25 October 2024

Shri Akhilesh Kumar Trivedi,
Advisor (Networks, Spectrum and Licensing)
Telecom Regulatory Authority of India
Tower F, NBCC World Trade Centre,
Nauroji Nagar, New Delhi-110029

Subject: Tata Communications Limited comments to TRAI Consultation Paper on 'Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services'

Dear Sir,

This is with reference to the TRAI Consultation Paper No. 13/2024 dated 27-09-2024 on **'Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services'.**

In this regard, please find enclosed herewith Tata Communication Limited's comments for your kind consideration as Annexure.

We request you to kindly consider our submissions while finalizing the recommendations and would be happy to provide any additional information, if required.

Thanking You,

Yours Sincerely,

Alka Selot Asthana
Vice President and Head Regulatory
Tata Communications Limited

Enclosed: As above

Tata Communications Limited Response to TRAI Consultation Paper on 'Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services'

At the outset, we thank TRAI for providing us an opportunity to share our comments/inputs on the critical issues raised in this consultation paper which is a significant milestone for future assignments of spectrum for Satellite-Based Commercial Communication Services.

Tata Communications in its response to the Consultation paper, "*Assignment of Spectrum for Space-based Communication Services*," had proposed the following:

(a) administrative Spectrum for satellite-based communications services should be assigned on a non-exclusive basis in line with global practices
(b) long-term spectrum allocation for a minimum period of 15 to 20 years without any rollout obligations as the spectrum required for satellite services is shared and can be shared among multiple licensees
(c) high spectrum fee should not become an artificial barrier to entry
(d) spectrum charging mechanism should be based on the AGR of the licensee for the administratively assigned spectrum to recover the administrative cost of spectrum management.

The above recommendations promote efficient, long-term, and affordable administrative spectrum allocation for satellite services in India.

Considering new technological developments in Satellite communication will enable multiple use-cases for its users, it is important to have enabling provisions for the assignment of spectrum for Satellite-based services. Tata Communications expresses its appreciation for The Telecommunication Act 2023, which mandates that the spectrum for Satellite-based services (such as GMPCS, ILD, NLD etc.) be assigned through an administrative process. Since deployment of Satellite-based communication services entails significant investments and it is a supplement to the existing terrestrial based network, therefore, the regulatory framework should ensure that both communication services coexist and the satellite-based communication provide alternate communication mode for the telecommunications users in India.

Further, in our view, all eligible licensees incl. ISPs, should be allowed to use the spectrum allocated administratively on sharable basis. Globally mature satellite markets use satellite spectrum allocation on an administrative basis and follow the sharing of the spectrum between multiple Operators in the lines of guidelines defined by the ITU Radio Regulation. It is also important to understand that under the administrative and sharing principles of spectrum assignment, it is simple to allocate spectrum to any new eligible entrants using the above sharable principle defined in the ITU Radio Regulations guidelines.

In view of the same, the terms & conditions incl. spectrum pricing, as covered in this consultation paper, for the assignment of spectrum for certain satellite-based services are important to have clarity to the industry and stakeholders.

Tata Communications issue-wise comments are as follows:

Q1. Which frequency band(s)/ range(s) should be considered for the assignment to NGSO based Fixed Satellite Services for providing data communication and Internet service? Please provide a detailed response separately for the user link and feeder link.

Tata Communications Response:

All specified ITU Bands for Satellite services should be considered for the assignment to NGSO Fixed Satellite Services for providing data communications and Internet Service as it is important to have access to a diverse set of frequency bands and services that can support these applications.

The relevant bands for Satellite Spectrum are S-band, L-band, Ku-Band, Ka band, Q & V bands.

- L-band (1-2 GHz),
- S-band (2- 4 GHz),
- Ku-band (10-15 GHz)
    - Downlink: 10.7-12.75Ghz
    - Uplink: 13.75-14.5 GHz; 12.75 – 13.25Ghz
- Ka-band (17-31 GHz)
    - Downlink: 17.8 – 18.6Ghz; 18.8 – 19.3Ghz; 19.7 – 20.2Ghz; 20.2-21.2Gh
    - Uplink: 27.5 – 30Ghz; 30-31Ghz
- Q/V band - 33-75 GHz
    - FSS Downlink bands - 37.5 - 42.5 GHz
    - FSS Uplink bands - 47.2-50.2 GHz; 50.4 - 51.4 GHz; 51.4-52.4 GHz

Additionally, the demand for spectrum will only increase with the growing use of satellite-based services, so the availability of maximum possible spectrum can help meet this demand and ensure efficient use of limited resources while avoiding interference.

Q2. Which frequency band(s)/ range(s) should be considered for the assignment to GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet service. Please provide a detailed response separately for the user link and feeder link.

Tata Communications Response:

The same spectrum bands identified for NGSO based FSS in Q1 above should be considered for assignment for GSO/NGSO based MSS services. This is because Satellite Spectrum bands are shareable amongst different service providers and amongst different services.

While L-band & S-band are most suitable to GSO/NGSO MSS services for text/occasional voice/low data-rate application services, MSS for providing internet services, heavy data etc. bands like Ku/Ka/Q/V may be more suitable due to availability of larger spectrum/bandwidth.

Q3. What should be the maximum period of assignment of spectrum for -

a) NGSO based Fixed Satellite Services for providing data communication and Internet services, and

b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services? Please provide a detailed response along with international practice in this regard.**

Tata Communications Response:

The period of validity of spectrum assignment for NGSO based FSS and GSO/ NGSO based MSS should be 20 years in line with the period of validity of the service authorisation, so that it provides sufficient certainty to service providers for recovery of their capital investments. This is essential for both FSS and MSS Operators to make business investments with longer term certainty.

Q4. For assigning spectrum for NGSO-based communication services, whether every ITU filing should be treated as a separate satellite system? Please provide a detailed response along with international practice in this regard.

Tata Communications Response: No Comments

Q5. Whether the provisions of ITU-RR are sufficient to resolve interference related challenges and coordination issues? If not, what additional conditions should be prescribed while assigning frequency spectrum for –

a) **NGSO based Fixed Satellite Services for providing data communication and Internet services; and**
b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services? Please provide a detailed response along with international practice in this regard.**

Tata Communications Response:

As spectrum sharing among satellite operators is global phenomenon, with administrative allocation methodology adoption, it will enable satellite operators to comply with the provisions contained in the Radio Regulations (ITU Radio Regulations) as follows:

- Coexistence between NGSO systems and GSO networks is ensured, as also well described in the text of the consultation, either via compliance with Article 22 limits or coordination, depending on the frequency bands.

- Coexistence between NGSO systems is established by bi-lateral coordination discussions in which analysis is carried out by the different operators, taking into account the relevant provisions of the ITU Radio Regulations.

Hence ITU RR are sufficient to take care of the interference related challenges and coordination issues.

Q6. For satellite earth station gateways of different satellite systems operating in the same frequency range, whether there is a need to prescribe a protection distance or any other measures to avoid interference from each other–

a) **Between the gateways of GSO and NGSO systems; and**
b) **Between the gateways of NGSO systems?**

If yes, please provide a detailed response along with international practice in this regard.

Tata Communications Response: No comments.

Q7. In case the spectrum assigned for satellite gateway links is also assigned to terrestrial networks such as Fixed Service, IMT etc., what protection distance or criterion should be included in the terms and conditions of the assignment of spectrum for satellite gateway links to avoid any interference to/ from terrestrial networks? Please provide a detailed response along with international practice in this regard.

Tata Communications Response:

Tata Communications advocates for optimal utilization of scarce spectrum for various upcoming applications and technologies. In many frequency bands, spectrum is shared between satellite-based networks and terrestrial networks such as Fixed Service (backhaul) and IMT. However, at the same time from a technical perspective and for co-existence of these two services in the same band, careful planning, and coordination is required to ensure no interference between the services.

In case of 27.5 GHz to 28.5 GHz frequency band which can be used for gateway links w.r.t Satellite based communication services and CNPN services since the service area for CNPN is typically limited to indoors or in the given specific geography. Hence, it is recommended that 27.5GHz to 28.5GHz band should be assigned directly to Enterprises with the condition of ensuring non-interference to Space-based communication services. This will ensure optimal use of the spectrum.

Q8. In case the spectrum assigned to the satellite user link is also assigned to terrestrial networks such as Fixed Service, what criterion should be included in the terms and conditions of the assignment of spectrum for satellite user links to avoid any interference to/ from terrestrial networks? Please provide a detailed response along with international practice in this regard.

Tata Communications Response:

Given the growing demand for multiple different type of Services and Applications especially as a part of industry 4.0 revolution, and to ensure most efficient and optimal use of spectrum, co-existence use of spectrum must be enabled with adequate interference control among spectrum assignees.

Spectrum assignees may need to develop interference management plans to address any interference issues that may arise between space-based communication services and terrestrial services. This may involve developing advanced interference mitigation techniques, conducting regular interference monitoring, reporting, and coordinating with other spectrum users to manage interference issues.

Spectrum assignees may need to comply with certain technical specifications, such as power limits, frequency bands, and distance w.r.t Space-based communication services to ensure efficient use of the spectrum and minimize the risk of harmful interference.

Q9. Whether there is a need to prescribe any conditions to mitigate the risk of scarcity of satellite gateway sites? If yes, please provide a detailed response along with international practice in this regard.

Tata Communications Response: No comments

Q10. In addition to the roll-out conditions recommended by TRAI for satellite-based Telecommunication Service Authorisation through its recommendations on the Framework for Service Authorisations to be Granted Under the Telecommunications Act, 2023 dated 18.09.2024, whether there is a need to impose certain additional roll-out obligations for the assignment of frequency spectrum for –

a) **NGSO based Fixed Satellite Services for providing data communication and Internet services.**
b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

Please provide a detailed response along with international practice in this regard.

Tata Communications Response:

In our view there is no need to impose roll-out obligations for the assignment of frequency spectrum. However, certain timeline/period say 24 months could be prescribed for start of satellite-based services by satellite operator or applicant post obtaining the spectrum from authority. This is to ensure the applicants are not blocking precious resources.

Moreover, considering the fact that the spectrum required for satellite services is shared and can be shared among multiple space-based communication service licensees and Terrestrial Networks. For instance, in case of CNPN services in 27.5 GHz – 28.5 GHz frequency band and similarly, the 28.5 GHz – 29.5 GHz frequency band will also be shared among various Satellite Service Providers. Thus, there is no hording of spectrum, and it continues to be available for other interested licenses. Therefore, there is no specific need to define the rollout obligation.

Q11. Whether there is a need to introduce a provision for surrender of frequency spectrum prior to the expiry of the period of validity of spectrum assigned for -

a) **NGSO based Fixed Satellite Services for providing data communication and Internet services.**
b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

If yes, what should be the process, and associated terms and conditions such as minimum period of spectrum holding, notice period, surrender fee, etc.? Please provide a detailed response with justifications.

Tata Communications Response:

Yes, there should be provision for surrender of frequency spectrum prior to the period validity of spectrum assigned for NGSO system.

Q12. Whether there is a need to prescribe timelines for processing the applications for the assignment of frequency spectrum for-

a) **NGSO based Fixed Satellite Services for providing data communication and Internet services.**
b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

Please provide a detailed response with justifications.

Tata Communications Response:

Yes, there should be a process which should be timebound, and rule based. It is preferable that that spectrum assignment and allocation be made, within 15 days of the application. Delay in the assignment of spectrum may result in non-utilization of precious satellite resources. Therefore, it is important that the frequency spectrum is assigned to the authorised entities within a reasonable timeframe of 15 days. Further, to make the process seamless, the end-to-end process should be online.

In this regard, TRAI recommendations on ease of doing business for Satcom issued in May 2023 may also be reiterated.

Q13. Whether there are any other suggestions related to assignment of spectrum for-

a) **NGSO based Fixed Satellite Services for providing data communication and Internet services.**
b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

Please provide a detailed response with justifications.

Tata Communications Response: No comments.

Q14. Should spectrum charges for NGSO-based FSS providing data communication and Internet services, be levied:

i. **On a per MHz basis,**
ii. **On a percentage of Adjusted Gross Revenue (AGR) basis, or**
iii. **Through some other methodology?**

Please provide a detailed justification for your answer.

Q16. If it is decided that spectrum charges for NGSO-based FSS providing data communication and Internet services should be levied on a percentage of AGR basis:

i. **What should be the appropriate percentage of AGR?**
ii. **Should a minimum spectrum charge be specified to address the issue of inefficient utilization of spectrum? If yes, what methodology may be used to determine the amount of the minimum spectrum charge?**
iii. **Is there an alternative approach that could be followed to address the issue of inefficient spectrum utilization?**

Please provide a detailed justification for your answers.

Q17. Considering the Adjusted Gross Revenue (AGR) based charging methodology currently followed for Commercial VSAT and in view of the enhanced scope of the

Satellite service authorisation, what should be the spectrum charge, as a percentage of AGR, that should be levied on GSO-based FSS? Or,
Should some alternative spectrum charging methodology be used for determining spectrum charges for GSO-based FSS?
Please provide a detailed justification for your answer.

Q18. Should spectrum charges for GSO and NGSO-based MSS that provide voice, text, data, and Internet services be levied:

i. **On a per MHz basis,**
ii. **On a percentage of AGR basis, or**
iii. **Through some other methodology?**

Please provide a detailed justification for your answer.

Q20. If it is decided that spectrum charges for GSO/NGSO-based MSS providing voice, text, data, and Internet services should be levied on a percentage of AGR basis:

i. **What should be the appropriate percentage?**
ii. **Should a minimum spectrum charge be specified to address the issue of inefficient utilization of spectrum? If yes, what methodology may be used to determine the amount of the minimum spectrum charge?**
iii. **Is there an alternative approach that could be followed to address the issue of inefficient spectrum utilization?**

Please provide a detailed justification for your answers.

Tata Communications Response to Q 14, Q16, Q17, Q18 and Q 20:

The spectrum charging mechanism should be based on the AGR of the licensee for the administratively assigned spectrum. In our view, there should be a single rate of SUC, and it should be only 1% of AGR to cover administrative charges.

High spectrum fees should not be a disincentive to operators to use spectrum efficiently/flexibly and should not become an artificial barrier to entry. The cost of spectrum can vary significantly from country to country. There is however a general tendency towards spectrum fee reduction (e.g. Australia, Canada, Colombia, Saudi Arabia), especially in microwave frequencies, also due to the recognition that modern satellite systems can use large amount of spectrum (e.g. around 4GHz in Ka-band).

This would be also in consonance with the TRAI Recommendations of June 2021 for implementing 1% SUC for all Commercial VSAT & GMPCS Licenses

Q15. In case it is decided that spectrum charges for NGSO-based FSS providing data communication and Internet services should be levied on a per MHz basis, should these charges be calculated based on:

i. **The Department of Telecommunications (DoT) order dated December 11, 2023, or**
ii. **An alternative approach (please specify)?**

Please provide a detailed justification to support your answer.

Q19. If it is determined that spectrum charges for GSO/NGSO-based MSS providing voice, text, data, and Internet services should be levied on a per MHz basis, should these charges be calculated based on:

i. **The Department of Telecommunications (DoT) order dated December 11, 2023, or**
ii. **An alternative approach (please specify)?**

Please provide a detailed justification to support your answer.

Tata Communications Response to Q 15 & Q19:

No comments in view of our response given to Q 14, Q16, Q17, Q18 and Q 20 as above.

Q21. Whether there are any other issues/suggestions relevant to the spectrum charging for:

i. **NGSO/GSO based FSS providing data communication and Internet services.**
ii. **NGSO/GSO based MSS providing voice, text, data, and Internet services.**

The response may be submitted with proper explanation and justification.

Tata Communications Response: No comments.