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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 196-E** |
|  | **31 October 2023** |
|  | **Original: English** |
|  |
| Ghana |
| PROPOSALS FOR THE WORK OF THE CONFERENCE |
|  |
| Agenda item 7(A) |

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(A) Topic A - Tolerances for certain orbital characteristics of non-GSO space stations in the FSS, BSS or MSS

MOD GHA/196/1#1982

RESOLUTION 35 (Rev.WRC‑23)

A milestone-based approach for the implementation of frequency assignments
to space stations in a non-geostationary-satellite system
in specific frequency bands and services

The World Radiocommunication Conference (Dubai, 2023),

considering

…

recognizing

…

recognizing further

…

noting

that for the purpose of this Resolution:

– the term “frequency assignments” is understood to refer to frequency assignments to a space station of a non-GSO system;

– the term “notified orbital plane” means an orbital plane of the non-GSO system, as provided to the Radiocommunication Bureau (BR) in the most recent notification information for the system’s frequency assignments, that possesses the general characteristics of items:

– A.4.b.4.a, the inclination of the orbital plane of the space station;

– A.4.b.4.a.1, the planned tolerance for the inclination of the orbital plane of the space station;

– A.4.b.4.d, the altitude of the apogee of the space station;

– A.4.b.4.d.1, the planned tolerance for the altitude of the apogee of the space station;

– A.4.b.4.e, the altitude of the perigee of the space station;

– A.4.b.4.e.1, the planned tolerance for the altitude of the perigee of the space station;

– A.4.b.4.i, the argument of the perigee of the orbit of the space station (only for orbits whose altitudes of the apogee and perigee are different); and

– A.4.b.4.i.1, the planned tolerance for the argument of the perigee of the orbit of the space station (only for orbits whose altitudes of the apogee and perigee are different

in Table A of Annex 2 to Appendix **4**;

– the term “total number of satellites” is understood to mean the sum of the various values of Appendix **4** data item A.4.b.4.b associated with the notified orbital planes in the most recent notification information submitted to BR,

resolves

…

ADD GHA/196/2#1972

Draft New Resolution [A7(A)-NGSO-FSS-BSS-MSS-Tolerance-Option A] (WRC‑23)

Tolerances for certain orbital characteristics of space stations
deployed as part of non-GSO FSS, BSS or MSS systems

The World Radiocommunication Conference (Dubai, 2023),

considering

that WRC‑19 invited ITU‑R to study, as a matter of urgency, tolerances for certain orbital characteristics of the non-geostationary-satellite orbit (non-GSO) space stations of the fixed-satellite service (FSS), the broadcasting-satellite service (BSS) and the mobile-satellite service (MSS) to account for the potential differences between the notified and deployed orbital characteristics for the inclination of the orbital plane, the altitude of the apogee of the space station, the altitude of the perigee of the space station and the argument of the perigee of the orbital plane,

noting

that, for the purposes of this Resolution, tolerances refer to the maximum variations allowed between the value notified and/or recorded for the orbital characteristics referred to in the *considering* above and those associated with the actual deployment of satellites of the non-GSO FSS, BSS or MSS under consideration,

recognizing

*a)* that the use of frequency assignments to non-GSO FSS, BSS and MSS are subject to the regulatory and operational limits stipulated in the Radio Regulations;

*b)* that Nos. **11.44C**, **11.49.2** and **11.51** require the deployment of satellites on notified orbital planes;

*c)* that orbital tolerances for a non-GSO system should take into account design considerations including the atmospheric drag characteristics of the altitude chosen and solar cycle predictions, which could have an impact on the lifetime of the satellites;

*d)* that there are legitimate reasons for a satellite operating at a variance from its notified orbital characteristics, such as maintaining separation between satellites in the same system or with satellites in another satellite system, in order to minimize the risk of collision;

*e)* that satellites on highly elliptical orbits and high inclined orbits have significant orbital precession rates and, consequently, restrictive orbital-keeping requirements and correction of orbit parameters may lead to a reduction of such satellites lifetime and to a frequent replacement;

*f)* that this Resolution defines the maximum acceptable variation of certain orbital characteristics of a non-GSO system to be considered as operating within its notified orbital plane and does not preclude other coordination requests or notification filings under Articles **9** and **11** of the Radio Regulations for other non-GSO systems at the same altitude and tolerance;

*g)* that administrations and their operators may establish separate operational arrangements regarding coexistence of the physical orbits of satellite systems and networks, including satellites in geostationary-satellite orbits and non-GSO, and that such arrangements are not addressed by the ITU Radio Regulations which deal with avoidance of harmful interference due to radio frequency usage,

resolves

1 ***Option A2A1***: that, as of [*16 December 2023 or the entry into force of the Final Acts of WRC-23]* for space stations notified as part of a non-GSO FSS, BSS or MSS system with an apogee altitude less than 15 000 km:

 ***Option A2A2***: that, as of [*16 December 2023 or the entry into force of the Final Acts of WRC-23]* for space stations with an orbital eccentricity[[1]](#footnote-1)1 less than 0.5/TBD notified as part of a non-GSO FSS, BSS or MSS system with an apogee altitude less than 15 000 km:

 ***Option A2A3***: that, as of [*16 December 2023 or the entry into force of the Final Acts of WRC-23]* for space stations notified as part of a non-GSO FSS, BSS or MSS system subject to Resolution **35 (WRC‑19)** with an apogee altitude less than 15 000 km:

 ***Option A2A4***: that, as of [*16 December 2023 or the entry into force of the Final Acts of WRC-23]* for space stations with an orbital eccentricity1 less than 0.5/TBD notified as part of a non-GSO FSS, BSS or MSS system subject to Resolution **35 (WRC‑19)** with an apogee altitude less than 15 000 km:

a) the observed variation for the altitude (Δ*altObserved*) of both perigee and apogee, shall not exceed allowed variation for the altitude (Δ*altAllowed* ) (see the Annex);

b) the observed variation for the inclination (Δ*iObserved*) shall not exceed allowed variation (Δ*iAllowed*) for the inclination (see the Annex);

2 that, as of [*16 December 2023 or the entry into force of the Final Acts of WRC-23]* and except for the application of Nos.**11.44C** or**11.49.2**, the BR shall allow a possible exceedance of the tolerances referred to in *resolves*1for a maximum of (90/180) consecutive days, when conducting its investigations under No. **13.6;**

3 that any space station deployed as part of a non-GSO FSS, BSS or MSS system at an altitude and with an inclination other than the notified altitude or the notified inclination*,* shall not cause more interference nor require more protection than if the space station was deployed at the notified altitude and the notified inclination,

instructs the Radiocommunication Bureau

1 to take the necessary actions to implement this Resolution, including providing assistance to administrations when requested, to address the difficulties they may encounter in the implementation of this Resolution without any regulatory impact on the administrations; and

2 to report to future world radiocommunication conferences any difficulties or inconsistencies encountered in the implementation of this Resolution.

Annex to Draft New Resolution [A7(A)-NGSO-FSS-BSS-MSS-Tolerance-Option A] (WRC‑23)

Variation for the altitude and the inclination

1 The observed variation for the altitude (Δ*altObserved*) of a non-GSO satellite is equal to:

      in kilometres

where:

 *altd*: is the observed altitude in kilometres of the deployed satellite at the perigee or apogee

 *altn*: is the altitude of the perigee or apogee in kilometres of the associated notified orbital plane of the non-GSO system.

2 The allowed variation for the altitude (Δ*altAllowed*) of a non-GSO satellite is equal to:

 ∆*altAllowed =* X      in kilometres

Where X is a fixed value equal to 70-100

3 The observed variationfor the inclination (Δ*iObserved*) of a non-GSO satellite is equal to:

      in degrees

where:

 *id* is the observed inclination in degrees of the deployed satellite

 *in* is the inclination in degree of the associated notified orbital plane of the non-GSO system.

4 The allowed variation for the inclination (Δ*iAllowed*) of a non-GSO satellite is equal to:

 ∆i*Allowed =* Z       in degrees

Where Z is a fixed value equal to 3

 (1)

**Reasons:** Ghana Administration supports Method A2 from the CPM text. As this method is meant to not allow any other protection rather than the one obtained at the ITU notified altitude and does not grant any other extra protection. It ensures that the interference environment remains as filled from the notified altitude. Ghana Administration supports an absolute value of 70-100 kilometres that provides adequate tolerance to accommodate other non-GSO systems in similar altitudes to ensure efficient sharing of orbital resources and the tolerance should be just adequate for operators to safely fly their satellites on a day-to-day basis. Noting that this tolerance is only for determining whether an operator is operating satellites within its ITU filing parameters, and sufficient ITU filing tolerance is required to enable accommodation of additional systems on an operational basis.

1. 1 The eccentricity “*e*” is equal to: ,

where:

*Ra*: distance between the centre of the Earth and the space station at apogee

*Rp*: distance between the centre of the Earth and the space station at perigee. [↑](#footnote-ref-1)