AWS COMMENTS ON THE TRAI CONSULTATION PAPER LICENSING FRAMEWORK FOR ESTABLISHING SATELLITE EARTH STATION GATEWAY

Subject: Comments on the TRAI Consultation Paper on Licensing Framework for Establishing Satellite Earth Station Gateways

Respected Sir,

Amazon Web Services (**AWS**) is thankful to the Telecom Regulatory Authority of India (**TRAI**) for initiating a consultation process on satellite earth station licensing in India. We commend the TRAI for releasing the Consultation Paper on Licensing Framework for Establishing Earth Station Gateway (**Consultation Paper**).

AWS has a long-term vision in India and we are excited to participate in India's growth story. In 2016, we launched our first AWS Region, which consists of multiple data centres, in Mumbai. In 2017, the Ministry of Electronics and Information Technology empanelled AWS for providing cloud services to Indian government agencies. In November 2020, we announced our second AWS Region Hyderabad, which will be functional by mid-2022.

We have regularly participated in TRAI's other public consultations as well, on issues such as cloud computing, regulation of 'Other Service Providers (OSPs)' and OTT services, among others. Recently, we submitted our comments on the TRAI Consultation Paper on Licensing Framework for Satellite-based Connectivity for Low Bit Rate Applications.

We thank the TRAI for seeking comments on this matter. We believe it will pave the way for space innovation in India. Before we address the specific questions posed in the Consultation Paper, it is important to explain the exact nature of our operations in the space industry.

AWS Ground Station (**AWS GS**) is a managed service that lets customers control satellite communications, downlink and process satellite data, scale their satellite operations quickly, easily, and cost-effectively, without having to worry about building or managing their own ground station infrastructure. Our global customers rely on AWS GS' global footprint of ground stations to control satellite communications and downlink and process data when and where they need it, and can save up to 80 percent of their ground station costs by paying for antenna access time on demand.

Larger socio-economic benefits may also accrue as it is a major step in creating affordable, scalable, and global satellite-connected networks, which will continue to serve the growing needs of the Indian economy. The Ground Station as a Service (**GSaaS**) model also furthers the cause highlighted by the Consultation Paper of having a ground station providing satellite-based resources in a "*transparent, fair, and non-discriminatory manner*".

In this regard, it is pertinent to note that AWS GS ***does not*** operate as a traditional telecommunication service. GSaaS enables private one-way transfer of data (space to ground or ground to space), ***does not*** have a hub station, and does not enable ground to space to ground communication. Hence, GSaaS is not similar to a satellite communication service like a VSAT or GMPCS service, wherein the equipment used (for example, a hub station) and the purpose for which it is typically used are entirely

different from the AWS GS service offering as well as the use cases for which it is intended. In contrast, AWS GS supports services that require one-way transfer of data for non-telecom purposes such as:

a. Earth observation – weather (analysing downlinked weather data to predict patterns) or natural disaster (analysing downlinked data during natural disasters to identify survivors and assess structural damage) prediction;
b. telemetry tracking and control (**TT&C**) data encompassing data related to the health and status of the satellite, and the determination of the exact location of the satellite;
c. command function (uplinking commands for control of satellite), etc.

Our enclosed responses (Annex A) are framed keeping the above context in mind. To summarise, we recommend any regulatory framework envisaged should:

1. **Enable GSaaS** in the interest of creating low capex, scalable infrastructure.
2. **Avoid introducing a separate and additional licensing framework for GSaaS earth stations**, in addition to any regulations proposed by the DoS. If such additional framework were imposed, we recommend a light-touch approach with a simple notification or registration regime. Such an approach should not create onerous compliance obligations on GSaaS operators, including setting specific contractual terms for GSaaS operators and their customers (i.e., satellite operators) and any other third parties, or placing restrictive conditions pertaining to the relationship between the GSaaS operator and the satellite operator as they will impact accessibility of satellite services.
3. **Allow sharing of GSaaS earth station resources** to bring greater efficiency and enhanced savings on major operational costs, thereby lowering the entry barriers into the industry.
4. Ensure **that spectrum assignments by the Department of Telecommunications (DoT) are carried out through administrative assignments charged at a standard pricing** to avoid cost barriers to both GSaaS earth station operators and their customers. Internationally as well, most administrations – such as Sweden and the United States – assign spectrum administratively for a GSaaS earth station.

We are grateful to TRAI for this opportunity to share our ideas, and we look forward to working towards an enabling policy environment in India.

Best Regards
Yours Sincerely

(Bishakha Bhattacharya)

Authorised Signatory

Public Policy Leader for Public Sector, India / SAARC
Email: bishakha@amazon.com
Mobile: +91-9873100040
Amazon Internet Services Pvt. Ltd

Annexure A : Response to Consultation on Licensing Framework for Establishing Satellite Earth Station Gateway

A. Ground Station as-a-Service

AWS Ground Station (**AWS GS**) is a managed service that lets customers control satellite communications, downlink and process satellite data, and scale their satellite operations quickly, easily, and cost-effectively, without having to worry about building or managing their own ground station infrastructure. Our global customers rely on AWS GS' global footprint of ground stations to control satellite communications and downlink and process data when and where they need it, and can save up to 80 percent of their ground station costs by paying for antenna access time on demand.

Since the cost of deploying satellites and other related ground infrastructure (which can often involve multiple ground stations for low and medium earth orbit satellites) is a significant capital and operational expenditure, Ground Station as-a-Service (**GSaaS**) models such as AWS GS allow satellite operator customers to conduct business without the long-term commitment and costs involved in setting up new infrastructure. This has the potential to enhance the capabilities of existing players and new entrants across various sectors, both government and private, as it allows more capital to be redirected towards R&D and reduces overall costs. Larger socio-economic benefits may also accrue as it is a major step in creating affordable, scalable, global satellite-connected networks, which will continue to serve the growing needs of the Indian economy. The GSaaS model also furthers the cause highlighted by the Consultation Paper of having a ground station providing satellite-based resources in a "*transparent, fair, and non-discriminatory manner*".

In this regard, it is pertinent to note that AWS GS ***does not*** operate as a traditional telecommunication service. It enables private one-way transfer of data (space to ground or ground to space). It ***does not*** have a central hub station and does not enable ground to space to ground communication. Hence, it is not similar to a satellite communication service like a VSAT or GMPCS service, wherein the equipment used (for example, a hub station) and the purpose for which it is envisaged and typically used, are entirely different from that of the service provided by AWS GS. As an example, under the License Agreement for Unified License issued by the DoT, the scope of a VSAT service is to '*provide data connectivity between various sites scattered within territorial boundary of India using VSATs.*' VSAT is envisaged for a specific use case. VSAT users are typically small and medium size businesses with a central office, banking institutions with branches all over the country, reservation and airline ticketing systems, etc.

In contrast, the AWS GS service offering, as well as the use cases for which it is intended and can be used by, are entirely different. AWS GS supports services that require one-way transfer of data for non-telecom purposes, such as:

a. Earth observation – weather prediction (analysing downlinked weather data to predict patterns) or natural disaster (analysing downlinked data during natural disasters to identify survivors and assess structural damage);
b. telemetry tracking and control (**TT&C**) data encompassing data related to the health and status of the satellite, and the determination of the exact location of the satellite;
c. command function (uplinking commands for control of satellite), etc.

B. Answers to questions posed by TRAI

Q1. Whether there is a need to have a specific license for establishing satellite Earth Station Gateway in India for the purpose of providing satellite-based resources to service licensees? Do justify your answer.

We welcome the move to create a flexible, independent regulatory environment for the setting up of GSaaS earth stations, de-linked with the provision of satellite-based services. However, we believe that since the DoT's primary purview is telecom regulation, their focus should not be on regulating entities like AWS GS. AWS GS does not serve telecom functions, and should not be treated at par with telecom services. Instead, AWS GS should be subject to the existing or proposed policies of the Department of Space (**DoS**).

As discussed above, the existing licensing framework for GSaaS earth stations under the DoT, such as the VSAT CUG service license is not envisaged, and is unsuited, for entities that provide ground segment management, data downlink, and other data processing services as GSaaS services do not operate as traditional telecom services. While telecom operators may also use GSaaS, they can also be leveraged by other classes of customers, (such as those working with agricultural data, geospatial data, meteorological data, for instance), distinct from the use cases envisaged for the VSAT regime.

VSAT services are true telecom services, with the telecom entity serving as a bridge between multiple end users. However, AWS GS does not provide telecom services; it simply allows a one-way communication between the satellite and the ground segment. Further, the VSAT network comprises of two components, i.e. the Earth and the space segment. Entities that allow satellite data uplink, downlink, and processing facilities only operate the ground component for limited purposes, while the space component is managed by the satellite operator. This further highlights the divergence between the VSAT license and the AWS GS business model.

Due to the above reasons, we recommend that the DoT should avoid stop-gap measures such as an additional license for GSaaS earth stations. Instead, we recommend that the framework for regulating GSaaS earth stations should be overhauled and simplified. In effect, this would mean that the DoT should not regulate entities that do not perform a core telecom function/do not provide telecommunications services to the public, and all regulation relating to GSaaS earth stations should be governed by the DoS and the Indian National Space Promotion and Authorisation Center (**In-SPACe**). As stated in the SpaceCom Policy issued by the DoS, In-SPACe is the designated agency for the regulation of all space-related activities.

Enabling a facilitative environment for GSaaS earth stations will also help the Indian satcom sector compete in the global arena. It will be aligned with the Government's objectives under the National Digital Communications Policy, 2018, which seeks to provide affordable digital communications infrastructure and services to customers, as well as strengthen and promote development of satellite communications related infrastructure through appropriate policies including by *'revising licensing and regulatory conditions that limit the use of satellite communications*' and '*reviewing SATCOM policy for communication services, along with Department of Space, to create a flexible, technology-neutral and competitive regime'*, to support India's transition to a digitally empowered economy.

Recommendation: We recommend that the regulatory framework envisaged by the TRAI should enable GSaaS in the interest of creating low capex, scalable infrastructure. This should be without adding additional licensing, especially as GSaaS services do not involve the provision of telecom services to public.

Q2. If yes, what kind of license/permission should be envisaged for establishing Satellite Earth Station Gateway in India? Do provide details with respect to the scope of the license and technical, operational, and financial obligations, including license fee, entry fee, bank guarantees, and NOCC charges, etc.

We believe that introducing a separate and additional licensing framework for GSaaS earth stations will hinder the broader aim of enabling a vibrant space and satellite communications industry, with the objective of increasing private participation in the sector. AWS respectfully suggests that the GSaaS regulatory framework be reconsidered. GSaaS uniquely enables faster scaling of satellite-based services, as it leads to the proliferation of satellite-based services without the costs involved to set up infrastructure. GSaaS also enables the provision of cost-effective resilient, ubiquitous, and seamless connectivity for IoT devices to run efficiently. IoT operators can harness the benefits from satellite communications, such as the ability to operate across a vast geography, connect remote assets, and downlink their data onto cloud storages. For satellite operators, engaging GSaaS is much cheaper than setting up their own earth stations.

This demonstrates the need for a regulatory framework for GSaaS operators that allows satellite operators to harness the value of space-led innovation, where GSaaS is seen as a unique model that brings value to satellite-led research, separate from the traditional telecom-related use cases of satellites. There is also a need to create a single window clearance apparatus for GSaaS, solely under the purview of the DoS and In-SPACe, to avoid any regulatory overlap and ensure that the GSaaS industry is not subjected to overly onerous obligations. Thus, we believe that the TRAI should recommend that the DoS and In-SPACe should take the lead in formulating all necessary regulation for GSaaS.

However, if the TRAI/DoT choose to consider regulating GSaaS, we recommend a light-touch regime which only requires GSaaS operators to notify and register with the DoT, instead of a full-fledged licensing framework. GSaaS operators do not carry out a core telecom function, and the use of spectrum is merely incidental to their operations. Thus, we reiterate that the TRAI/DoT should ensure minimum interference in the governance of the GSaaS industry, which should remain the domain of the DoS/In-SPACe.

Recommendation: Introduction of a separate and additional licensing framework for GSaaS earth stations should be avoided. DoS and In-SPACe should be the enabling and regulating agency for GSaaS earth stations.

Q3. Whether such Earth Station license should be made available to the satellite operator or its subsidiary or any entity having a tie-up with the satellite operator? Do justify your answer.

As discussed in our responses to Q1 and Q2, we believe that the TRAI and DoT should not set up a licensing framework for GSaaS earth stations, if they do not provide/facilitate telecom services to the public in India. This should be the sole domain of the DoS and In-SPACe.

In case the TRAI/DoT does propose a new GSaaS earth station license, it should not be made contingent on any relationship between the licensee and any satellite operator. These licenses should also not be restricted to satellite operators or their subsidiaries alone, but must allow independent entities having tie-ups with satellite operators to provide such services. An onerous licensing regime that only allows certain entities in specific arrangements to operate will hurt India's space industry. GSaaS operators can offer services to multiple satellite operators without being their subsidiary or being engaged in a long-term contract with them. Given the vast growth in satellite-led innovation, barriers (such as multiple approvals and onerous compliance requirements) to establishing GSaaS earth stations can stifle this growth. In the absence of onerous license conditions, GSaaS providers can easily set up their operations and customise their offerings to benefit their customers.

If GSaaS operators are subject to light-touch regulatory frameworks, they can enable satellite operators to benefit from a pay-as-you-go model where they share GSaaS earth station resources with other similar players. It will also achieve the primary objective that the TRAI is trying to achieve through this Consultation Paper, which is to avoid duplication of infrastructure and faster roll out of provisioning of satellite transponder capacity.

The provision of GSaaS earth station licenses should not be so limited as applying only to satellite operators and their subsidiaries. If these barriers are placed, business models such as AWS GS that offer pay-as-you-go GSaaS services will not be able to operate their GSaaS earth stations.

Recommendation: No new licensing framework should be imposed on GSaaS earth stations. However, if one is established, we recommend that the TRAI/DoT explore a light touch regulation with a simple notification or registration requirement. This should not entail the TRAI/DoT setting any contractual terms between GSaaS operators, satellite operators, or any third parties, as a precondition to offering these services.

Q4. What mechanism/framework should be put in place to regulate the access to satellite transponder capacity and satellite-based resources of a Satellite operator/Earth Station licensee by the service licensees so as to get the resources in a time-bound, transparent, fair, and non-discriminatory manner?

GSaaS earth station operators should be allowed to contractually determine the allocation of satellite-based resources between their customers. In addition to this, the growth of different models of satellite services such as GSaaS is only possible in a regime which does not restrict satellite operators/ GSaaS earth station operators to specific models of provision of services. Such development may in fact be useful for ensuring equitable use of resources -- for instance, AWS GS currently operates on a zero/minimal interference basis. Accordingly, strict rules around use of spectrum may be detrimental in such a case and defeat the purpose of such restrictions.

Recommendation: GSaaS earth station operators and their customers can self-regulate the access to satellite-based resources. A separate regulatory mechanism would be restrictive and detrimental to the growth of innovation and competition in the sector.

Q7. Whether the sharing of Earth Station among the licensees (between proposed Earth Station licensee and Service Licensee; and among service licensees) should be permitted? Do provide the details with justification.

We agree with the TRAI's observations that sharing of GSaaS earth station resources will bring greater efficiency in the industry. As mentioned above, sharing of satellite resources will result in satellite operators saving on major operational costs, thereby lowering the entry barriers into the industry.

To this end, we appreciate the DoT's stance on liberalising the GSaaS earth station sector and support any measures that allow various stakeholders to collaborate towards the growth of the industry.

It has been rightly identified by the DoT in its letter to the TRAI that the current licensing conditions pose a limitation to establishing one's own gateway for rendering satellite services, thereby resulting in higher CapEx and OpEx.

It must also be noted that the TRAI's and the DoT's efforts allowing sharing of both passive and active infrastructure in the telecom sector led to the rapid growth of this sector, combined with reduced costs, and resulted in India emerging as a trendsetter in infrastructure sharing. It also helped the green

telecom initiative, and thereby maximised efficient utilisation of resources. The sharing of GSaaS earth stations used for providing GSaaS between service licensees/spacecom authorisation holders should also be permitted, as it will further the Consultation Paper's objective of reducing costs related to infrastructure and increase proliferation through sharing.

Recommendation: The DoT should not impose any restrictions on such sharing and allow the licensees to arrive at a mechanism to allocate these resources in a fair manner. We also recommend enabling a framework where GSaaS operators are allowed to share ground stations with holders of spacecom authorisations and applicable telecom authorisations (such as GMPSC and VSAT under the Unified License).

Q8. To whom should the frequency carriers be assigned: the Earth Station Licensee, or the Service Licensee, or whoever establishes the Satellite Earth Station? Do justify your answer.

Under the existing regime, spectrum should be assigned to service licensees on an administrative basis for providing services. This should be followed for any GSaaS earth stations as well, since these services are not being used to provide access services. Internationally most administrations -- such as Sweden and the United States -- assign spectrum administratively for GSaaS earth stations.

Q9. What should be the methodology for the assignment of spectrum for establishing satellite Earth Station? Provide a detailed justification.

Under the existing regime, spectrum should be assigned to service licensees on an administrative basis for providing services. This should be followed for any GSaaS earth stations as well, since these services are not being used to provide access services. Internationally most administrations -- such as Sweden and the United States -- assign spectrum administratively for GSaaS earth stations.

Q10. What should be the charging mechanism for the spectrum assigned to the satellite Earth Station licensee? Elaborate your answer with justification.

At this nascent stage in the growth of the GSaaS earth station and space industry in India, auctioning a vital resource such as spectrum will result in extremely high long-term investments from prospective licensees.[1] Due to the typical nature of auctions, the price of the auctioned commodity is driven up, to a point when it is only affordable for a limited set of players.[2] A high procurement rate for spectrum will mean that licensees will either find it unviable to participate, or be compelled to offer their services at a high price, leading to the end-service being unaffordable for a large section of the economy. Thus, in order to ensure that innovators and start-ups are able to enter the sector without major cost barriers, we believe that spectrum should be administratively assigned by setting a standard fee/charge, arrived at in a manner that avoids players being priced out, while also ensuring the standard fee/charge is regionally competitive. This is also an approach that is adopted by most countries (such as Australia, Sweden and the United States, among others) with a licensing framework for GSaaS earth stations, as recognized in the Consultation Paper.

Recommendation: Spectrum assignments should be carried out through administrative assignments charged at a standard pricing to avoid creation of cost barriers to both GSaaS earth station operators and their customers.

[1] As per research by Verified Market Research cited in **this** article, India's share of the global satellite industry is at only 2% in 2021, and will grow to 10% in 2030.

[2] As per the ICRIER paper on ***Evaluating Spectrum Auctions in India*** **(link)**, after India started auctioning spectrum instead of assigning it, the increased cost of spectrum led to higher entry barriers for newcomers (page 6)