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**AGENDA ITEM 9.1, ISSUE 9.1.3
PRELIMINARY VIEWS FOR WRC-19
(Item on the Agenda: 3.1 (SGT-3))
(Document submitted by the Coordinator)**

SGT-3 – Satellite services

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Agenda Item 9.1, Issue 9.1.3

Study of technical and operational issues and regulatory provisions for new non-geostationary-satellite orbit systems in the 3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz frequency bands allocated to the fixed-satellite service

BACKGROUND

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The Report of the Director of the Radiocommunication Bureau to WRC-15 acknowledged that there may be a need for “reviewing or confirming” assumptions that led to the development of the power limits found in Article 21 and Article 22, taking into account the characteristics of non-GSO systems recently submitted to the ITU-R. Moreover, given the growing interest in deploying non-GSO FSS systems, the Report of the Director of the BR noted that there is a need to ensure that all existing services are adequately protected.

As a result, WRC-15 adopted Resolution 157 (WRC-15), which discusses how facilitating the deployment of new types of non-GSO systems has the potential to augment the capacity, spectrum efficiency and benefits derived from GSO and non-GSO systems operating in the bands 3 700-4 200 MHz (space-to-Earth), 4 500-4 800 MHz (space-to-Earth), 5 925-6 425 MHz (Earth-to-space), 6 725-7 025 MHz (Earth-to-space).

There are approximately 170 GSO satellites currently operating in the 3700-4200 MHz band and 229 allotments in the 4500-4800 MHz band, both of which are globally allocated to provide C-Band FSS downlinks. Many highly sensitive and public services use the FSS C-band, such as satellite telemetry, disaster relief, public meteorological data distribution, and aeronautical applications in various regions. A number of next-generation NGSO systems are being developed that can provide high-capacity, low-latency communications to end users in all locations around the world, thus allowing those living and working in rural and remote areas to access the same level of connectivity as those living in more densely populated urban areas.

Resolution 157 (WRC-15) also contains a list of technical and operational issues (e.g. Article 21 and 22) to be studied for the bands identified above; requests the development of new regulatory provisions for the protection of terrestrial services in the band 4 500-4 800 MHz and non-GSO MSS feeder links receiving stations in the band 6 700-7 075 MHz; and the clarification of some existing regulatory provisions (e.g. 5.440A and 5.457C).

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Article 21 and Article 22 of the Radio Regulations contain provisions to ensure compatibility of non-GSO FSS operations with terrestrial stations and GSO networks, respectively. Among these provisions, Article 21 contain power flux-density (pfd) limits to protect terrestrial stations and Article 22 contain equivalent power flux-density (epfd↓) limits in the frequency band 3 700-4 200 MHz (space-to-Earth) and epfd↑ limits in the frequency band 5 925-6 725 MHz (Earth-to-space) to protect GSO networks from unacceptable interference pursuant to RR No. 22.2.

The development of current regulatory provisions for sharing between non-GSO FSS operations with GSO networks in the 6/4 GHz bands was based on using highly-elliptical orbits (HEO). Based on the unique orbital configuration of the HEO systems, Article 22 epfd limits are more stringent than epfd limits in other FSS bands where non-GSO using circular orbits was taken into account. WRC-19 issue 9.1.3 calls for reviewing Article 21 power flux-density (pfd) limits and Article 22 equivalent power flux-

density (epfd↓) limits applicable to non-GSO systems operating in the 3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz frequency bands taking into account the characteristics of potential new non-GSO FSS operations, with the view to ensure protection of all existing services, since non-GSO FSS systems are obligated by No. 22.2. of the Radio Regulations not to cause unacceptable interference to or claim protection from GSO FSS networks. Resolution **157 (WRC-15)** calls to study technical and operational issues and regulatory provisions for these non-GSO FSS operations.

ISSUES

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Under the current regulatory framework, the use of the bands 3 700-4 200 MHz and 5 925-6 425 by non-GSO FSS systems is allowed subject to regulatory measures such as Article 22 EPFD limits and Article 21 PFD limits developed to protect GSO FSS systems and terrestrial services, respectively, from a specific type of non-GSO FSS systems (HEO systems). These measures may not be suitable for other types of non-GSO FSS systems, noting further resolves 1 which states that the results of studies shall in no way change the protection criteria and protection levels defined in those criteria for the GSO FSS, the fixed service and the mobile service.

- Under the current regulatory framework, the use of the bands 4 500-4 800 MHz (space-to-Earth) and 6 725-7 025 MHz (Earth-to-space) by the fixed satellite service shall be in accordance with the provisions of Appendix 30B, which is limited to the geostationary-satellite of the fixed-satellite service as per No. 5.441.
- Under the current regulatory framework, the protection of the non-GSO MSS feeder link receiving earth station in the band 6 700 -7 075 MHz is ensured through the application of coordination procedures under No. **9.17A** (see also Table 9a in Appendix 7). As already indicated above, the use of the band 6 725-7 025 MHz by non-GSO FSS in the earth-to-space direction is not allowed as per No. **5.441**.

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Traditionally, the C-band has had limited opportunities for sharing between non-GSO FSS operations with GSO networks, given the wider antenna beams and poorer off-axis discrimination. However, it is important to emphasize that the use of 3 700- 4 200 MHz (“C band”) is widespread in Brazil due to its climate characteristics, associated with its continental dimensions and the lack of telecommunications infrastructure in several parts of the Country. In these bands, uplink signals are operating in thousands of land stations associated with networks that provide crucial services for public institutions (public law enforcement and security, natural disasters, social programs for distance learning, electronic government services, etc.) which bring benefits to millions of citizens. These bands are also used by operators of commercial public networks (DTH, Internet, VOIP, backhaul of mobile telephony) with millions of private users.

It will be important to conduct the necessary studies including the development of the epfd mask for the potential new non-GSO FSS operations to determine the sharing potential between non-GSO FSS operations with GSO networks as well as, other incumbents in this band while ensuring the protection of existing services in this band.

PRELIMINARY VIEW

CAN

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Canada supports the studies under Resolution **157** (WRC-15) for new non-GSO FSS satellite systems. Any modification to Article **22** for the inclusion of efd limits for non-GSO FSS systems in the bands 4 500-4 800 MHz (space-to-Earth) and 6 725-7 025 MHz (Earth-to-space) to protect the geostationary FSS allotments in the Plan and the assignments in the Appendix 30B List can only be considered in conjunction with modifications to Article **5**, including No. **5.441** to authorize use of these bands by non-GSO FSS systems. This footnote specifies that the use of the bands by the FSS shall be in accordance with Appendix **30B**, which is limited to the geostationary-satellite of the fixed-satellite service. This is not the case in the bands 3 700-4 200 MHz and 5 925-6 425 MHz where non-GSO FSS are currently allowed without any restrictions in Article **5**.

Similarly, the adoption of regulatory measures to protect terrestrial services in the band 4 500- 4 800 MHz (space-to-Earth) can only be considered in conjunction with modifications to No. **5.441**.

Canada also notes that under the current regulatory framework, the protection of the non-GSO MSS feeder link receiving earth station from non-GSO FSS transmitting earth station in the band 6 700 -6 725 MHz and 7 025- 7 075 MHz is ensured through the application of coordination procedures under No. **9.17A** (see also Table 9a in Appendix 7). An extension of these coordination procedures to the band 6 725-7 025 MHz can only be achieved through modifications to No. **5.441** referred to above.

B

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The Brazilian Administration is of the view that studies are necessary to ensure that the protection of GSO networks would not be reduced beyond that currently afforded by Article **22** efd limits.

USA

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The United States supports the study of a regulatory framework, under the terms of Resolution **157** (WRC-15), to enable circular-orbit non-GSO FSS satellite systems to operate in the 3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz frequency bands, while ensuring the protection of existing services and applications, and to take appropriate action based on the results of these studies.