloud cover and gaseous absorption;

*g)* that given these expected high levels of fading, it is desirable for GSO networks and non-GSO FSS systems to implement fade counter measures such as automatic level control, power control and adaptive coding and modulation,

noting

*a)* that PDN Recommendation ITU‑R S.[50/40 GHz FSS SHARING METHODOLOGY] contains the methodology for determining conformity to the single-entry and aggregate limits to protect the GSO networks;

*b)* that Recommendation ITU‑R S.1503 provides guidance on how to compute the epfd levels from a non-GSO system into GSO earth stations and satellites;

*c)* that WD PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS] contains GSO satellite system characteristics to be considered in non-GSO/GSO frequency sharing analyses in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz,

resolves

Option 1:

1 that administrations operating or planning to operate non‑geostationary FSS systems in the frequency bands referred to in *considering a)* above, shall, in collaboration, take all necessary steps, including, if necessary, by means of appropriate modifications to their systems or networks, to ensure that the aggregate interference impact to geostationary FSS, MSS and BSS satellite networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate protection limits – that is, the time allowance for the *C*/*N* value specified in the short-term performance objective associated with the shortest percentage of time (lowest *C*/*N*) for each GSO reference link and the decrease in time-averaged spectral efficiency for links using Adaptive Coding and Modulation listed in WD PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS] by more than 10%, as determined pursuant to No. **22.5M** of the Radio Regulations;

Note: The term “time-averaged” means averaged over a period of a year, in accordance with Recommendation ITU-R P.618. A view was expressed that further clarification may be required on the reference point for which the reduction in spectral efficiency is considered.

Option 2:

1 that administrations operating or planning to operate non‑geostationary FSS systems in the frequency bands referred to in *considering a)* above, shall, in collaboration, take all necessary steps, including, if necessary, by means of appropriate modifications to their systems or networks, to ensure that the aggregate interference impact to geostationary FSS, MSS and BSS satellite networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate protection limits – that is, the time allowance for the *C*/*N* value specified in the short-term performance objective associated with the shortest percentage of time (lowest *C*/*N*) each GSO reference link and the decrease in reserve capacity for long term performance objective specified over one year for links using Adaptive Coding and Modulation listed in WD PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS] by more than 10%, as determined pursuant to No. **22.5M** of the Radio Regulations;

Note: The term “reserve capacity” is used in Recommendation ITU-R S.1323, but for which there are no examples for calculation and would require further clarification in Option 2. To date, Option 2 has not been studied in the ITU-R, but considers the same principle as in Recommendation ITU-R S.1323.

2 that to carry out the obligations in *resolves*1 above, administrations operating or planning to operate non-geostationary FSS systems shall agree cooperatively through regular consultation discussions referred to in *recognizing* *b)* to ensure that operations of all non-GSO networks do not exceed the aggregate level of protection for geostationary satellite networks;

3 that to carry out the obligations of *resolves*2above*,* administrations shall take into account the GSO satellite characteristics listed in WD PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS] when applying the methodology contained in PDN Recommendation ITU‑R S.[50/40 GHz FSS SHARING METHODOLOGY] and the results of the aggregate impact to GSO networks calculated by validation software;

Option 1:

4 that administrations shall use the methodology in PDN Recommendation ITU‑R S.[50/40 GHz FSS SHARING METHODOLOGY] to determine conformity to the aggregate limits to protect the GSO reference links in WD PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS];

Option 2:

No *resolves*4.

5 that administrations (including representatives of administrations operating GSO FSS, MSS and BSS networks) participating in a consultation meeting are allowed to use their own software in conjunction with any software tools used by the BR for the calculation and verification of the aggregate limits given in PDN Recommendation ITU‑R S.[50/40 FSS GHz SHARING METHODOLOGY], subject to the agreement of the consultation meeting;

6 that administrations, in carrying out their obligations under *resolves*1 above, shall take into account only those non-geostationary FSS systems with frequency assignments in the frequency bands referred to in *considering a)* above that have met the criteria listed in Annex 2 to this Resolution through appropriate information provided in the course of consultation discussions referred to in *resolves*2;

7 that administrations, in developing agreements to carry out their obligations under *resolves*1 above, shall establish mechanisms to ensure that all potential FSS system and network notifying administrations and operators are given full visibility of and the opportunity to participate in the process;

Option 1:

8 that participation in the consultation process by administrations operating or planning to operate non-GSO FSS systems that are subject to this Resolution is required, and that failure by a responsible administration to participate in the consultation process does not relieve that administration of obligations under *resolves*1 above, nor does it remove their systems from consideration in any aggregate calculations by the consultation group;

Option 2:

8 the obligation in *resolves*2 above begins to apply when a fourth non-geostationary FSS systems with frequency assignments in the frequency bands referred to in *considering a)* meets the criteria listed in Annex 2 to this Resolution;

9 that each administration, in the absence of an agreement reached at consultation meetings referred to in *resolves* 2, shall ensure that each of its non-GSO FSS systems subject to this Resolution are operated in accordance with reduced single-entry interference impact allowances, calculated by the apportionment of the aggregate allowance commensurate to the number of simultaneously operating non-GSO systems, so as to ensure that the aggregate allowance in No. **22.5M** is not exceeded in operation;

10 that, in specific implementation of *resolves* 8above, if the consultation discussions show that there would be an exceedance of the aggregate allowance from non-GSO FSS systems in operation, every operational non-GSO FSS system shall reduce its emissions:

Option 1: *pro rata* by the amount of the exceedance of the aggregate allowance;

Option 2: or by means of appropriate modifications to their systems;

11 that the administrations participating at the consultation discussion referred to in *resolves*2 shall designate one convener to be responsible for communicating to the Bureau, such as shown in Annex 1 that the results of the aggregate non-GSO system operational calculation and sharing determinations made in application of *resolves*1, 8, and 9 above, without regard to whether such determinations result in any modifications to the published characteristics of their respective systems, providing a draft record of each consultation meeting, and posting the approved record,

invites the Radiocommunication Bureau

to participate in the consultation meetings in *resolves* 2 as an observer and to provide advice as necessary with respect to the results of the aggregate interference impact calculation performed according to *resolves*1,

instructs the Radiocommunication Bureau

1 to publish in the International Frequency Information Circular (BR IFIC), the information referred to in *resolves*7;

2 to exclude the aggregate calculations given in No. **22.5M** as part of a satellite network examination under No. **11.31**,

urges administrations

to provide the Radiocommunication Bureau and all participants to the consultation meetings with the methodology, assumptions and inputs used in conjunction with *resolves* 3.

ANNEX 1 TO draft new RESOLUTION [QAT/A16] (WRC-19)

List of geostationary networks characteristics and format of the result of the aggregate calculation to be provided to BR for
publication for information

# I GSO networks characteristics to be used in the calculation of aggregate emissions from non-GSO FSS systems

## I-1 GSO networks characteristics

WD PDN Recommendation ITU‑R S.[50/40 REFERENCE LINKS].

## I-2 Non-GSO satellite system constellation parameters

For each non‑GSO satellite system, the following parameters should be provided to BR for publication in the aggregate calculation:

– notifying administration;

– number of space stations used in aggregate calculations;

– single-entry contribution to the aggregate of each non-GSO FSS system.

# II Results of the aggregate epfd calculation

ANNEX 2 TO draft new RESOLUTION [QAT/A16] (WRC-19)

List of criteria for the application of *resolves* 5

1 Submission of Coordination or Notification Information.

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

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.

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 agreement.

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

3 As an alternative to satellite manufacturing or procurement and launch agreements, evidence of guaranteedfunding arrangements for the implementation of the project would be accepted. The notifying administration is responsible for authenticating the evidence of these arrangements and for providing such evidence to other interested administrations in furtherance of its obligations under this Resolution.

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