BROADBAND INDIA FORUM
"Think Tank for Digital Transformation"

Suites 215 & 216, DBS Office Business Centre,
1st Floor, World Trade Tower,
Barakhamba Lane, New Delhi-110001

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

At the outset, we wish to welcome and thank TRAI for coming up with this excellent Consultation Paper which focusses on unbundling service provision from infrastructure creation. This would enable easier and faster creation of network infrastructure and faster rollout of provisioning of satellite transponder capacity, which is necessary for proliferation of Satellite based Communication Services all across the country. This concept would enable more players to enter in both the infrastructure and the service layers, thereby creating additional competition in each of the segments and help in making end user services more affordable.
There are 4 different network scenarios for which this new architecture needs to be examined viz.
(i) GSO with single widebeam
(ii) GSO –HTS with single gateway
(iii) GSO with multiple gateways
(iv) NGSOs with multiple gateways

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.

BIF RESPONSE

Both Yes and No.

1.1 In case of GSO-Widebeam and GSO-HTS with single gateway, the open network architecture supports creation of a standalone Satellite Earth Station Gateway (ESG). However in case of GSO-HTS with multiple gateways to support multiple spot beams and in case of NGSOs where multiple gateways are required in a country, the technological complexity of the new Satellite systems have made it extremely difficult for having a standalone earth station station gateway (ESG) through which infrastructure sharing can take place with Licensed Satellite Communication Service Providers(SCSPs).

1.2 In view of the above, in the first two cases the standalone ESGO (ESG Operator) could be permitted through a ' simple registration 'with an annual token fee of Re. 1. In the latter two cases, it would have to assume the form of a 'light touch license'.

Reasons/Justification for the same are given below:

1.3 As per TRAI's existing Recommendations made on 13th March 2020 on the subject of ' Enhancing scope of IP1s' , TRAI has argued "it can be safely stated that the registration

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certificate issued to IP-I is a kind of licence/permission granted under Section 4 of the Indian Telegraph Act, 1885, though on a different consideration and with specific scope. It is quite clear that the Government is using different terms such as license, registration, authorisation, etc. for parting with its exclusive privilege under Section 4 of the Indian Telegraph Act, 1885. Further, it indicates that having a similar kind of license fee obligations on different kind of licensees is not necessary." In view of the above, this new entity viz. ESGO should be permitted through a Registration and also charged a nominal annual fee of Re. 1, on the lines of the authorisation granted to a IFMC Service Provider.

1.4 As mentioned earlier that in case of the GSO-HTS (with multiple gateways) and NGSO scenario, since the Earth Station Gateway is associated closely with spectrum and baseband and is closely coupled with the satellite operator and the service provider network, it maybe authorised under a 'license' albeit a ' light touch license'. In this case the ESGO controls the IP addressing scheme, the access mechanism and also the spectrum assignment. Additionally, there are security conditions and other obligations which are required to be met.

1.5 A well-established framework is already in place for GSOs in the Broadcasting space. For GSOs, all the above entities exist today viz. Satellite Operator, Earth Station Gateway Operator (Teleports) and SCSP such as various TV channel broadcasters. The framework for this is already in place and the existing teleport operators are already providing such services. For GSOs as the teleport operator already exists with a well-established framework in place it is suggested that no change required in the GSO framework

1.6 It is a fact that out of the GSO scenarios, in case of two scenarios viz. GSO-Widebeam and GSO-HTS with Single Gateway, a standalone Earth Station Gateway (ESG) is possible to be established. However, currently in both these cases, the ESG is included in the Licensed SCSPs network for communications and the disaggregated model of satellite operator, standalone teleports and licensed SCSPs is working very well in the broadcasting space with no perceivable demand for any change required in either case. In case of GSO-HTS with multiple gateways and in case of NGSOs, it is anyways not possible to have a standalone ESG. **In view of this situation, BIF is unable to make any clear Recommendations as to whether this concept of standalone ESG is required to be mooted or not.**

Please note that the questions below are applicable, in case the Authority decides to provide recommendations in favour of creating a standalone Earth Station Gateway (ESG).

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.

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BIF RESPONSE

2.1**:** As delineated above, there are two different scenarios –one for GSO-widebeam and GSO-HTS (Single Gateway) and the other for GSO-Multiple Gateway and NGSOs.

2.2 While the GSO-Widebeam and GSO-HTS (Single Gateway) scenario is akin to an IP1 or ' Infrastructure as a Service ' (IaaS) or Wholesale model, the GSO-HTS (Multiple Gateway) & NGSO scenario is more akin to a retail model or ' Platform as a Service'(PaaS).

2.3 Due to the inherent differences in the acquisition of spectrum, allocation of frequencies to the Earth Station Gateway (ESG) and the baseband in both the scenarios, the license conditions and associated obligations are different in each of the cases. In the case of the GSO-HTS (Multiple Gateway) and NGSOs along with ability to provide bandwidth/services to the SCSP , the ESGO needs to be licensed (albeit light license).

2.4 In the case of GSO-Widebeam, HTS-(Single Gateway) **:** The ESG should be permitted to operate through a 'simple registration'. The scope of this permission maybe akin to that of a 'Neutral Host' or an IP1 (in the case of terrestrial networks) as its role is that of a neutral infrastructure provider who provides shared satellite infrastructure and resources for use by multiple service licensees. Since this entity is not expected to purchase, own and manage its own spectrum (as it belongs to either the satellite operator or the service licensee through allocation from the operator), the ESG Operator need not be subject to any hard licensing but a 'Simple Registration', akin to an IP1 Registration.

2.5 In view of the above, this new entity viz. ESGO can be permitted through a Registration and also charged a nominal annual fee of Re. 1, on the lines of the authorisation granted to a IFMC Service Provider. As regards other obligations –technical, operational and financial obligations – it should be the same as applicable to an IP1.

2.6: In case of the GSO-HTS (with multiple gateways) and NGSOs, the ESGO must be permitted through a formal license, albeit a ' light touch one' .

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.

BIF RESPONSE

3.1: Yes-the permission for setting up the ESG should be made available to any satellite operator which is an Indian entity or its Indian subsidiary or any Indian entity having a tie-up with the satellite operator, who wishes to setup his own Earth Station in India, so long as the Satellite System is fully coordinated with Indian administration as per ITU processes and is duly authorised.

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3.2: The ESG should be a locally incorporated entity in India and should be able to demonstrate either its relationship with the satellite operator or that it has partnership agreement with the operator.

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?

BIF RESPONSE

4.1 A broad framework on the lines of a Reference Interconnect Offer (RIO) /Agreement (RIA) as is done in the case of Interconnect Agreement in case of TSPs should be put in place. This framework should govern all the 3 parties involved, viz. Satellite Operator, ESG Operator and the SCSP:

(i) Outline the process to be followed for applying for satellite transponder capacity/resources by the Service Provider from the Satellite Operator;
(ii) along with the detailed proposal by the Service Provider for the services being offered.
(iii) Broad Interconnect T&Cs between the ESG and the Service Provider, that need to be standardized and are non-discriminatory in nature.
(iv) Process of acceptance/rejection, along with the defined process and timelines, etc.

4.2 **The pricing of satellite capacity** is dependent on the quantum of capacity, the duration of commitment and the time of commitment (before or after launch of satellites/constellations). This is market driven and should not be regulated.

4.3 A detailed framework will bring in transparency and will help in bringing accountability.

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.

BIF RESPONSE

5.1: Yes. The Earth Station Gateway Operator should be permitted to install baseband equipment. However, we have attempted to answer this Q for all the different architecture scenarios.

5.2.: GSO-Wide Beam, GSO-HTS (Single Gateway) and GSO-HTS (Multiple Gateway)
Currently for Wide beam GSOs , the Baseband is under the direct control of the licensed SCSP. Going forward for all scenarios, it is suggested that the Baseband be made a part of the ESGO along with the RF & Antenna. All legal compliance for delivery of internet bandwidth to SCSPs

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for provision of satellite communication services that use the internet, or cloud, or other such facilities shall remain solely with the ESGO.

5.3: NGSOs: In the case of NGSO where the baseband is an integral part of the network and cannot be separately installed by the service providers unlike in the case of GSO HTS, the same shall be integral to the gateway infrastructure and under the direct control of the satellite operator.

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.

BIF RESPONSE

6.1 **Amendment to existing Service Licenses:**

6.1.1 All the Licensed SCSPs would therefore need to undergo an amendment so as to allow the licensees to operate their services using infrastructure through a standalone Earth Station Gateway infrastructure, rather than being forced to put up their own Gateway in their premises, as per the current License conditions.

6.1.2 The September 2021 License Amendment from DOT, to the UL on provision of Cellular backhaul Connectivity, as well as to the VSAT CUG, had two critical parts to it:

(i) Allowing existing VSAT SP's infrastructure, viz. Earth Station Gateway, to be used for CBH/WiFi backhaul purposes without needing any other license like NLD etc. The same infrastructure could also be used for any other service authorized under UL.

(ii) Another important clause was to allow an authorized Earth Station Gateway operated by the Satellite Provider to be shared with the satellite bandwidth user like the VSAT CUG licensee. This allowed for the Gateways created by ISRO for its HTS satellite, though operated by BSNL in BSNL premises, to be shared by licensed VSAT CUG Service providers.

6.1.3 There is another part to this that needs to be explored – which is the sharing of such Earth Station Gateway infrastructure between SCSPs.

6.1.4: To further improve the infrastructure sharing concept, it would be good to allow any SCSP's Earth Stations that have already been established to be shared with other SCSPs This would bring in further efficiencies into the ecosystem, since the SCSP who has already established the ESGO for a given satellite, has obviously got all the necessary permissions to set it up. And hence any other SCSP who wants to use the same satellite should be able to take benefit of this existing infrastructure as well as all the licenses/permissions already so obtained.

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6.2. To enable a service licensee viz. SCSP or a Broadcasting Service Provider (DTH Service Provider/Teleport) to connect to the ESG for obtaining and using the satellite transponder bandwidth and resources, following amendments would be required to be made. The reasons/justification for the same are given below.

6.3: For the provision of satellite-based services, the respective service licensees under the Unified License and broadcasting (DTH/Teleport) licenses are required to establish their own Satellite Earth Station (Hub) and User Terminal Station, and provide the service after obtaining the satellite transponder bandwidth from the satellite operator. However, in the situation of Satellite Earth Station being established and operated by an independent entity, the service licensee intending to provide satellite based services should be permitted to connect to such ESG for obtaining and using the satellite transponder bandwidth and satellite-based resources.

6.4: It is to be made clear that the requisite service licensees will continue to have their rights to establish the Earth Station for provision of service in case it is mutually agreed with the satellite operator.

6.5: Further, in case a service licensee (Licensed SCSP) has already established its own Earth Station Gateway for using the transponder capacity of a specific satellite, the service licensee may like to continue using its own Earth Station Gateway, even if the same satellite operator establishes its own Earth Station after obtaining the proposed Earth Station permission. It may be desirable that the satellite operator (after obtaining the proposed Earth Station permission) should permit such service licensee to continue using their own Earth Station Gateway.

6.6: Further, there may be entities operating under a service license currently in absence of a separate /standalone ESG available today. Such entities holding service licenses should be given an option of a migration path if wish to move to standalone ESG based model. Such migration should be allowed at no worse-off conditions.

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.

BIF RESPONSE

7.1_Yes-Sharing of proposed Earth Station Gateway among Licensed SCSPs should be permitted in all the cases. However, satellite earth station operator should be allowed to provide service to multiple SCSPs by allowing local licensees to access all possible satellites) to maximise the capacity utilized over India. The end consumers will also have multiple choices on the service provided. This type of competition has been proven time and again to provide a better quality of service at lower retail prices.

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7.2. While infrastructure sharing should be encouraged, we would like to highlight that Gateway Earth Station sharing is not technically feasible between different LEO constellations since these systems are specifically purpose built for particular satellite constellation, and hence, every satellite operator will have to build their own gateway and apply for their Earth Station permission separately.

7.3 Infrastructure sharing is key to achieving cost reduction, and therefore the regulatory regime should encourage the sharing of active infrastructure also. Accordingly, sharing of Earth Station among the licensees too needs to be explored, where it is technically and commercially feasible.

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.

BIF RESPONSE

8.1. In the case of conventional GSO-Widebeam satellites and GSO HTS where the baseband is operated by the service provider, the frequency carriers should be assigned to the SCSP. However, in the proposed scenario through the creation of this new entity viz. ESGO, the frequency carriers maybe assigned to the ESGO.

8.2. For GSO-HTS (Multiple Gateways) & NGSO constellations where the baseband is installed and operated by the GSO-HTS or the NGSO satellite operator, the gateway side of spectrum should be assigned to the gateway operator and the terminal side of spectrum should be assigned to the service provider. However, it is not possible to demarcate spectrum between each service provider because of the dynamic nature of the spectrum use by the technology. So the entire quantum of terminal spectrum should be authorized for use to the SCSP. The Frequency carriers should continue to be assigned to the Licensed SCSP only and not to the ESG Operators, since the ESG Operator is like a shared infrastructure provider (passive), it shall not have exclusive spectrum rights. This is with the exception of the frequencies required for communication between the Satellite and its Earth Station Gateway which is known as RF Feeder links.

8.3. In the scenario where the satellite Earth Station is being established by the satellite operator or any other independent Indian Entity (for NGSO and GSO HTS requiring multiple gateways) and the service licensee has to obtain the satellite transponder bandwidth resources by connecting to the said Earth Station, the Earth Station established by the satellite operator being an integral part of the satellite ground network, the frequency band coordinated with national administrations and ITU holds good for the entire satellite system, including the satellite as well as the Earth Station. However, since the ESG is managing the RF feeder link for the satellite and the service licensee is seeking the requisite bandwidth from the ESG, the frequency carriers for the feeder link may be assigned to the ESGO.

8.4. Spectrum gets assigned to the ESGO for the Earth Station operation. The Earth Station is involved in communication between Earth Station and Satellite; therefore, the

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spectrum considered here pertains to the spectrum used for communication between Earth Station and Satellite, usually known as feeder link. The frequencies required to be assigned for user terminals shall continue to be part of the requisite service license as the services to the end-user come under the scope of respective service authorizations/licenses.

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

BIF RESPONSE

9.1 Spectrum assignment for satellite based communication and broadcasting applications **should only be done in an administrative manner**. Reasons and justification for the same are given below.

9.2 Assignment of orbital and spectrum resources for satellites is globally coordinated at ITU level. Once the proposed frequencies to be used in a specific satellite are globally coordinated, the same is to be assigned and used for that particular satellite by the national administrations.
9.3 As per the current licensing and regulatory framework, the spectrum is assigned to service licensees for using the space segment obtained from the satellite operators and in the case of provision of satellite communication services by the service licensee, the spectrum is assigned on an administrative basis.

9.4 Earth Station discussed here is involved in communication between Earth Station and Satellite; therefore, the spectrum considered here pertains to the spectrum used for communication between Earth Station and Satellite i.e. the feeder link. Globally, most of the administrations are assigning spectrum administratively for the Earth Station Operating entity.

9.5 Typically, a LEO satellite operator may require only a few (say 2 or 3) gateway locations across the country. It must be noted that Spectrum is a requirement only for the small parameters of the gateway landing stations and unlike terrestrial network, not used all over the geographical region of the country. Since this assignment of orbital /spectrum resources for satellites is globally coordinated at ITU level, and given administratively world over, the same priority and methodology should be followed by the Indian administration as well.

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

BIF RESPONSE

10.1 **In the case where the gateway operator is assigned spectrum, the spectrum should be charged as a flat fee, determined in a simple and transparent manner. In the case where the licensed SCSP is assigned the spectrum, the formula/AGR based charging must continue.**

In the case where the ESGO is assigned the frequencies, the number of carriers should not matter and determination of fee must account for the fact that such spectrum is being used only at a few locations by ESG operator. The formulae based charging has the negative aspect of recalculating the value every time a change is made and it is very complex. That should be avoided.

10.2 In its recommendations dated 3rd October 2005, on 'Growth of Telecom services in rural India - The Way Forward', the Authority had recommended that there should be a single rate for SUC and the ceiling of 4% should be lowered to 1% to cover administrative charges only. Further, the Authority vide its recommendations dated 7th March 2017 on 'Spectrum Usage Charges and Presumptive Adjusted Gross Revenue for Internet Service Providers and Commercial Very Small Aperture Terminal Service Providers' has reiterated that the SUC should not be more than 1% of AGR irrespective of the data rate in respect of Commercial VSAT CUG Services. BIF supports the TRAI Recommendations for reduction of SUC Charges to 1% for all Satellite Services. **However, it must be noted that this formula / AGR based charging is relevant for a service licensee.**
10.3 Globally, spectrum for Earth Station licensees is charged as an administrative fee to cover the administrative costs, in majority of the administrations.

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

BIF RESPONSE

11.1 WPC Spectrum Assignment and issuance of Decision Letter: The time taken for the spectrum assignment and issuance of Decision Letter takes a long time. This does not allow the service provider to use the space segment for which they are paying. At the same time, the customers who are dependent on this capacity are also severely impacted. As on date, the capacity authorization is done by DoS. We understand that the same may be done by INSPACe as soon as the new Spacecom policy comes into effect. The capacity authorization contains the spectrum details that will be used by the gateway and the terminals. In addition to this, NOCC authorizes detailed frequency plans and link budgets. Considering that the frequency for satellite operations are well coordinated with WPC and NOCC approves the detailed frequency plan, the spectrum assignment can be done without a multi stage approval process. Secondly, as opposed to the practice of assigning spectrum on a per carrier basis, the entire spectrum used by the satellite can be authorized ('General Authorisation') to the service providers. This will cut down the overheads on the side of the department and at the same time bring the much needed speed and efficiency in assigning spectrum. This will also eliminate the need for service providers to keep coming back to the department every time a few MHz of capacity is added.

11.2 Wireless Operating Licenses: WPC has recently simplified the process of SACFA. This is a welcome move by the industry. In the case of mobile towers, the Wireless Operating Licenses on a per tower basis has been done away with. The SACFA approval itself is treated as the final step of authorization. A similar approach needs to be taken for VSATs as well. The proliferation of satellite terminals is going to go up substantially in the near future. Since the

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SACFA step takes into account the spectrum assignment, the mast height & the frequency of operation and the power transmitted, an approval given at this stage can be treated as final without the need for an additional Wireless Operating License.

11.3 Migration path should be made available for existing service licensees who wish to move towards the new ESG permission based regime, at no worse-off condition.

11.4 NGSO gateway coexistence: While GSO and NGSO gateways can coexist in most case, it is very difficult to have NGSO gateways to be in close proximity of other NGSO gateways. A minimum separation distance is generally needed between the gateways of different NGSO systems. The required separation distance would depend on the specific technical and operational characteristics of the concerned systems and would be negotiated during coordination discussions after detailed analyses. Before issuing any such new gateway authorisations, the DoT may consult with the operator of the licensed gateway and request that they conduct analyses to determine what separation distance is feasible.

11.5 The Ka band (27.5-30.0 GHz) uplink, paired with (17.8-19.3 GHz) downlink is used for the gateway earth station to satellite link in current satellites design and hence access to the full bandwidth at each gateway location is a business and operation continuity requirement for such operators in India and South Asia. While the 28 GHz was not accepted as a potential IMT band at ITU WRC-15 and WRC-19, the ITU Members States have instead harmonised a total of 17 GHz of other mmWave band for 5G. We recommend those bands should be exhausted before additional mmWave band is considered for mobile.

11.6 For effective utilisation of ESG and provide seamless connectivity to users across the country, all ESG should be interconnected in Mesh over MPLS backbone. This may be made as mandatory requirement for setting ESG.

11.7 Data centre may be permitted to be collocated with ESG for cashing and Peering of data and applications hosting.

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