T: ( 011 26851660, 26137200
E: i infocomthinktank@yahoo.com
W: www.infocomthinktank.com

# *Infocom Think Tank*

(Autonomous Scientific Body)
"Research House" Saket, New Delhi -110017

17 October 2024



**Sri Akhilesh Kumar Trivedi**

**Advisor (Networks, Spectrum, Licensing)**

**TRAI, New Delhi**

***Re: TRAI CP on Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services***

**Dear Sir**

**Our response appears in the 2 Annexures.**

**Best wishes**

**Sincerely**

**N K Mathur**

**Chairman**

# ANNEXURE 1

## INFOCOM THINK TANK (IcTT)

### VIEWS ON TRAI CONSULTATION PAPER ONTERMS AND CONDITIONS FOR ASSIGNMENT OF SPECTRUM FOR CERTAIN SATELLITE BASED COMMERCIAL COMMUNICATION SERVICES

We are a group of serving and retired experts in the fields of ICT, space science, research, broadcast, social science and allied areas with fair experience. We have deliberated in some depth on the above subject matter and wish to submit our views on issues and questions raised by TRAI.

With reference to DoT's Instant reference dated 11.07.2024 (See Page 75 of the CP) TRAI has been requested to provide its recommendations on terms and conditions of spectrum assignment including spectrum pricing while accounting for *level playing field with terrestrial access services.*

TRAI has also sought whether the Spectrum Usage Charges (SUC) be a percentage of the AGR or calculated per MHz of the spectrum used and if SUC are AGR based, what % of the AGR should be used.

The status of Satcom services in India today, is almost similar to that of Cellular Mobile Service, about 25 years ago. Adequate government support would encourage these services to grow - similar to that of Cellular mobile service, that resulted in its exponential growth.

Satcom services can meet the modern day needs of internet/broadband connectivity for everyone and in this respect, the spectrum charges for satellite services should adequately cover administration and management costs for the WPC Wing and Wireless Monitoring Organisation (WMO).

*`Level playing field'* is the basis for all policy discussions and all recommendations are based on fair play and competition. Moreover, Telecom Act 2023 has decided that Satellite Spectrum is to be administratively assigned and not to be treated at par with spectrum for terrestrial services (the latter being done through auctions).

**Infocom Think Tank (IcTT**) feels that bringing in the concept of level playing field, between two different categories of services i.e. Cellular Mobile service and Satellite based services, is a flawed concept.

Reference by the DoT, to Section 4 read with Schedule 1 of the Telecom Act, and make a reference to TRAI to come out with this Consultation Paper, seeking 'level playing field' with terrestrial access services, is not in line with the Telecom Act.

**IcTT** therefore submits that the DoT Reference to TRAI regarding 'Level Playing Field' between Cellular Mobile services and Satellite based services, is improperly aligned and completely incorrect.

TRAI in its ` *Recommendations on the Framework for Service Authorisations to be Granted Under the Telecommunications Act, 2023'* brought out on 18 September 2024, has clearly demarcated "satellite-based telecommunication service" as a service separate from "access services. Also, it has recommended merger of the currently separate GMPCS and the VSAT CUG licences**.**

TRAI has clearly recommended that as per the First Schedule of the Telecommunications Act 2023, satellite-based services including VSAT and GMPCS (both specifically mentioned there) are to get administratively assigned spectrum.

With access service separated from satellite service by the TRAI, there is abundant clarity on this aspect. The concept of NTN (Non-Terrestrial Networks), coined by the 3GPP is envisioned to extend telecom coverage to areas which are not covered by terrestrial networks and is different from satellite services.

*Non-terrestrial networks (NTN) are networks or segment of networks that use either Uncrewed Aircraft Systems (UASs) operating typically between 8 and 50 km altitude, including High Altitude Platforms (HAPs) or satellites in different constellations to carry a transmission equipment relay node or a base station and uses other ground assets to extend existing cellular communications. NTNs are envisioned to extend telecom coverage to areas which are not covered by terrestrial networks. Development of NTNs would also provide opportunities to expand the usage of communication technologies to develop new use cases and applications in different sectors for the benefit of society and achieving the UN SDGs.*

***Spectrum Usage Charges:***

There is enormous disparity between the revenues generated by Satellite and terrestrial services. While Terrestrial Services fetch revenues of the order of Rupees 3 lakh crores , Satcom sector gross revenues are around Rupees 600 - 800 Crores - which constitutes around 0.2% of the Terrestrial Revenues.

To make Satcom Services affordable, it is in national interest that Satcom Spectrum be made affordable.

IcTT feels that Spectrum Usage Charges (SUC) be a percentage of the AGR and not calculated as per MHz of the spectrum used.

Considering the cost of satcom spectrum administration & regulation for SUC calculations, **IcTT** feels that a 0.1% of AGR may be a justifiable figure as it adequately covers the cost of administration and regulation of spectrum.

TRAI has aptly divided the questions posed in their CP into various categories:

- Frequency bands for satellite-based communication services
- Validity of spectrum assignment
- Interference related challenges & coordination issues

- Scarcity of satellite gateway sites
- Roll-out obligations for assigned spectrum
- Surrender of assigned spectrum
- Timelines for processing applications for assignment of spectrum
- Spectrum charging mechanism for satellite based commercial communication services

With regard to the frequency bands, validity of assignment, interference/coordination issues, ITU's Radio Regulations (a binding international treaty) *provide all the necessary answers to various questions raised in the Consultation Paper*.

The process & methodology of sharing spectrum for space-based services by multiple users has been developed over more than 60 years, as a result of multiple World Radiocommunication conferences from 1963 to 2023. (Extraordinary Administrative Radio Conference 1963, also known as 'Space Conference').

*`Whether the provisions of ITU-RR are sufficient to resolve interference related challenges and coordination issues'*, appears to question the efficacy and veracity of ITU's Radio Regulations.

ITU's Radio Regulations have over the years provided interference free space operations**.** *According to the declaration made by Director of the ITU's Radiocommunication Bureau during the `Space Sustainability Forum (Geneva, 10-11 September 2024)', 99.94% of satellite operations were free of interference during 2023.*

Likewise, frequency band(s)/range(s) for assignment to NGSO based Fixed Satellite Services and GSO/ NGSO based Mobile Satellite Services are all contained in Article 5 of the ITU–Radio Regulations (RR) with footnotes providing all conditions for their assignment and use.

The NFAP-2022 with specific `India Notes' by WPC Wing is in vogue and is in the process of being revised after the WRC-23.

In the Article 5 of ITU-RR, out of the 130 Frequency Bands allocated for space services, the ones allocated to FSS / MSS, or part thereof, can be suitably used for assignment to NGSO based Fixed Satellite Services and GSO/ NGSO based Mobile Satellite Services.

Other questions pertaining to maximum period of assignment of spectrum for - NGSO based Fixed Satellite Services, etc. are dependent on the validity of the license or can be co-terminus with the `validity of the concerned frequency assignment' as published by the ITU-BR.

Coexistence of space and terrestrial services are dealt with in Chapter VI of the ITU-RR dealing with `Provision for services and stations' where Article 21 deals with 'Terrestrial and space services sharing frequency bands above 1 GHz'. Appendix 5 of ITU-RR provides `Identification of administrations with which coordination is to be effected or agreement sought under the provisions of Article 9', and Appendix

7 deals with `Methods for the determination of the coordination area around an Earth Station in frequency bands between 100 MHz and 105 GHz.

*Evidently, most of the information that is proposed to be obtained through various questions posed in TRAI's CP, is available and well documented in ITU-RR so painstakingly after years of efforts.*

On the issue of *Administrative and regulation costs for Satcom,* it may be reiterated that

- *Cost of Satellite Spectrum should be as low as possible and just sufficient to cover the cost of administrating and regulating the spectrum.*

- *Administrative and regulation costs for Satcom work out to be a fraction of 1% (Approx. 0.1 to 0.2 % of the sector Revenues). Hence the SUC should be of that order only.*

***Other important issue:*** During discussion of TRAI Recommendations on Satcom Service Authorisation, it was felt that Land Mobility through Satcom services should also be stressed adequately (some cellular service providers don't consider satellite-based land mobile services to be essential/ necessary).

In the light of the points mentioned above, **IcT**T has provided short responses to each category of questions. The same may be seen in the ANNEXURE 2.

---

## ANNEXURE 2

**FREQUENCY BANDS FOR SATELLITE BASED COMMUNICATION SERVICES:**

***Q 1,2: IcTT Response:*** *In the Article 5 of ITU-RR, there are 130 Frequency Bands allocated for space services. Out of these, the ones allocated to FSS/MSS, or parts thereof, read with NFAP-2022 subject to the conditions detailed in the INDIA footnotes and the footnotes of Art.5 of RR, can be used for providing voice, text, data, and Internet service by NGSO based FSS or GSO/ NGSO based MSS.*

**VALIDITY OF SPECTRUM ASSIGNMENT**

***Q 3,4: Response:*** *The validity of the service authorization or the period of validity (Item A2b - shown in the ITU publication for the satellite network) of the satellite frequency assignment can be taken as the maximum period of assignment of spectrum for - NGSO based FSS for providing data communication and Internet services or GSO/ NGSO based MSS for providing voice, text, data, and Internet services. 20 years' validity for service authorisation, with possibility of extension/renewal (or till validity of frequency assignments in ITU's MIFR – Master Internation Frequency Register - whichever is earlier), in line with other telecom services, can be a reasonable period for SatCom service provider.*

*Every ITU filing is NOT a separate satellite system. ITU filings fall in 3 categories MOD, ADD or SUP to the original filing and may apply to the same satellite network.*

*However, a service provider may provide services utilizing multiple satellite systems, as filed with ITU, especially in the case of the use of a combination of satellite orbits. This is aligned to global best practices.*

**INTERFERENCE RELATED CHALLENGES & COORDINATION ISSUES**

***Q 5,6,7,8: IcTT Response:*** *ITU's Radio Regulations have over the years provided interference free space operations. According to the declaration made by Director of the ITU's Radiocommunication Bureau during the `Space Sustainability Forum (Geneva, 10-11 September 2024)', 99.94% of satellite operations were free of interference during 2023.*

*`Whether the provisions of ITU-RR are sufficient to resolve interference related challenges and coordination issues'*, appears to question the veracity of ITU's Radio Regulations.

*Coexistence of space and terrestrial services are dealt with in Chapter VI of the ITU-RR dealing with `Provision for services and stations' where Article 21 deals with 'Terrestrial and space services sharing frequency bands above 1 GHz'. Appendix 5 of ITU-RR provides `Identification of administrations with which coordination is to be affected or agreement sought under the provisions of Article 9' and Appendix 7 deals with `Methods for the determination of the coordination area around an Earth Station in frequency bands between 100 MHz and 105 GHz.*

*All information is well documented in ITU-RR so painstakingly after years of efforts, and can provide valuable guidance, beyond stakeholders' views.*

**SCARCITY OF SATELLITE GATEWAY SITES**

**Q9.** ***IcTT Response:*** *In a large country like India, finding suitable location(s) for required number of Gateways may not be a serious challenge. Still, international best practices, if any, in this regard may be followed.*

**ROLL-OUT OBLIGATIONS FOR ASSIGNED SPECTRUM**

**Q10.** ***IcTT Response:*** *Normally, a satellite system will cover the whole of India, once brought into service. Also, the roll out obligations should not be very stringent in the initial phase of SatCom services, to allow their proper growth. The matter can be reviewed after a reasonable period, say 5 years, and roll-out obligations similar to other services can be considered then. International best practices existing in this regard can also be followed.*

**SURRENDER OF ASSIGNED SPECTRUM**

**Q11.** ***IcTT Response:*** *The minimum period, or terms & conditions for spectrum holding, should encourage the growth of this service. Still, to discourage/ dissuade any non-serious players, a minimum period of 5 years for spectrum holding can be specified.*

**TIMELINES FOR PROCESSING APPLICATIONS FOR ASSIGNMENT OF SPECTRUM**

**Q12. 13:** ***IcTT Response:*** *TRAI recommendations on ease of doing business for Satcom may be suitably adhered to.*

**SPECTRUM CHARGING MECHANISM FOR SATELLITE BASED COMMERCIAL COMMUNICATION SERVICES**

**Q14….20:** ***IcTT Response:*** *Cost of spectrum administration & regulation (WPC Wing & Wireless Monitoring Organization - WMO), for SUC Calculations, for Satcom show that a 0.1 to 0.2 % of AGR (calculated by making an assessment of the cost of spectrum administration & regulation and also the relative revenue generation between terrestrial and space services) may be quite adequate to cover the cost of administration and regulation of spectrum. The SUC can be revisited and reviewed from time to time.*

**Q21** ***IcTT Response:*** *The spectrum charges may also take into account potential for reuse/ sharing with other satellite systems/ constellations. Systems with greater potential for reuse/ sharing should be allowed some concession/ relief, compared to large NGSO constellations, which have relatively lesser potential for reuse/ sharing with other satellite systems/ constellations.*

*Data communication and Internet services are fraught with `security-issues' and these must not be lost track of. Data security is paramount and the existing norms & guidelines existing nationally and internationally must be meticulously followed in consultation with security agencies in India.*

**********