VSAI RESPONSE TO TRAI CP ON Licensing Framework for Establishing Satellite Earth Station Gateway

PREAMBLE

At the outset, we wish to welcome & thank TRAI for coming up with this excellent Consultation Paper which focuses on the establishment of satellite earth station gateway for GSO/NGSO HTS by the satellite operator themselves or by a satellite operator designated entity. The gateways (primarily the RF Terminal) are intended to be shared resources that are being setup by either the satellite operator or an entity that has a relationship with the satellite operator.

Today, in the case of conventional GSO satellites the service providers are putting up the gateways along with the baseband to provide services to the customers. The service providers have made substantial investment in satellite networks that include the RFT and baseband equipment. The baseband equipment allows the service provider to bring in efficiencies in terms of the bits/hz ratios, over the air provisioning, IP addressing, different access techniques that are best suited for different customer applications, many performance enhancements to address the delay associated with satellite connectivity and many more such features. The feature set gives the service provider a competitive edge in the marketplace and proves beneficial to the customer as it gives a better quality of service and user experience. So in an ideal world, just like mobile operators installing their own core networks, the satellite service providers would like to continue with their own baseband equipment.

Thus, for GSO wide beam satellites and GSO HTS where one gateway allows access to all the beams to cover the Indian subcontinent, the earth stations are established by Service Licenses and thus there is no need to have a separate license for establishing satellite Earth Station Gateway in India.

In the case of GSO HTS, it is not optimal to put multiple RFTs. The GSO HTS is also designed with multiple spot beams that are configured for gateway usage and terminal usage. Spectrum is appropriately divided between the gateway usage and the terminal usage. GSO HTS allows a common antenna and RF to be installed by the satellite operator or a gateway provider in such a fashion that service providers can still host their own baseband to provide a service. The service providers would like to continue with the baseband technology where they have made significant investments in developing the skill set for managing and operating the networks efficiently and securely.

However, in the case of NGSO (LEO/MEO) HTS, the technology is very complex and is tied closely to the constellation of satellites. Since the satellites are constantly moving, each terminal needs to switch to multiple satellites and do a hand-off without losing the connection. This results in the gateway seeing as much as 10,000 hand-offs/second. As a result, it is essential for the baseband to be installed by the satellite operator or an entity designated by the satellite operator (gateway operator). With this in mind, following models of gateway operations are being followed globally.

Model 1: Applies only to GSO Wide-beam and GSO HTS where only one gateway is required to cover whole of India

In the case of GSO Wide-beam satellites and GSO HTS where one gateway covers all the user beams over India, the gateway investment is required only in one location. Currently the VSAT Service licensee installs such gateways and that is a very fair and viable option. In such scenarios, there is no need to have a separate license for satellite earth station gateway in India. As such our recommendations for separate license for Satellite Earth Station Gateway excludes such scenarios.

Model 2: Applies only to GSO HTS which require multiple gateways to cover India

The antenna and RF systems are set up by the satellite operator in a gateway facility. Service providers can install their own baseband and NMS systems in the same gateway facility to provide services to their customers. The service providers essentially share the antenna and RF systems setup by the satellite operator to access the satellite capacity. In this case, the satellite operator sells the capacity to the service provider in MHz and the service provider uses their baseband to convert this MHz into Mbps to deliver a service to their customers. The satellite operator might either operate the gateway themselves by taking suitable authorization or choose to enter into an arrangement with another entity to operate the gateway. The sale of capacity and the operation of the gateway are de-linked in this case. In this case, the gateway acts as an infrastructure. For all practical purposes, the gateway can be treated as a passive infrastructure (even though there are active electronics used in the RF systems). The capacity being sold is directly linked to the spectrum of operation and can be clearly demarcated between service providers.

Model 3: Applies only to GSO HTS which require multiple gateways

A variant of Model 2 could be that the satellite operator chooses to partner with a UL holder to set up and operate the gateway on their behalf. In such a case, the other service providers who use their gateway should be able to share the same infrastructure.

Model 4: Applies only to LEO/MEO HTS

The satellite operator sets up the gateway (either on its own or by getting into an arrangement with an Indian entity) that includes the antenna, the RF systems and the baseband. The satellite operator then sells the capacity to the service provider in either MHz or Mbps as the case may be. The service provider might use the bandwidth for a backhaul or a satellite broadband service to both B2B and B2C customers. The satellite operator and service provider might jointly customize service plans that are applicable for the customers of the given service provider. The service plans are configured on the NMS installed at the gateway. The satellite operator might partition the NMS with an objective of giving access to the service provider for the portion of the network that is used to provide the service to the service provider and to its customers. **In this case it is only possible to bifurcate spectrum between the usage by the gateway and the usage by the user terminals. It is not possible to bifurcate spectrum service provider wise**.

In light of the above background defining the characteristics of the proposed Satellite Earth Station Gateway, we wish to provide our Responses to all the Questions as given below:

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.

VSAI RESPONSE

1.1 **In reference to the Model 1 mentioned above**, there is no need to have a separate license for satellite earth station gateway in India.

1.2 In Model 2 and Model 3, the gateway can be set up by simply taking an IP-1 registration as it is only an infrastructure that is being set up. In Model 2 and Model 3, the gateway can be set up using the service provider's existing license (as long as they have the appropriate licenses/authorizations).

1.3 In Model 4, there is a need to establish a Earth Station Gateway license that allows for setting up of the gateway and that is de-linked from service provisioning.

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.

VSAI RESPONSE

2.1 In the case of Model 2 and Model 3 as above, the Earth Station gateway operator can be an IP-1 registration holder. All the terms and conditions as stipulated in the IP-1 registration can be followed. For model 2, no separate license/authorization is required.

2.2 For Model 4, a separate license needs to be created. The scope of this license should be only for setting up Earth Station Gateways and it should not have any provision to provide a telecom service to a subscriber (both B2B and B2C).

2.3 The technical scope should enable the gateway operator to set up a gateway anywhere in India and access an authorized satellite (authorized by Department of Space or INSPACe) and provide satellite bandwidth to other telecom service providers (Access/NLD/VSAT/ISP). The technical scope should enable the gateway operator to provide both backhaul/access bandwidth as long as they do not provide the service to the ultimate consumer/customer (who is not a telecom licensee).

2.4 The entry fees can be kept minimum and similar to that of Commercial VSAT license. The license fee should be at Rs. 1 (similar to that of the IFMC authorization). The rationale for the same is that the service provider is paying license fees as a percentage of the end revenues. The license fees should not be double charged. The bank guarantee requirements should be kept to a minimum to cover the license fee and the spectrum charges.

2.5 Since the satellite beams on which gateways are located for modern HTS, both GSO & NGSO do not have pan India coverage, it will be extremely difficult for NOCC to set up monitoring stations all across the country. The monitoring of such gateways should be left to the satellite operators, who are equipped to handle any inter-satellite interference. For monitoring of interference from/to other services (terrestrial), WPC has adequate monitoring mechanism and is adequately covered by way of spectrum usage charges. In case it is decided to continue with the NOCC monitoring mechanism, the satellite operators should be mandated to provide a live feed of their gateway spectrum (it is not practically possible to monitor the user spectrum and beams) to NOCC. This will reduce the infrastructure cost for NOCC quite significantly and the charges for NOCC monitoring can be drastically reduced and a small flat fee for cost recovery can be charged.

2.6 The Unified License Chapter VI Security Conditions mandates service providers to take adequate measures for the purpose of security. The same conditions should be applicable to

the gateway operator as in the case of a satellite network the security precautions apply more to the gateway and less on the customer premises equipment.

2.7 The sale of capacity in all models should be directly between the satellite operator and the service provider. This ensures that there are no additional mark-ups and as a result keeps the cost to the ultimate customer under check.

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.

VSAI RESPONSE

3.1 In the case of Model 2 and Model 3, the norms followed by IP-1 registration need to apply.
3.2 For Model 4, it should be possible for both the satellite operator or a designated Indian entity to apply for the Earth Station Gateway License. In both cases, the license applicant should be an Indian company (registered under the Companies Act). The financial criteria can be kept on similar lines of the Commercial VSAT license.

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?

VSAI RESPONSE

We wish to submit that this is not internationally regulated. While it is intended that the satellite operator or gateway operator should not deny the service to any service provider, the tariff and the terms and conditions should not be regulated. This is entirely dependent on the quantum of bandwidth hired, the type of service availed, the pre-commitment/commitment that is being offered by the service provider to the satellite operator/gateway operator.

Q5. Whether the Earth Station Licensee should be permitted to install baseband equipment also for providing satellite bandwidth to the service licensees as per need? Provide a detailed response.

VSAI RESPONSE

In Model 2 & Model 3, the gateway operator need not be permitted to install the baseband equipment and can simply take a IP-1 registration to install the gateway RFT. The service providers can bring in their own baseband and provide the services to their respective customers. However, in the case of NGSO HTS, the entire capacity of the satellite for the given spectrum is derived only because it is closely tied to the baseband. The satellite operator is in the best position to exploit the spectral efficiency. Spectral efficiency is a function of the baseband and so the gateway operator should be able to install & operate the baseband equipment as well. The baseband controls the quantum of spectrum used, the modulation/coding schemes, the IP address schemes, the access schemes (CIR/MIR, handling of real-time traffic needed for cellular backhaul networks) and all the security

aspects of the network. The service plans are also defined in the associated NMS of the baseband. The quantum of spectrum that needs to be authorized for a given gateway also depends on the baseband equipment. The installation/operation of baseband should be permitted only in model 4, where the Earth Station Gateway operator is suitably licensed.

Q6. What amendments will be required to be made in the existing terms and conditions of the relevant service authorizations of Unified License, DTH License/Teleport permission to enable the service licensee to connect to the Satellite Earth Station Gateway established by Earth Station Licensee/Service Licensee, for obtaining and using the satellite transponder bandwidth and satellite-based resources? Do justify your answer.

VSAI RESPONSE

6.1 The recent amendment to the license under clause in Part-I Chapter-V under Operating Conditions sub-clause 33.3 reads as *"An authorized Gateway hub operated by the Satellite Provider itself is permitted to be shared with the bandwidth seeker".* This clause needs further amendment. The bandwidth seeker first of all should be an authorized service provider either authorized by DOT or MIB. Secondly, the Earth Station Gateway needs to be operated either by the satellite operator themselves or a designated Indian entity. That needs to be incorporated. Thirdly, it is not sharing infrastructure with the service provider. The gateway operator provides bandwidth to the service provider. This also needs to be addressed. The suggested text for the above clause can read as follows:

"An authorized Earth Station Gateway/Hub operated either by the Satellite Operator or its designated Indian entity is permitted to provide gateway services to an authorized service provider holding an appropriate license/authorization".

6.2 Similarly, the amendment to the license under clause in Part-I Chapter-V under Operating Conditions sub-clause 33.2 reads as *"The Licensee may share its own active and passive infrastructure for providing other services authorized to it under any other telecom license issued by Licensor.* This amendment only allows the service provider to share gateway infrastructure across the multiple licenses it holds. It does not allow service providers to share the gateway infrastructure with each other. This needs to be enabled for model 2 through a suitable amendment.

6.3 In the broadcast domain, some of these concepts exist already. The teleport provider already acts as an earth station gateway provider. The teleport provider can either act as a gateway provider under Model 2, where the channels get their own space segment and come to the teleport provider for uplinking or the teleport provider can provide a managed uplinking service for the channel (which is akin to Model 4). The international best practice is for teleport providers to provide teleport services for both broadcasting and broadband requirements. The teleport providers can be enabled to provide the earth station gateway infrastructure under Model 2. However, in Model 3 & Model 4, there is a requirement of a license and hence they need to take the appropriate telecom service license to provide gateway services. The DTH providers who own/operate their own earth station can also be enabled to provide earth station gateway services under Model 2. Again, in Model 3 & 4, they need to take the appropriate licenses.

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.

VSAI RESPONSE

The aspect of sharing of infrastructure between earth station licensee and service licensee has already been addressed above in Model 2. Sharing of earth station gateway among service licensees has been addressed above through Model 3. Both should be suitably enabled. In Model 4, it is not technically possible to share the infrastructure.

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.

VSAI RESPONSE

The notion of assigning frequency carriers should be done away with. Since the satellite spectrum is a shared spectrum used by many users/service providers, they are only authorized for the use of this spectrum. The entire quantum of spectrum for gateway operations and terminal operations should be looked at as two blocks. The authorization that is provided today by DoS and tomorrow by INSPACe will allow for the satellite operation in India and also the spectrum that is being used to access the satellite. The inter satellite coordination done by ISRO/DoS also takes into account the usage of spectrum by any given satellite. Broadband satellites used in the C, XC, Ku, Ka and V/Q bands use shared spectrum. This means the same spectrum is used across multiple orbital positions/orbital planes. As a result, there is no exclusive assignment of spectrum taking place. The authorization provided by DoS/INSPACe will take into account the spectrum allocation as per the National Frequency Allocation Plan. Further NOCC approves a detailed carrier plan. So technically, the assignment of spectrum has already taken place for a given satellite, when it is authorized. The carrier plan needs to be recorded by WPC and the gateway operator/service provider be suitably licensed.

Still if there is a specific need to assign spectrum for gateway operations and terminal operations, the spectrum used by the earth station gateway should be assigned to the earth station gateway operator and the terminal end spectrum should be assigned to the service provider. It is worth pointing out that modern GSO HTS/NGSO use dynamic spectrum management. So it will be impossible to bifurcate spectrum between service providers when multiple service providers share a common gateway. In such a case, the enter terminal spectrum needs to be assigned to all the service providers.

Since the charging of spectrum for service providers is based on a percentage of AGR, it would not matter. However, if there is any attempt to tweak the charging based on the quantum of spectrum, that mechanism will fail as the spectrum used by each terminal is not clearly identifiable.

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

VSAI RESPONSE

The methodology for assignment of spectrum should continue on an administrative basis. Satellite orbital location and spectrum are closely tied to each other and cannot be separated.

Countries that have auctioned satellite resources have auctioned satellite orbital slots and spectrum together for this reason. Satellite orbital slots are like plots/houses. Spectrum is like the road to access the plots/houses. If the roads were to be auctioned in isolation, there would be plots/houses that will have no access. Only those orbital slots can be auctioned that belong to an administration/country. As a country we cannot auction the orbital slot that has been notified/filed by another administration/country. Many of the foreign satellites today operate on orbital slots filed by other administrations. They cannot be auctioned. Two countries that auctioned the orbital slot & spectrum combination eventually did not succeed as they soon ran out of orbital slots that had a priority in terms of filing. After this happened, for the remaining orbital slots/spectrum there were no takers. Today India does not have adequate orbital slots with priority in filings. That is the reason, the draft spacecom policy expects satellite operators to transfer orbital resources from their respective administrations to India when applying for authorizations

Additionally, satellite spectrum is a shared spectrum. The basic principle of auction is to provide exclusive assignments. That is not possible in the case of satellite spectrum. As a result, it is prudent that the current methodology of assignment (administrative) continues.

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

VSAI RESPONSE

The Earth Station Licensee is in effect using spectrum to access the satellite resources. The spectrum usage is today charged as a percentage of AGR from the service licensees. The separate Earth Station License model does not increase the spectrum usage in any way. If at all it optimizes it. So the gateway operator should not be charged separately for spectrum. The authority has already recommended the reduction of SUC from 4% to 1% (irrespective of the data rate) for satellite broadband services. In the event a quantum of spectrum dependent charging is considered either for the gateway operator or the service licensee, the same should take into account the total quantum of spectrum and should not be dependent on individual carriers. The individual carriers do not offer any flexibility and cause an enormous amount of administrative overhead when there is any change in the number or size of the carriers during the operation of the network.

Q11. Give your comments on any related matter that is not covered in this Consultation Paper.

VSAI RESPONSE

1. **Spectrum Assignment:** The process of spectrum assignment is very long and in many cases takes many months. If the spectrum is assigned to the satellite operator for the operation of the satellite (by DoS/INSPACe in consultation with WPC), then there is no separate assignment required for earth station operators or service providers. What spectrum is used by which service (gateway or terminals needs to be recorded). The spectrum assignment takes extraordinary time because of a lack of delegation. The assignment process is very long and has to traverse multiple levels in DOT. This should certainly be simplified. This is the single big pain point and a show stopper for satellite broadband services (considering that the open skies is just round the corner). Once an assignment of the entire spectrum used by the satellite (on a shared basis) has happened, the earth station operator/service provider should

not be coming to WPC with an application for additional assignment of spectrum for every increase in the usage of capacity.

2. **SACFA/WPC for terminals:** The Government as a part of the Telecom Reforms has simplified the SACFA process for remote sites. This is a very welcome step. However, each site is still separately licensed (Wireless Operating License). While the wireless operating licenses have been exempted for mobile towers, the same has not been done for satellite broadband/VSAT sites. With the large-scale proliferation of satellite broadband terminals, this will act as a show stopper. The exemption provided for mobile towers needs to be extended to VSAT terminals as well.

3. **Antenna Sizes:** The Ku antenna size restriction of minimum 1M for Fixed sites and 0.60 M for Maritime should be done away with. With the advancement in technologies, there are solutions that work for much smaller antenna sizes. Smaller form factor VSAT terminals including flat panel antennas (size between 10 – 20 cms) should be allowed for use under the existing & prevailing Service Provider licenses as per their usage as long as they are able to meet the appropriate technical criteria (coordinated PSD etc.).