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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| PLENARY MEETING | **Addendum 2 to Document 6(Add.23)(Add.2)-E** |
|  | **14 October 2015** |
|  | **Original: English** |
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| United States of America | |
| Proposals for the work of the conference | |
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| Agenda item 9.2 | |

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations; and

Background Information

Section 3.2.2.4.2 of Addendum 2 of the Report of the Director of the Radiocommunication Bureau to WRC-15 indicates that further study regarding the power limits applicable to non-GSO systems is necessary to apply them to systems operating with characteristics materially different from those assumed at the time the limits were adopted. Specifically, the Director’s Report suggests that the ITU-R may wish to review the Articles 21 and 22 power limits “taking into account the characteristics of the networks submitted recently and the overall trend for a growing interest in operating non-GSO FSS systems, with the view to ensure that all existing services are adequately protected.”

Articles 21 and 22 of the Radio Regulations contain provisions to ensure compatibility of non-GSO FSS operations with co-primary services. Among these provisions are uplink and downlink equivalent power flux-density (epfd↑ and epfd↓) limits to protect GSO networks from unacceptable interference pursuant to No. 22.2 and downlink power flux-density (pfd) limits in No. 21.16 to protect terrestrial services.

Based on the unique orbital configuration of the highly-elliptical orbit (HEO) systems that were proposed when the limits were adopted, the epfd limits in the 3 700-4 200 MHz (space-to-Earth) and 5 925-6 725 MHz (Earth-to-space) frequency bands are significantly more stringent than in other FSS bands. In addition, the pfd limits for 3 700-4 200 MHz are 8 dB more stringent for non-GSO than GSO for angles of arrival 25° to 90° even though no such difference exists in other FSS bands. Also in this band, the non-GSO pfd limits for angles of arrival less than 25° are based on the number of non-GSO satellites *in a given hemisphere* per No. 21.16.15. This implies only HEO systems were considered because for most types of circular orbit non-GSO systems, many of the satellites in a given hemisphere would not be visible from a specific location on the Earth.

Prior assumptions regarding the operating characteristics of non-GSO systems are not representative of the non-GSO systems that seek to operate in the C-band. Therefore, a draft new Resolution is proposed that calls for ITU-R studies of the Articles 21 and 22 power limits applicable to non-GSO systems in the bands 3 700-4 200 MHz and 5 925-6 725 MHz and the development of appropriate power limits applicable to non-GSO systems in the bands 4 500-4 800 MHz and 6 725-7 025, while, as noted in the Director’s Report, ensuring “that all existing services are adequately protected.”

Proposal

ADD USA/6A23A2A2/1

Draft New Resolution [USA-A92-NGSO FSS C-BAND] (WRC-15)

Regulatory provisions for non-GSO systems in the 3 700-4 200 MHz,   
4 500-4 800 MHz and 5 925-7 025 MHz frequency bands   
allocated to the fixed-satellite service

The World Radiocommunication Conference (Geneva, 2015),

considering

*a)* that systems based on the use of new technologies associated with both geostationary satellite orbit (GSO) and non-geostationary satellite orbit (non-GSO) constellations are capable of providing high-capacity and low-cost means of communication even to the most isolated regions of the world;

*b)* that GSO and non-GSO satellite orbits and associated spectrum are valuable resources and equitable access to these resources should be protected for the benefit of all countries in the world;

*c)* that facilitating use of new non-GSO systems has the potential to augment substantially the capacity, spectrum efficiency and benefits derived from GSO and non-GSO systems operating in the bands: 3 700-4 200 MHz, 4 500-4 800 MHz and 5 925-7 025 MHz,

noting

*a)* that the Article **21** power flux-density (pfd) limits and Article **22** equivalent power flux-density (epfd↓) limits in the frequency band 3 700-4 200 MHz (space-to-Earth) and the Article **22** epfd↑ limits in the frequency band 5 925-6 725 MHz (Earth-to-space) are based on a particular highly-elliptical orbit configuration while new non-GSO systems that seek to operate in these bands may utilize other orbits;

*b)* that Article **22** does not contain epfd↓ and epfd↑ limits for non-GSO systems in the 4 500-4 800 MHz (space-to-Earth) and 6 725-7 025 (Earth-to-space) frequency bands allocated to the fixed-satellite service (FSS), the use of which is subject to the provisions of Appendix **30B**;

*c)* that the Director’s Report to WRC-15 acknowledges that there may be a need for “reviewing or confirming” assumptions that led to the current values of the Article **21** and Article **22** power limits, taking into account the characteristics of systems recently submitted “and the overall trend for a growing interest in operating non-GSO FSS systems, with the view to ensure that all existing services are adequately protected”;

*d)* that specifically identified studies taking into account current technical and operational characteristics will help determine appropriate Article **21** pfd limits and Article **22** epfd limits for the bands 3 700-4 200 MHz, 4 500-4 800 MHz and 5 925-7 025 MHz for non-GSO systems,

recognizing

*a)* that enabling GSO networks and non-GSO systems to make the most efficient use of satellite orbits and frequency bands allocated to the FSS should take into consideration the other services to which those bands are also allocated on a primary basis;

*b)* that the 3 700-4 200 MHz, 4 500-4 800 MHz and 5 925-7 025 MHz bands are also allocated in one or more Regions to the fixed and mobile services on a primary basis;

*c)* that in the 3 700-4 200 MHz, 4 500-4 800 MHz and 5 925-7 025 MHz frequency bands, non-GSO FSS systems are obligated by No. **22.2** not to cause unacceptable interference to or claim protection from GSO FSS networks;

*d)* that under **No. 5.458B** the band 6 700-7 025 MHz allocated to the FSS, on a primary basis in the space-to-Earth direction is limited to feeder links for non-GSO systems of the mobile-satellite service (MSS);

*e)* that Nos. **5.440A** and **5.457C** were adopted to address the operation of aeronautical mobile telemetry (AMT) for flight testing by aircraft stations (see No. **1.83**) in the bands 4 400-4 940 MHz and 5 925-6 700 MHz with respect to the FSS only using GSO networks,

resolves to invite ITU-R

to study the following issues relating to non-GSO systems in the following frequency bands allocated to the FSS:

*a)* in the 3 700-4 200 MHz (space-to-Earth) frequency band, the Article **21** pfd limits with a view to enabling non-GSO systems with various orbital configurations to operate in these FSS frequency bands, while ensuring that existing primary services are protected;

*b)* in the 3 700-4 200 MHz (space-to-Earth) and 5 925-6 725 MHz (Earth-to-space) frequency bands, the Article **22** epfd↓limits and epfd↑ limits applicable to non-GSO systems with a view to enabling non-GSO systems with various orbital configurations to operate in these frequency bands, while ensuring that GSO networks are protected from unacceptable interference pursuant to No. **22.2** and existing protection criteria;

*c)* in the 4 500-4 800 MHz (space-to-Earth) and 6 725-7 025 (Earth-to-space) frequency bands, the possible development of Article **22** epfd↓and epfd↑ limits similar to those in other FSS bands with a view to enabling non-GSO systems to operate in these frequency bands, while ensuring that GSO networks are protected from unacceptable interference pursuant to No. **22.2** and existing protection;

*d)* in the 6 700-7 025 MHz frequency band, the protection of feeder links for MSS systems operating in the space-to-Earth direction from unacceptable interference, pursuant to existing criteria, from non-GSO FSS system earth stations operating in the Earth-to-space direction;

*e)* in the bands 4 500-4 800 MHz (space-to-Earth) and 5 925-6 700 MHz (Earth-to-space), the development of regulatory provisions to clarify Nos. **5.440A** and **5.457C** would apply in a manner to ensure that non-GSO FSS systems do not cause harmful interference to, nor claim protection from, AMT for flight testing by aircraft stations,

further resolves to invite WRC-19

to consider the results of the above studies and take appropriate action,

resolves to invite administrations

to participate in the studies by submitting contributions to ITU-R,

instructs the Director of the Radiocommunication Bureau

to provide the results of the above studies in his report to WRC-19.

**Reasons:** This new Resolution will provide structure and guidance to ITU-R to address a wider range of non-GSO systems that seek to operate in the 3 700-4 200 MHz, 4 500-4 800 MHz and 5 925-7 025 MHz frequency bands allocated to the FSS, while protecting GSO networks and other existing primary services.

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