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| APTlogogreen3 | ASIA-PACIFIC TELECOMMUNITY | **Document:**  |
| **The 2nd Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-2)** | **APG19-2/OUT-05** |
| 17 – 21 July 2017, Bali, Republic of Indonesia | **21 July 2017** |

Working Party 3

**PRELIMINARY VIEWs on WRC-19 agenda item 1.6**

**Agenda Item 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)****”*

1. **Background**

Resolution **159 (WRC‑15)** is entitled “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)”. The principal requirement is for the ITU-R to conduct “studies of technical and operational issues and regulatory provisions for the operation of non-GSO FSS satellite systems in the frequency bands 37.5-42.5 GHz (space-to-Earth) and 47.2‑48.9 GHz (limited to feeder links only), 48.9-50.2 GHz and 50.4-51.4 GHz (all Earth-to-space), while ensuring protection of GSO satellite networks in the FSS, MSS and BSS, without limiting or unduly constraining the future development of GSO networks across those bands, and without modifying the provisions of Article **21**”. Protection of EESS (passive) and RAS is also required.

Sharing Between Non-GSO and GSO

Resolution **159 (WRC-15)** invites the ITU-R to study technical and operational issues and regulatory provisions to enable the sharing and operation of non-GSO systems and GSO networks. Working Party 4A is undertaking development of a working document towards a preliminary draft new Recommendation/Report on technical and regulatory provisions for 50/40 GHz (V-band) GSO/non-GSO sharing.

The objective of the working document is to enable use of these frequency bands by non-GSO systems while ensuring appropriate protection of GSO FSS networks, thereby significantly enhancing spectrum use. The working document currently presents six studies of sharing considerations and discussions of these sharing considerations to be considered in the development of epfd masks in the 50/40 GHz bands. Studies currently show that sharing between non-GSO and GSO systems is possible while observing the GSO protection criteria.

ITU-R studies have shown that in the 50/40 GHz bands, propagation impairments such as rain, cloud and gaseous absorption exist that can substantially affect FSS satellite links. Not only are rain fade and gaseous absorption propagation effects more severe than in lower frequency bands, but effects such as cloud attenuation can also have a significant impact to the FSS intra-service sharing environment in the 50/40 GHz frequency bands. Thus, higher margins of atmospheric fade can exist in evaluating sharing criteria between non-GSO and GSO systems in the 50/40 GHz frequency range. The studies demonstrated that since propagation impairments can be significant for FSS operations in the 50/40 GHz bands, these impairments should be taken into account for spectrally efficient sharing analyses on both the wanted and interfering paths.

FSS Characteristics

There are currently no ITU-R defined protection requirements for 50/40 GHz (V-band) GSO networks. Work is being undertaken within WP 4A to define suitable parameters so sharing studies between FSS systems in the 50/40 GHz band can be completed.

A working document towards a preliminary draft new Recommendation ITU-R S.[50/40 GHZ FSS SHARING METHODOLOGY] is under development. This new Recommendation will consider the unique properties of the 50/40 GHz band to establish appropriate protection criteria and maximum permissible levels of interference for emissions between FSS networks (GSO/FSS; non-GSO/FSS; GSO and non-GSO/MSS feeder links) operating co-frequency in the 50/40 GHz frequency bands.

Compatibility with EESS (Passive) and RAS

Working Party 4A has received contributions on sharing between FSS and EESS (passive) and RAS. In the discussion on the studies, it was noted that a non-GSO earth station deployment model is required to determine the amount of interference that an EESS (passive) sensor may receive. Further studies may need to be conducted with representations of non-GSO system operations.

ITU-R Recommendations & Reports

WD-PDNR. ITU-R S.[50/40 GHZ FSS SHARING METHODOLOGY]

WD-PDN Report on Sharing between 50/40 GHz GSO and non‑GSO systems

WD-[PDN Report] on Protection of EESS (passive) and RAS Systems

**2. Documents**

Input Documents:

APG19-2/INP-10 (KOR), INP-16 (SNG), INP-22 (NZL), INP-30 (AUS), INP-41 (INS), INP‑46 (VTN), INP-51 (CHN), INP-57 (J)

Information Documents:

APG19-2/INF-01 (Chairman, APG-19), INF-04 (CITEL), INF-05 (RCC), INF‑14 (CEPT), INF-15 (WP3)

**3. Summary of Discussions**

**3.1 Summary of Members’ view**

**3.1.1 Republic of Korea**

The Republic of Korea supports ITU-R studies on technical, operational issues and regulatory provisions for non-geostationary fixed-satellite services satellite systems in the frequency bands 37.5-42.5 GHz (space-to-Earth), 47.2-48.9 GHz (limited to feeder links only), 48.9-50.2 GHz and 50.4-51.4 GHz (all Earth-to-space) in accordance with Resolution **159 (WRC-15)**.

The Republic of Korea has a view that the studies should ensure protection of GSO satellite networks in the FSS, MSS and BSS and should not limit or unduly constrain the future development of these GSO satellite networks in the frequency bands above.

The Republic of Korea also has a view that the studies should ensure protection of the RAS in the adjacent bands from non-GSO FSS transmissions in the frequency bands above.

The Republic of Korea further has a view that compatibility and sharing with the service/application for which allocation/identification is envisaged under WRC-19 Agenda Item 1.13 in the overlapping frequency bands, in particular in the frequency band 37.5-42.5 GHz, should be ensured.

**3.1.2 Singapore**

Singapore supports studies under WRC-19 Agenda Item 1.6 with a view to develop a regulatory framework for non-GSO satellite systems in the existing FSS allocations in the 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) frequency bands under the terms of Resolution **159 (WRC-15)**.

**3.1.3 New Zealand**

New Zealand supports the ITU-R studies undertaken in accordance with Resolution **159 (WRC-15)**. As some of the frequency bands subject to studies under this agenda item are underutilised in New Zealand, we are open to consider better harmonised use of these frequencies.

**3.1.4 Australia**

Australia supports studies into the technical and operational issues associated with the establishment of a regulatory framework for non-GSO FSS 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), in accordance with Resolution **159 (WRC-15)**.

**3.1.5 Indonesia**

Indonesia supports studies on technical and operational issues and regulatory provisions of non-GSO FSS 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) while ensuring protection to GSO satellite networks in FSS, MSS and BSS, and other existing services in the same and adjacent frequency bands.

**3.1.6 Viet Nam**

Considering no technical measures and regulatory framework for sharing between non-GSO systems and GSO networks, Viet Nam is of the view that:

* Support to develop a regulatory framework to facilitate co-frequency operation of GSO networks and non‑GSO FSS systems in the 50/40 GHz frequency bands, while ensuring protection of GSO satellite networks in the FSS, MSS and BSS, without limiting or unduly constraining the future development of GSO networks across those bands.
* Taking into account studies regarding these bands carried out under WRC-19 AI 1.13

**3.1.7 China**

Chinese preliminary views are as follows:

 – China support current ITU-R studies of technical and operational issues and regulatory provisions for the operation of non-GSO FSS satellite systems in the frequency bands 37.5-42.5 GHz (space-to-Earth) and 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space);

– GSO satellite networks in the FSS, MSS and BSS should be protected, without limiting or unduly constraining the future development of GSO networks across those bands, and without modifying the provisions of RR Article 21;

– EESS (passive) should be protected in the frequency bands 36-37 GHz and 50.2-50.4 GHz from non-GSO FSS transmission;

– The radio astronomy should be protected in the frequency bands 42.5‑43.5 GHz, 48.94-49.04 GHz and 51.4-54.25 GHz from non-GSO FSS transmissions.

**3.1.8 Japan**

Japan is of the view that appropriate protection of existing services is necessary.

**3.2 Key points raised during the meeting**

APT members support studies on technical and operational issues and regulatory provisions of non-GSO FSS 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) while ensuring protection to GSO satellite networks in FSS, MSS and BSS, and other existing services in the same bands as well as protection of the EESS (passive) in the frequency bands 36-37 GHz and 50.2-50.4 GHz and the radio astronomy service in the frequency bands 42.5-43.5 GHz, 48.94-49.04 GHz and 51.4-54.25 GHz.

It was noted that for this agenda item, a number of frequency bands are also being studied under agenda item 1.13 (IMT), agenda item 1.14 (HAPS) and agenda item 9.1 (Issue 9.1.9 – 50 GHz NGSO).

**4. APT Preliminary View(s)**

APT Members support studies on technical and operational issues and regulatory provisions of non-GSO FSS 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) while ensuring protection to GSO satellite networks in FSS, MSS and BSS, and other existing services in the same bands as well as protection of the EESS (passive) in the frequency bands 36-37 GHz and 50.2-50.4 GHz and the radio astronomy in the frequency bands 42.5-43.5 GHz, 48.94-49.04 GHz and 51.4-54.25 GHz.

**5. Other Views**

None

**6. Views from Other Organisations**

These views from other organisations are presented for information only.

**6.1 Arab Spectrum Management Group (ASMG)**

Protect the fixed-satellite service systems in GSO either by adequate epfd levels or any other methodologies or according to wave propagation models in the frequency bands above 30 GHz.

Consult the satellite operators of the team to determine the epfd value that ensures the protection of the satellite networks in the geostationary orbital positions and the opinion for the proposed mechanism.

**6.2 European Conference of Postal and Telecommunications Administrations (CEPT)**

CEPT considers that studies for the development of regulatory provisions and technical and operational conditions shall ensure protection for GSO satellite networks and stations of other existing services including passive services in the adjacent frequency bands. To ensure the protection of the EESS (passive) and RAS.

CEPT supports to study the effects of aggregate FSS interference from GSO satellite networks and NGSO systems operating in the relevant bands.

CEPT considers that the criteria based on Recommendation ITU-R S.1323 or other new possible ITU-R Recommendation shall be used while developing the aggregate epfd limits for protection of GSO networks. CEPT supports a methodology of interference assessment that takes into account the correlation between a fading event attenuating both the wanted signal and interfering signals in the frequency bands 40/50 GHz.

CEPT supports further studies on methodology of interference assessment applicable to frequency bands above 30 GHz to verify compliance with the criteria in Recommendation ITU-R S.1323.

**6.3 Inter-American Telecommunication Commission (CITEL)**

CAN

Canada supports the studies under Resolution 159 (WRC-15) to develop a regulatory framework for new non-GSO FSS satellite systems. For the band 36-37 GHz: Canada is of the view that based on the results of studies, EESS (passive) systems operating in the 36- 37 GHz band and non-GSO FSS systems are compatible and no regulatory measures are required to address the compatibility between these two services. For the band 50.2-50.4 GHz: Canada is of the view that based on the results of studies, mitigation techniques and/or regulatory measures may be required to ensure compatibility between EESS (passive) systems operating in the band 50.2-50.4 GHz and non-GSO FSS systems.

USA

The United States supports studies under WRC-19 Agenda Item 1.6 regarding the development of a regulatory framework for non-GSO satellite systems in the existing FSS allocations in the 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) frequency bands under the terms of Resolution 159 (WRC-15) and to take appropriate action based on the results of these studies.

**6.4 Regional Commonwealth in the field of Communications (RCC)**

The RCC Administrations consider that studies on technical and operational issues and regulatory provisions in order to ensure operation of non-GSO FSS satellite systems in the frequency bands 37.5-42.5 GHz (space-to-Earth), 47.2-48.9 GHz (limited to feeder links), 48.9-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) shall ensure protection to GSO satellite networks in FSS, MSS and BSS, and also to stations of other existing services in the same and adjacent frequency bands.

The RCC Administrations consider that technical conditions and regulatory provisions shall be developed to ensure sharing of the considered frequency bands between non-GSO FSS systems.

The RCC Administrations consider that when conducting studies, protection shall be ensured to EESS (passive) in the frequency bands 36-37 GHz, 47.5-48.5 GHz and 50.2-50.4 GHz, and also to the radio astronomy service in the frequency bands 42.5-43.5 GHz, 48.94-49.04 GHz and 51.4-54.25 GHz from non-GSO FSS transmissions.

The RCC Administrations find it reasonable to study the impact of aggregate interference from GSO FSS networks and non-GSO FSS systems operated or planned to be operated in the frequency bands 37.5-42.5 GHz (space-to-Earth), 47.2-48.9 GHz (limited to feeder links), 48.9-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) with the purpose of possible revision of Resolution**750 (Rev. WRC-15)** "Compatibility between the Earth exploration-satellite service (passive) and relevant active services".

The RCC Administrations consider it reasonable to study modification of interference assessment methodology specified in the Recommendation ITU-R S.1323 (Methodology A) with the purpose to broaden applicability of this recommendation in the frequency bands above 30 GHz.

**7. Issues for Consideration at Next APG Meeting**

Update the country positions and APT preliminary views based on the progress of studies.

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