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Date: Tue, 19 Nov 2024 23:21:30 +0530

Subject: Comments on TRAI Consultation Paper on The Terms and Conditions of Network Authorisations to be Granted Under the Telecommunications Act, 2023

==== Forwarded message =====

**Kind Attn: Shri Akhilesh Kumar Trivedi, Advisor (Networks, Spectrum and Licensing), TRAI**

Reference: TRAI Consultation Paper on "The Terms and Conditions of Network Authorisations to be Granted Under the Telecommunications Act, 2023" dated 22nd October, 2024

Dear Sir,

Greetings of the day!

Appended below are the comments from us for the questions related GSaaS authorisations of the above referenced TRAI Consultation paper.

**Q9. Whether there is a need to introduce an authorisation under Section 3(1) of the Telecommunications Act, 2023 for establishing, operating, maintaining or expanding ground stations, which may be used to provide ground station as a service (GSaaS)? If yes, what should be the eligibility conditions, area of operation, validity period of authorisation, scope, and terms & conditions (general, technical, operational, security etc.) for the authorisation to establish, operate, maintain, or expand ground stations, which may be used to provide GSaaS? Kindly provide a detailed response with justifications.**

**Avantel Response:**

At present, the Indian space economy is valued at approximately USD 8.4 billion, constituting a 2% share of the global space market. The government envisions scaling the space economy to USD 44 billion by 2033, including US \$11 billion in exports amounting to 7-8% of the global share. This growth is anticipated to be driven by private sector participation, including a promising pipeline of around 250 startups currently operating across various segments of the space economy in India (Source: <https://pib.gov.in/PressReleaselframePage.aspx?PRID=2068155>).

Indian Space assets, players and use cases are going to be increased multi-fold in near term and the ground infrastructure need to be scaled to meet up the emerging needs. Further, most of the space players who are startups or small players do not have the wherewithal or the required capital to invest in ground segment infrastructure. Here

lies the GSaaS role which will offer ground station services on pay per use model thus directly contributing to the Space economy.

The following excerpt from the Euroconsult report “Ground Segment Market Prospects, 5th edition” makes amply clear how important the GSaaS is going to be in future.

*“Providers offering satellite-to-ground communication services, such as GSaaS, are enabling satellite operators to shift ground segment costs from capital expenditure (CAPEX) to operational expenditure (OPEX), mainly driven by Earth observation (EO) requirements. It’s particularly relevant for new operators testing their business models and aiming for progressive scaling. The Ground Station as a Service (GSaaS) market grew at an 11% CAGR during the last five years and is expected to continue expanding to reach \$400 million by 2027”.*

There are about 18 GSaaS providers world-wide, whose list is growing by the day and they have their ground stations proliferated globally. However, since there is no GSaaS policy / players in India, commercial ground station services are not being offered from the Indian region resulting in not meeting global customer requirements for real time data / satellite TT & C connectivity over Indian region. India is also missing the opportunity of GSaaS business models contributing to the growth of Space economy.

Hence, there is an urgent need to introduce an authorisation under Section 3(1) of the Telecommunications Act, 2023 for establishing, operating, maintaining or expanding ground stations, which may be used to provide ground station as a service (GSaaS).

The following points may be considered.

- IN-SPACe has recently issued detailed norms / guidelines for undertaking Space activities by NGE’s which includes GSaaS authorisation and issued authorisation to offer GSaaS services commercially to three private establishments. The detailed eligibility conditions have been laid down in the document and same needs to be adopted by DoT while making the GSaaS licensing policy.
- The GSaaS services authorisation may be issued on All India basis with a specific procedure to onboard additional Ground Stations by the GSaaS operator as per business requirements.
- The license may be given for a period of twenty years similar to the other network licenses being issued by DoT.
- The security provisions have to be incorporated so that national security does not compromise due to the actions of the GSaaS operators. However, the provisions need to be evolved in such a manner that the “Business interests” of the GSaaS operators doesn’t get compromised. As the GSaaS business model is highly customer centric and limited by the SLAs between the GSaaS operators & customers, State could impose various checks &

balances in terms of customer onboarding requirements, audits / periodical reports, regular security audits by security agencies etc. The provisions should not be stringent but lighter approach be adopted otherwise the GSaaS business will become unviable.

**\_Q29. In case it is decided to introduce an authorisation under Section 3(1) of the Telecommunications Act, 2023 for establishing, operating, maintaining or expanding ground stations, which may be used to provide Ground Station as a Service (GSaaS), then:**

**(a) Whether there is a need to have financial conditions associated with such an authorisation?**

**(b) In case your response to the above is in the affirmative, then what should be financial conditions for such an authorisation?**

**Please provide detailed response with justification.**

**Avantel Response:**

1. Yes, the state may impose financial conditions for GSaaS authorisation as the GSaaS operators are adopting “Business for Profit” model. This will result in revenue generation to the state. However, as the business is competitive, the financial conditions should not be taxing the GSaaS operators in a way that the business becomes unviable. A nominal licence fee for granting the license may be charged and post grant of licence, a percentage of AGR (Annual Gross Revenue) i.e. approximately 2% to 4% as being charged for some of the network licenses may be charged as annual royalty for grant of licence.

2. The Global Best Practices for GSaaS Regulations are highlighted below. These aspects may be considered while arriving a more business freindly GSaaS policy.

- A global frequency license is granted to support any satellite that operates in the approved EESS S, X, and Ka-bands. The list of these satellites from the satellite company’s ITU-R filing, which is published on the ITU website and can be kept at the GSaaS station. This is beneficial to both the regulatory agency and GSaaS operator as it avoids the unnecessary schedule delays, paperwork, and manpower required to request a license for each additional satellite that will come on to the network. In the ground as a service business, new satellites will typically be added every month which can result in a tremendous burden on regulatory agency to approve each individual request.
- A license is only required for transmit (uplink from ground to satellite) and not for reception (downlink from satellite to ground). This is in keeping with regulatory norms for most other countries (except Australia) where only the originator of the transmitting signal is required to have a license.
- Spectrum fees are only charged for S-band uplink and not for S, X, Ka-band downlink. This is necessary to make the business case for ground as a service a viable business.

- One license can cover a satellite or an entire constellation of satellites using the same configurations, frequencies, and power levels.
- Licenses for satellite operators range from \$200 USD to typically no more than \$1,000 USD and are good for the life of the satellite

**3. Alternative Scenario** An alternative scenario that is viable for the business case is to implement the same spectrum licensing rules that are in place for GSaaS services in Argentina:

- A global frequency license is granted to support any satellite that operates in the approved EESS S, X, and Ka-bands and has a published filing with the ITUR but under the condition that Avantel reports to DOT the specific information of the signal to be transmitted and requests confirmation from DOT.
- Same conditions as #2 and #3 in the best case scenario.
- The highest license fee that has (sometimes) been commercially accepted is ~\$8,000 USD for central Australia. The fee covers the cost of deconflicting with all other spectrum users. This is a one-time fee.

**4. Conditions that are not Recommended** Conditions that are not recommended for the business case viability of ground as a service include:

- Spectrum fees for downlink. EESS allocated frequency bands have large bandwidth X (375 MHz) and Ka-bands (1500 MHz) to allow high speed downloads of data during the finite pass window durations of only a few minutes. Worldwide market pricing for ground as a service for EESS satellites do not allow for spectrum costs for downlinking and hence would prevent India from participating in the ground as a service business for EESS satellites.
- Ground station verification testing for specific signal frequencies and modulations/coding and/or in conjunction with the satellites to be served. Unlike prior generation satellites, many of today's modern EESS satellites have onboard software defined radios which can rapidly change frequency/data rate/modulation/coding across a wide variety of choices on the fly. A testing requirement is not feasible for ground as service because:
  - There is a near infinite quantity of combinations of frequency, data rates, modulations, and coding possible on the modern satellites
  - It is not feasible to cease revenue producing service to perform tests each time a new satellite is added
  - An essential requirement for the survival of a satellite is to receive ground support immediately after separation from the launch vehicle (called "LEOP"). A testing requirement with the satellite would prevent the ground station from supporting this essential service. The testing requirement is so objectionable that one of the GSaaS operator had to cancel a planned site in southern Japan. The legacy requirements by the Japanese regulator for this kind of testing was so onerous and expensive that the GSaaS customers could not justify using the site.

5. Reporting of user data. Satellite operators demand security for their traffic and will not tolerate disclosure of their data to outside parties, including to regulatory agencies, or excessive time spent on onerous and unnecessary reporting requirements. Canada is an ideal location to support the majority of EESS satellites which operate in near polar orbits, however, their regulatory agency requires reporting of user data for every pass! Owing to its desirable location from an orbit perspective, one of the GSaaS operator was planning to install one of its ground as a service antennas in Canada, but cancelled those plans upon learning of this requirement to report user data. Canada is the one country in the world that has these onerous reporting requirements.

6. Long delays in license approvals. Customers readily accept 1-3 months in processing time. However, Japan requires 9-12 months, which is unacceptable to commercial satellite operators.

**Thanks & Regards.**  
**Wg Cdr PRI. Prakash (Retd).**  
**Vice President - Strategy & Business Development**

