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Telecom Regulatory Authority of India

Consultation Paper

on

Licensing Framework for Establishing Satellite Earth Station Gateway

New Delhi, India

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Written Comments on the Consultation Paper are invited from the stakeholders by 13th December 2021 and counter-comments by 27th December 2021. Comments and counter-comments will be posted on TRAI's website. The comments and counter-comments may be sent, preferably in electronic form, to Shri Syed Tausif Abbas, Advisor (Networks, Spectrum and Licensing), TRAI, on the email ID advmn@trai.gov.in**.**

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INTRODUCTION

1.1 The early 1980s witnessed the satellite communication revolution in India, with the INSAT satellite network steered by the Indian Space Research Organization (ISRO). Satellite-based communication systems can provide coverage to the remotest and most inaccessible areas of a geographically widespread country like India. The demand for satellite bandwidth is growing in light of increasing communication needs for socio-economic development, connecting inaccessible areas, proliferation of broadband services, increasing online consumer services, use of connectivity for disaster management, and use of digital technology for national security.

1.2 Many sparsely populated areas, including areas of strategic importance and areas important from the socio-economic angle, do not have mobile terrestrial coverage or other forms of connectivity. Satellites can bridge this gap by providing connectivity and provide telecom and broadcasting services to even the remotest areas.

1.3 Satellites have the advantage of communicating and collecting data from virtually anywhere without being hindered by terrestrial coverage limitations. So, new satellite technologies can be used to provide ubiquitous coverage across the country.

Satellite-based services include:

(i) **Remote Sensing and Imaging:** Remote sensing satellites detect both visible lights for photographs as well as electromagnetic radiation used for microwave, ultraviolet, infrared, radio, and other types of sensing. This information is used by weather forecasters, farmers, scientists, government users, and a host of other users.

(ii) **Mobile Communications:** Mobile communications satellites provide ubiquitous voice and data services to users virtually anywhere, far beyond the coverage provided by cellular or terrestrial networks.

(iii) **Broadband Connectivity:** Many communications satellites provide high-speed broadband services globally. Several LEO constellations are being launched for providing broadband connectivity to users on the land, sea, and air. These satellites provide connectivity for:

- Broadband services to the unconnected remotest and rural regions.
- Maritime broadband.
- In-flight connectivity (IFC) broadband services.

(iv) **GPS and Navigation:** GPS satellites provide location-based services for navigation devices, including the average smartphone. They also serve billions of customers with timing information, which is critical for the operation of everyday services.

(v) **Disaster Management**: Satellite connectivity can help restore the services in the situation of disasters, where the terrestrial networks get damaged. This makes satellite services uniquely reliable and an invaluable tool for disaster relief management. Satellites can also provide valuable services post-disaster and backhaul capacity for network restoration.

(vi) **Broadcast**: Satellite TV & Radio Broadcast satellites transmit video of live news and sporting events so that viewers around the world can watch these events live.

(vii) **IoT and M2M**: Satellite data can connect IoT and M2M devices even when operating far beyond the coverage of terrestrial networks.

(viii) **Telemedicine**: Satellite data services help connect the patients in rural and remote regions with doctors virtually.

1.4 In order to provide the above-mentioned services, satellite orbit is selected based on the requirements of the application. Satellite orbits can be categorized as Geostationary Earth Orbit (GEO), Medium Earth Orbit (MEO), or Low Earth Orbit (LEO). MEO and LEO orbit satellites are collectively called Non-Geo Stationary Orbit (NGSO) satellites. The brief comparisons of the three Satellite System orbits are enumerated in Table 1.1.

Table 1.1: Brief comparison of the three satellite constellations

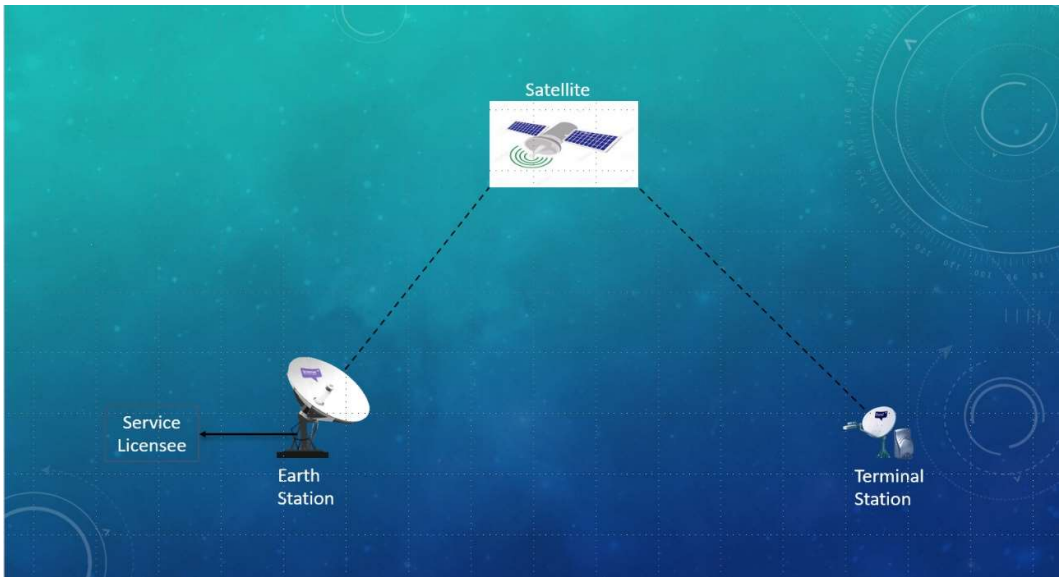
Parameters	LEO	MEO	GEO
Details as per International Telecommunication Union. 2020 report[1]			
Distance from Earth (Km)	160-2000	2000-35786 (Theoretical) 2000-20000 (In Practice)	~36,000
Orbital Period (Hours)	1.28-2.07	2.07-24	24
Satellite Life (Years)	5-10	10-15	15-20
Number of Satellites	Hundreds or Thousands	5-30	3
Latency (ms)	2-27	27-477	>477
Cost per satellite(million USD)	0.5-45	80-100	100-400

[1] https://www.itu.int/dms_pub/itu-d/opb/tnd/D-TND-01-2020-PDF-E.pdf

1.5 GEO satellites are mostly used for imagery, direct-to-home broadcasts, bandwidth, and broadband connectivity. However, these systems have some limitations for two-way communications, such as the need for high-power ground terminals and the signal delay caused by their high altitude. The NGSO satellites, which may be many in numbers, provide low latency communication for all kinds of telecom needs.

1.6 The typical elements involved in a satellite communication system are shown in Figure 1.1. It consists of a satellite, Earth Station, and terminal stations. The Earth Station is connected to service licensees' network for the provision of services to the users. The satellite shown in the diagram may be a GSO or an NGSO satellite.

Figure 1.1: Block Diagram of Satellite System Elements



1.7 As per the current licensing regime, a requisite service license is required for providing satellite-based services. For the provision of satellite-based services, the respective service licensees are required to establish their own Earth Station (Hub) and Terminal Station and provide the service after obtaining the satellite transponder bandwidth from the satellite operator. The satellite proposed to be used should be

coordinated with the INSAT system. The details of the relevant service licenses have been described in Chapter 2 of this paper.

1.8 However, with the technological development in the satellite communication segment, the operation of Earth Station (Hub) has become more complex and dynamic, and it may require to be established and operated by the satellite operator itself. Be it GEO, MEO, or LEO satellites, the satellite operators are establishing and operating their own Earth Stations (Hub) in different geographies as per requirement. As per the current licensing regime in India, establishing Earth Station is linked with the service license, and there is no specific license for establishing Earth Station by satellite operators to provide satellite-based resources to the service licensee.

1.9 Further, as per the draft Spacecom Policy 2020 released by the Department of Space, non-government private Indian entities are also proposed to be permitted to become significant players in the global space communication arena. The policy proposed to seek greater participation of the Indian Industry to meet the demands in activities of realizing, owning, operating satellite systems for communications over India and outside, creating facilities for satellite control operations, and so on. Accordingly, the private entities are also proposed to be launching their satellites and may need to establish Earth Station for providing the satellite-based resources to service licensees through their Earth Station.

1.10 In this backdrop, the Department of Telecommunications (DoT), through its reference vide letter dated 10th September 2021 **(Annexure 1)** has requested TRAI, under section 11(1)(a) of the TRAI Act, to furnish recommendations on the Licensing framework for Satellite Earth Station Gateway operations encompassing aspects like license fee, entry fee, bank guarantee, NOCC charges, and any other issue(s), which may be relevant for the LEO/MEO/HTS systems.

1.11 In the said reference letter, DoT has put forth the following propositions:

With the advancement in the satellite technologies, new generation satellites like HTS and LEO/MEO satellites are currently getting operational. The infrastructure and architecture of these new generation system(s) are quite different from conventional satellites. While the conventional satellites operate with a single wide beam spanning a large area (say entire Indian territory), the satellite technologies like LEO and MEO operate through narrow beams with typical span of beam approximately 250 Kms. This results into multiple narrow beams covering an area as compared to a single wide beam of conventional satellites. Consequentially, there may be a need to set up multiple gateways to control large number of beams.

The current licensing framework mandates a licensee to establish its own gateway for rendering any kind of satellite-based communication services. At present, the Unified Licensing framework is existent and provides authorization for following satellite-based services: i) VSAT CUG, ii) GMPCS, and iii) MSS-R.

As per the license conditions stipulated above, the service provider licensee is required to establish gateway itself for rendering satellite-based communication services. There are no provisions in the existing licenses of VSAT CUG, GMPCS and MSS-R regarding the usage of gateway by service provider established by a satellite constellation operator.

Given the current regulatory/licensing framework, a TSP may have to establish a gateway in compliance to the Unified License terms and conditions, even to utilize small chunk of bandwidth to render service. In case the TSP requires to use satellite bandwidth in multiple beam areas, then it is mandated to establish more gateways to utilize the

bandwidth in different beam areas. Also, with a number of TSPs in operation, this may lead to multiplicity in set up of gateways. The advantage of higher bandwidth in HTS/LEO/MEO satellite will, however, require establishing a large number of gateways by each individual licensee to whom the bandwidth is allocated by the satellite constellation operator. On the other hand, sharing of the gateway established by the satellite constellation operator among different TSPs, wherein the service providers need only to deploy baseband systems at gateways to start harnessing the satellite capacity, may result in cost-effective and optimum use of resources.

The current licensing conditions may pose a limitation to establish its own gateway for rendering satellite services thereby resulting in higher CapEx and OpEx. Given the circumstances, it may be desirable to explore the possibility of a licensing framework for establishing gateway as an independent facility, set up either by a satellite constellation operator or any other entity. Under the new framework, the licensee who establishes gateway should be able to deliver its services to other licensees, which in turn would render services to the end users.

1.12 This consultation paper has been prepared to discuss the issues involved and to seek comments from the stakeholders on the relevant issues. Chapter 1 provides the background information on the satellite services in India. Chapter 2 discusses the current Licensing framework for Satellite Earth Station Gateway and poses specific questions for seeking valuable inputs from the stakeholders. Chapter 3 discusses spectrum authorization and associated issues. Chapter 4 summarizes the issues of consultation.

CHAPTER 2

CURRENT LICENSING FRAMEWORK FOR SATELLITE EARTH STATION GATEWAY

2.1 DoT has clarified the requirement for operating the satellite communication system in India vide its notification dated 24th November 2014. The notification is reproduced below:

(i) This is to clarify that as per the Indian regulatory provisions, for operating satellite communication systems in India, be it Broadcasting Satellite (satellite-to-earth), Service or telecommunication (satellite-to-earth and earth-to-satellite) service, all entities, including government entities, need to obtain Service license and also Wireless operating license.

(ii) For broadcasting satellite services like Direct-to-Home (DTH), TV Uplink, Digital Satellite News Gathering Service (DSNG), etc., Ministry of Information & Broadcasting (MI&B) is the licensing authority. For interactive services like VSAT Services, DoT is the licensing authority. For any hybrid service, respective service license needs to be obtained from both these authorities.

(iii) In addition to these above service licenses, the entities need to obtain wireless licenses and uplink clearances from Wireless Planning & Coordination (WPC), DoT and Network Operation & Control Centre (NOCC), DoT, respectively, for the operations of the satellite network.

(iv) Internet Service Provider (ISP)/ Internet Protocol Television (IPTV) license alone is not sufficient to provide either Audio Visual or Broadband Wireless Access services through satellite.

(v) Even government agency engaged in Broadcasting or Telecommunication needs to obtain such service license, uplink/ downlink license, operating licenses from MI&B or DoT or both, as the case may be.

2.2 The current Licensing Framework of DoT envisages a grant of license for provisioning various kinds of telecom services. The license is called Unified License (UL), and there are nine different Service Authorizations for providing various kinds of services under Unified License. The Unified License permits the service licensee to establish the infrastructure, operate the network, and provide the service.

2.3 For the provision of satellite-based services, the respective service licensees are required to establish their own Earth Station and User Terminal Station and provide the service after obtaining the satellite transponder bandwidth from the satellite operator.

2.4 The scope of various UL authorizations and DTH license/Teleport permission that are dealing with the provision of satellite-based services and having the provisions for establishing Satellite Earth Station are discussed in this chapter. Besides, the Draft Spacecom Policy-2020 is also discussed subsequently.

A. Global Mobile Personal Communication by Satellite (GMPCS) Service Authorization

2.5 Global Mobile Personal Communication by Satellite (GMPCS) Service authorization envisages provision of satellite phone service. The scope of GMPCS Service authorization, as provided in Clause 2.1 of Chapter XII of Unified License, is as below:

> ***Clause 2.1****: The licensee may provide, in its area of operation, all types of mobile services, including voice and non-voice messages, data services by establishing GMPCS Gateway utilizing any type of network equipment, including circuit and/or packet switches.*

2.6 The relevant clauses of GMPCS Authorization (Chapter XII of Unified License) regarding establishment of Land Earth Station Gateway are as below:

Clause 2.2*: The Licensee shall establish Land Earth Station Gateway in India for the purpose of providing Global Mobile Personal Communication by Satellite (GMPCS) Service. GMPCS Service may be provided using one or more Satellite Systems provided that the Land Earth Station Gateway Switch is established separately in India for each Satellite System.*

Clause 4.1*: The Licensee shall disclose complete details on terms and conditions of the contracts/licenses entered into with its parent/associate company and/or space-segment/satellite-system owner/operator, including those contained in contracts/licenses issued by the Governments/Authorities of the country where the parent/associate company is registered and/or carries on its business prior to grant of license and before security clearance for the service in India. The information so furnished to the Licensor along with authenticated copies of all such contracts/licenses shall be certified to be true and correct to the best knowledge of the licensee. The information shall be regularly updated, as and when any changes occur, during the validity of the license.*

Clause 5.1*: The Land Earth Station Gateway Switch for provision of GMPCS Service must be commissioned within 12 months from the date of frequency allotment by WPC. The Licensee shall approach WPC for frequency allotment within 1 month of date of allocation of transponder bandwidth in the concerned Satellite System.*

Clause 5.2*: For the purpose of verification of the commissioning of the applicable system, Licensee shall register with the Network Operations Control Centre (NOCC) of DoT, as per the prescribed procedure and payment of prescribed charges.*

Clause 7.1*: The operation and maintenance center of the GMPCS Gateway shall also be located in India. The Licensee shall demonstrate the system capabilities with respect to security aspects, including monitoring to the Licensor or its authorized representative prior to starting of operations in India.*

Clause 7.4*: The designated Authority of the Central/State Government as conveyed by the Licensor from time to time shall have the right to monitor the telecommunication traffic in every Gateway set up in India.*

Clause 7.10*: Adequate monitoring facility should be made available by the Licensee at the GMPCS Gateway in India to monitor all traffic (traffic originating/terminating in India) passing through the applicable system.*

2.7 The scope of GMPCS service includes voice and non-voice messages and data services. Therefore, GMPCS service providers may provide voice, SMS (text), and internet service (data services) using a satellite system. For providing the services, the GMPCS licensee is required to establish Land Earth Station Gateway in India for each satellite system proposed to be used.

B. Commercial VSAT CUG Service Authorization

2.8 The Commercial Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service authorization envisages to provide data connectivity service to Closed User Groups. The scope of Commercial VSAT CUG Service authorization, as enumerated in Clause 2.1 of Chapter XIV of Unified License, is as below:

Clause 2.1 (i)*: The scope of service is to provide data connectivity between various sites scattered within territorial boundary of India using VSATs. The users of the service should belong to a*

Closed User Group (CUG). However, the VSAT licensee after obtaining ISP license may use same Hub station and VSAT (remote station) to provide Internet service directly to the subscribers and in this case VSAT (remote station) may be used as a distribution point to provide Internet service to multiple independent subscribers.

(ii) Long distance carriage rights, granted for NLD, ILD and Access service, are not covered under the scope of this service.

(iii) The Closed User Group Domestic Data Network via INSAT Satellite System using VSAT shall be restricted to geographical boundaries of India.

(iv) The Licensee can set up a number of CUGs using the shared hub infrastructure.

(v) PSTN/PLMN connectivity is not permitted.

(vii) Data Rate, as specified in TEC Interface Requirements No. TEC-IR/SCB-08/02-SEP.2009, is allowed, subject to the compliance of the Technical parameters as specified in TEC Interface Requirements No. TEC-IR/SCB-08/02-SEP.2009, as modified from time to time.

The scope of the Commercial VSAT CUG service authorization includes the provision of data connectivity between various sites. However, the user should belong to a Closed User Group.

2.9 The relevant clauses of VSAT Authorization (Chapter XIV of Unified License) regarding the establishment of Earth Station Gateway (Hub) are as below:

***Clause 4.3**: The HUB Station shall be operated and maintained by the Licensee subject to the following conditions:*

(i) The Hub station as well as all the VSATs shall be within the geographical boundary of India.

(ii) The VSAT at the premises of customer/users should have a logo prominently displayed indicating the name of VSAT Licensee.

(iii) The Licensor or its representative will have access to the HUB as well as the technical facilities provided by the Licensee for monitoring, inspection, etc.

(iv) Before start of operation from Hub Station, necessary clearances from Network Operations Control Center (NOCC) on payment of prescribed charges will be taken by the Licensee.

(v) The hub station shall have the auto-tracking facility to access all the satellites in INSAT Geo stationary arc. The hub station shall have 4 Port feed and motorized polarization adjustment facility.

(vi) The information should be maintained in the Network Management System (NMS) in such a way that by giving simple software command, the data related to the total number of VSATs configured/operational with date of commissioning should be available network-wise/customer-wise, along with their date of configuration, date of commissioning, coordinates, address of the VSAT locations along with the name of city, district, state, etc. In this regard, Licensee would abide by the directive issued by the Licensor/NOCC.

Clause 5.1*: The Licensee shall roll out the network by installing and commissioning a HUB Station for Star Network configuration or at least two VSAT Terminals in case of Mesh Network configuration within 12 months from the date of frequency allotment by WPC. The Licensee shall approach WPC for frequency allotment within 1 month of date of allocation of transponder bandwidth by Department of Space.*

Clause 5.2*: For the purpose of verification of the commissioning of the applicable system, Licensee shall register with the Network Operations Control Centre (NOCC) of DoT, as per the prescribed procedure.*

Clause 7.1*: Mandatory performance verification of HUB Station will be carried out by NOCC, or any other agency authorized by the Licensor for this purpose on payment of necessary testing charges by Licensee.*

2.10 The requirements of establishing Hub Station under the scope of INSAT Mobile Satellite System-Reporting (MSS-R) Service authorization, as enumerated in Chapter XV of Unified License, are also similar and are not being reproduced here for the sake of brevity.

2.11 The Access, NLD, and ILD service licensees are also permitted to use satellite-based media for their transmission network, however, nothing has been mentioned in the service authorization chapters of these services regarding the Earth Station. As per Clause 30.11 of Chapter V (common conditions applicable to all authorizations) of Unified License, a service licensee is permitted to use satellite media for the provision of services. Clause 30.11 of Chapter V (common conditions-applicable to all authorizations) of Unified License states as below:

Clause 30.11*: In case of provision of services by the LICENSEE through the Satellite media or use of satellite media through owned/leased satellite connectivity:*

(i) The Licensee shall abide by the prevalent Government guidelines, policy, orders, regulation or direction on the subject like Satellite communication policy, VSAT policy, etc.

(ii) Before putting in operation the network for Satellite-based services, necessary clearances from INSAT Network Operations Control Center (NOCC) on payment of prescribed charges will be taken by the Licensee. NOCC instructions with regard to space segment access and other relevant operational matters will have to be complied by the Licensee.

(iii) For use of space segment and setting up and to start operating the Earth Station, etc., Licensee shall directly coordinate with and obtain clearance from Network Operations Control Centre (NOCC), apart from obtaining SACFA clearance and clearance from other authorities.

(iv) Mandatory performance verification of HUB Station will be carried out by NOCC, or any other agency authorized by the Authority for this purpose on payment of necessary testing charges by Licensee.

(v) For VSATs supplied or leased by the Licensee, a certificate from the LICENSEE duly supported by the manufacturer certificate meeting the mandatory performance requirements shall be submitted by the LICENSEE to NOCC. Mandatory performance verification of VSATs will be carried out by NOCC on selective basis on payment of necessary testing charges by Licensee.

(vi) The Licensee shall submit a monthly operational report to NOCC/Satellite cell in DoT in both soft copy and hard copy.

C. Broadcasting Service Licenses/Permissions

2.12 As per the terms and conditions of the License for providing Direct-To-Home (DTH) Broadcasting Service, granted by the Ministry of Information & Broadcasting (MoIB), the Licensee is required to establish Uplink Earth Station for providing the DTH service. Clause 13.1 of Article-13 related to the Commissioning of DTH Platform is reproduced below:

Clause 13.1 The Licensee shall establish and complete the installation of the uplink earth station in India, including the monitoring facility, etc., and commission the DTH Platform within twelve months from the date of issue of the SACFA clearance by the WPC after obtaining wireless operational license and would submit a report to the Licensor in this regard.

2.13 Ministry of Information and Broadcasting (MoIB) also issues permission for 'Setting Up of Uplinking Hub/Teleports' as per the Policy Guidelines for Uplinking of Television Channels From India dated 5th December 2011. The relevant Clauses 5.1, 5.7, and 9.5 of the said guidelines are reproduced below:

Clause 5.1*: The company can uplink either in C or Ku Band. Uplinking in C Band would be permitted both to Indian as well as foreign satellites. However, proposals envisaging use of Indian satellites will be accorded preferential treatment. On the other hand, uplinking in Ku Band would be permitted through Indian satellite only, subject to the condition that this permission is not used to run/operate DTH service without proper license, to which separate guidelines apply. Satellite to be used should have been coordinated with INSAT System.*

Clause 5.7*: The company shall comply with the terms and conditions of Wireless Operational License to be issued by the WPC Wing, Ministry of Communications & IT.*

Clause 9.5 The applicant will pay the license fee and royalty, as prescribed by WPC Wing from time to time, annually, for the total amount of spectrum assigned to Hub/Teleport station, as per norms & rules of the WPC Wing.

D. WPC Application Form for Earth Station

2.14 Wireless Planning & Coordination (WPC) Wing of Department of Telecommunications, vide its letter no. R-19014/01/2012-SAT dated 10th July 2014 has issued modified proforma for WPC Application Form for Earth Station License. The format of the application is as below:

WPC Application Form requirement for Earth Stations:

1. *General Information:*
   - *i). Name of the Applicant/Agency/Company.*
   - *ii). Period of purported use of earth station: Temporary/Regular.*
   - *iii). Particulars of telecom service from DoT or Broadcasting Permit from Ministry of I&B:*
2. *Technical characteristics:*
   - *i). Name of Satellite and Satellite operator*
   - *ii). GSO Location of satellite*
   - *iii). Frequency band of operation: Ka Band/Ku Band/C Band/S Band/L Band*
   - *iv). Details of frequency and other tech. parameters*
   - *v). Type of Service: Captive/Commercial*
   - *vi). Category of service: Fixed/Mobile/Transportable*
   - *vii). If Broadcast Network: Teleport/DTH/HITS/DSNG/Others*
     If Telecom N/W: VSAT/NLD/ILD/ TTC Earth station/Telemetry/ Others
   - *viii). Category of application: New/Additional/Revision/Revision & Additional*
3. *Location Information for Hub/Teleport/Master Earth Station*
   - *i). Location & complete address of the Earth Station*

ii). Geographical coordinates in degrees, minutes, and seconds (Longitude & Latitude)

iii). Height of site above the Mean Sea Level (MSL) in meter

iv). Height of Antenna above the Ground level in meter

4. Antenna Details of Hub.

i). Size of Antennae

ii). Max. gain of the Antennae (dB) – Transmission & Reception

iii). G/T of the Earth Station

iv). Does the off axis pattern of the antenna complies with the prevailing TEC norms

5. RF Carrier Details

i). Total bandwidth to be used

ii). Nature of media to be transmitted: Data/Voice/Video

iii). Link Budget Calculations (As per TEC Doc: TEC/IR/SCB-08/03. Oct. 2013 as amended)

iv). Carrier Plan details (NOCC approved channel plan)

v). Transponder allocation and its validity (Transponder allocation letter from DoS/Satellite operator)*

6. RF Equipment

i). Details of RF equipment in the Hub (Proposed RF chain diagram), No of BUC/UPC in the chain & No of HPA/TWTA/SSPA/ODU

7. Miscellaneous:

i). *Details of remote terminals other than Hub*

Note: The satellite proposed to be used should have been coordinated with INSAT system and notified as per the ITU procedures.*

2.15 By analyzing the above paras, it is clear that as per the current regime, a requisite service license is required for providing satellite-based services. The service licensee is required to establish the Earth Station under the service license for providing the service.

2.16 For the provision of satellite-based services, the respective service licensees are required to establish their own Earth Station (Hub) and User Terminal Station and provide the service after obtaining the

satellite transponder bandwidth from the satellite operator. The satellite proposed to be used should be coordinated with the INSAT system.

2.17 However, with the technological development in the satellite communication segment, the operation of Satellite Earth Station (Hub) has become more complex and dynamic, and it may require to be established and operated by the satellite operator itself. Be it GEO satellites or LEO satellites constellation, the satellite operators are establishing and operating their own Earth Stations (Hub) in different geographies as per requirement.

2.18 As per the current licensing regime in India, establishing Satellite Earth Station is linked with the service license, and there are no specific license/provisions for establishing Earth Station by the satellite operators for providing satellite-based resources to the service licensee. The need has, therefore, arisen to have a specific authorization for establishing the satellite Earth Station gateway by a satellite operator or any entity having a tie-up with the satellite operator.

E. Draft New Spacecom Policy 2020 of the Department of Space

2.19 The satellite communication activities were steered under the provisions of the Policy Framework for Satellite Communication in India (SATCOM Policy-1997) and the Norms, Guidelines, and Procedures for implementation of the policy framework for satellite communication in India (NGP-2000).

2.20 On 15th October 2020, the Department of Space (DoS) published the Draft Space Based Communication Policy of India-2020 (Spacecom Policy-2020) and Draft Norms, Guidelines, and Procedures for implementation of the Spacecom Policy-2020 (Spacecom NGP-2020) for public consultation.

2.21 Draft Spacecom NGP-2020 envisages that, "*In several parts of the globe, the participation of private industry in building, operating, and offering satcom services is seen to be substantial. It is thus imperative to provide an environment for increased private (non-governmental) participation. In this endeavor, while the private enterprises bring in funds, talent, and speed in the activities, it is expected to enhance the indigenous space assets operating under the administrative purview of the Government of India. Space is considered the fourth frontier for humanity and the country's ability to use space-based communication plays a significant role in its place among the comity of nations. Thus, it is vital that the communication from any space object, including deep space, interplanetary and intersatellite communications through nano, micro or larger satellites operating in GSO & NGSO orbits, in any part of electromagnetic spectrum, to or from Indian Territory, is monitored and authorized by the Government of India. Considering these aspects, SPACECOM Policy-2020 has envisioned enhancement of the satcom capabilities and capacity of the country with the larger involvement of non-government players while ensuring the protection of the existing space assets. The policy aims at meeting the growing demands on satellite communication requirements, promotion of space-based communication activities by industry, advancements in the relevant indigenous technologies for self-sustenance and protection of space assets needed for the country*".

2.22 In respect of the promotion of increased participation of Indian industry to provide space-based communications both within the country and outside, the proposed draft Spacecom NGP-2020 states the following:

"The demand for bandwidth is increasing substantially from on-going services as well as emerging applications. With the advancements in technology, the space-based communications are becoming efficient and affordable.

The non-government private entities can play a big role in addressing the growing demand within India and also use the opportunity to be important players in the international space communications market.

It is an opportune time to enable commercial communication activities to be carried out by non-governmental Indian entities to not only meet Indian requirements but also enable them to become significant players in global space communication arena.

Government of India seeks a greater participation of Indian Industry to meet the demands in activities of realizing, owning, operating satellite systems for communications over India and outside, creating facilities for satellite control operations and so on.

Under the provisions of Spacecom Policy-2020, Indian entities can establish and operate satellite systems to provide capacity for communication services with authorizations.

Any communication service within the Indian territory from space can be carried out only with an authorised space asset. Only Indian entities are eligible for obtaining space asset authorisation. The authorization for establishing space-based communication systems by the Indian entities deals with use of Indian or non-Indian orbital resources and ownership and /or lease of the space asset".

2.23 The proposed Draft Spacecom NGP-2020 states that – *'Any communication service within the Indian territory from space can be carried out only with an authorized space asset. Only Indian entities are eligible for obtaining space asset authorization. The authorization for establishing space-based communication systems by the Indian entities deals with use of Indian or non-Indian orbital resources and ownership and/or lease of the space asset'.*

As per the Draft Spacecom NGP-2020, Indian Entity refers to Indian government bodies, PSUs/CPSEs, Indian registered non-Government Private Entity (NGPE), companies, start-ups, MSMEs, industries, academic institutions, etc.

2.24 The following authorizations have been envisaged in the proposed Draft Spacecom NGP-2020:

(i) Establishment of space-based systems for communications over India—using Indian orbital resources.

(ii) Establishment of space-based systems for communications over India—using non-Indian orbital resources:

a. establishing a space-based communication system;

b. providing space-based communication through leased space asset.

(iii) Establishment of space-based systems for communications exclusively outside India.

(iv) Establishment and utilization of NGSO communication systems:

a. establishing NGSO communication system;

b. providing communications through NGSO systems.

(v) Establishment of Ground Segments for Space Asset Operations:

a. Telemetry, Tracking and Command (TT&C) station(s).

b. Satellite Control Center (SCC).

2.25 The proposed Draft Spacecom NGP-2020 also states that, *'the authorization does not imply granting of any Service License or Frequency/ Siting clearances for Earth Stations. These must be obtained separately from the appropriate authorities under Ministry of Information and Broadcasting (MoIB), Ministry of Communication (MoC)*

in India, or similar regulatory authorities in other countries as the case may be'.

F. International Scenario on Earth Station Licensing

2.26 Many of the administrations separate the Earth Station operation and the service provisioning. Most of the administrations have the provision for a separate Earth Station license. Spectrum gets assigned for the Earth Station operation based on an individual authorization/license. Information about licensing regimes prevailing in a few countries is discussed below.

European Union

There is a provision of a single license for Earth Station, known as Individual Earth Station license[2]. The single license, provided by any one of the national regulatory authorities, is mutually recognized throughout all member states.

The UK[3]

There is a provision of a satellite Earth Station license. Under the satellite Earth Station license, the entity can set up Permanent Earth Stations, Transportable Earth Stations, Earth Station Network (VSAT Hub), NGSO Earth Stations, Non-Fixed Satellite Service (Non-FSS) Earth Station, Receive only Earth Station, etc.

In the UK, a satellite Earth Station license is often referred to as a site license or shell license for earth stations. The licensee can incorporate any number of earth station antennas that are located within 500 meters of a nominated center point for the license, particularly for NGSO Earth stations.

[2] https://ec.europa.eu/commission/presscorner/detail/en/P_94_2

[3] https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/satellite-earth/earth-stations

Australia

There is a provision of Individual Earth Station license termed as "Earth Station Transmit" and "Earth Station Receive" license. The yearly License Fee includes fees for services and a license tax.

The amount to be paid for an assigned license (frequency is assigned to the licensee) is an administrative prescribed fee and depends on:

- frequencies needed
- the amount of bandwidth
- the frequency
- location of the site
- transmitter power

ACMA[4] has initiated a consultation process to determine how spectrum is managed and priced in the relevant spectrum frequencies for satellite communication.

USA

There is a provision of Earth Station license. FCC[5] has prescribed Form 312 for application for an Earth Station authorization, which is to be obtained before the use and operation of Earth Station facilities within the United States. The Earth Station may communicate via US licensed space stations and through non-US licensed space stations that are on the Permitted Space Station List.

G. Need for a licensing framework for establishment of Satellite Earth Station

2.27 In view of the above, it is imperative that the Satellite Operators (Indian Entities), after obtaining space asset authorization, may need to establish a satellite Earth Station in India for providing the satellite

[4] https://www.acma.gov.au/consultations/2020-12/response-implementation-spectrum-pricing-review-consultation-392020#original-consultation-the-issue

[5] https://www.fcc.gov/earth-station-licensing-sample-form-312-applications

transponder bandwidth and satellite-based resources to service licensees. Though relevant service licensees are required to establish their own Earth Station (Hub), the technological advancement and complexity of the systems have made it a necessity for the satellite operators to establish their own satellite Earth Station and provide the satellite-based resources to the service licensee from their Earth Station. In fact, integration of satellites and their associated Earth Station is gradually becoming a norm for next-generation satellites. This is happening for both next-generation GEO satellites and NGSO satellites.

2.28 In some cases, the satellite operator entity may wish to provide the services directly to the end users. In such a scenario, the satellite operator entity will be required to obtain the requisite service license for the provision of services to the end users. The Earth Station license alone should not confer any right to the Earth Station licensee for the provision of services to the end users. There also may be a situation, where an independent entity or a subsidiary of a satellite operator may be interested in establishing a satellite Earth Station for specific satellites having a tie-up with the satellite operator for providing satellite-based resources to the service licensees. The scenarios discussed above require a specific license/authorization from DoT under Section 4 of the Indian Telegraph Act, 1885, for establishing a satellite Earth Station in India.

2.29 In the situation of Satellite Earth Station being established and operated by Satellite operator or an entity having Earth Station license, the service licensee intending to provide satellite-based services will be procuring the satellite transponder bandwidth from the satellite operator and connecting to it at the Earth Station established thereof. In such situation, the Satellite operator/Earth Station licensee must provide satellite-based resources to service

licensees in a time bound, transparent, fair, and non-discriminatory manner.

2.30 The question arises as to whether there is a need of a framework to be followed by the Satellite operator/Earth Station licensee for provision of satellite-based resources to the service licensees.

2.31 The framework may outline the process to be followed for applying for satellite transponder capacity/resources along with the detailed proposal, process of acceptance/rejection, along with the defined process and timelines, etc. Detailed framework will bring in transparency and will help in bringing accountability.

2.32 In view of the above discussion, the stakeholders are requested to provide their response to the following questions:

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.

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.

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.

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?

H. Installation of the Base-Band Equipment

2.33 A satellite Earth Station has the following major elements: the Antenna subsystem, RF subsystem, the baseband subsystem, the control equipment, and the user interface. The most essential portion of the baseband equipment is the baseband processing or formatting, digital modulation and demodulation, and channel coding and decoding. On the receiving side, the demodulator detects the incoming carrier, synchronizes the data, performs error correction, and outputs a clean bitstream for the application. The transmit side works similarly in the opposite direction.

2.34 In the International Scenario, it has been observed that there are two options for establishing baseband equipment:

a. The GSO/NGSO operator sets up a satellite Earth Station Gateway(s) and provides satellite capacity in '**MHz**'. The Gateway includes an antenna and RF Equipment. The satellite capacity is sold in MHz and can be clearly demarcated in terms of spectrum. Conversion of '**MHz to Mbps'** is done by the service provider using their own baseband equipment.

b. The GSO/NGSO operator sets up Satellite Earth Station Gateway(s) and provides satellite capacity in '**Mbps**'. The Gateway includes baseband equipment for conversion of MHz into Mbps. The satellite capacity is sold to service licensees in '**Mbps**'.

In view of the above discussion, the stakeholders are requested to provide their response to the following question:

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.

I. Amendments in the existing licensing conditions to enable the use of satellite Earth Station established by satellite operator or other Indian entity

2.35 For the provision of satellite-based services, the respective service licensees under the Unified License and broadcasting 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 entity having Earth Station license, (the entity may be a Satellite operator or an Indian entity having a license to establish Earth Station Gateway or a service licensee, who has established Earth Station Gateway), the service licensee intending to provide satellite-based services should be permitted to connect to such Earth Station facility for obtaining and using the satellite transponder bandwidth and satellite-based resources.

2.36 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. The situation being explored here pertains to such a scenario in which the satellite operator needs to establish its own Earth Station.

2.37 Further, in case a service licensee (Unified Licensee) 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 license. It may be desirable that the satellite

operator (after obtaining the proposed Earth Station license) should permit such service licensee to continue using their own Earth Station Gateway. Further, it may also be explored that the Earth Station Gateway, already established by any service licensee for specific satellite, may be permitted to be shared with the proposed Earth Station licensee (Earth Station license obtained for same satellite) so that the Earth Station Licensee may provide satellite bandwidth to other service licensees using the same Earth Station Gateway. This will avoid the duplication of infrastructure and will ensure faster roll out of provisioning of satellite transponder capacity.

2.38 Infrastructure sharing is key to achieving cost reduction, and therefore the regulatory regime should enable the creation of sharable active infrastructure. Accordingly, sharing of Earth Station too among the licensees needs to be explored.

2.39 In view of the above discussion, the stakeholders are requested to provide their response to the following questions:

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.

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.

CHAPTER 3

SPECTRUM AUTHORIZATION

3.1 Radio Frequency Spectrum is required for establishing any kind of wireless communication system. To avoid interference, different spectrum bands have been identified by ITU for different kinds of use. The aim of Frequency coordination is for developing new orbit-spectrum assets and protecting the rights to use such resources in accordance with Radio Regulation of the International Telecommunication Union (ITU). It is a technical and regulatory process by which radio-frequency interference between different radio systems that use the same frequency is removed or mitigated and trouble-free service to users is ensured.

3.2 International Telecommunication Union[6] (ITU), through its Radiocommunication Sector (ITU-R), and its executive arm, the Radiocommunication Bureau (BR), is the global agency responsible for the management of the radio-frequency spectrum and satellite orbit resources.

Radio Regulations (RR)

A key component of international frequency management is the Radio Regulations (RR), the binding international treaty that determines how the radio frequency spectrum is shared among different services, including space services. Covering fixed and mobile radio services, satellite systems, radio and TV broadcasting, radionavigation, meteorological monitoring, space research, and Earth exploration, as well as amateur radio, the RR encompass over 2300 pages of texts and charts that prescribe how equipment and systems must operate

[6] https://www.itu.int/en/mediacentre/backgrounders/Pages/itu-r-managing-the-radio-frequency-spectrum-for-the-world.aspx

to ensure peaceful cohabitation in today's increasingly crowded airwaves.

The RR contains several regulatory provisions and procedures, which describe how the administrations from the 193 ITU Member States may acquire and exercise rights to use spectrum in the various frequency bands allocated for this purpose, and the corresponding obligations. These rights and obligations may then be transferred to the operators of each specific radiocommunication station through a license delivered by or on behalf of the government of the corresponding country.

International Frequency Database

A key element of international frequency management is the Master International Frequency Register (MIFR). The MIFR is a database that contains the spectrum characteristics ("frequency assignments") of the radio stations in operation throughout the world and confers to these stations international recognition and protection against interference. This database is managed by BR (Radiocommunication Bureau) and currently contains 2.6 million frequency assignments for terrestrial services and over 200,000 are added every year. For space services, more than 1.1 million assigned frequencies are contained in this database. In addition, about 350,000 assigned frequencies for the broadcasting-satellite service and 25,000 allotted frequencies for the fixed-satellite service are planned for future uses.

3.3 Satellite technologies are more and more diverse and pervasive, but they all rely on the same core element: the availability of radio frequencies that can be operated free from interference. In order to ensure this availability, the Radio Regulations, the international treaty governing the use of the radio-frequency spectrum and the associated satellite orbits (both geostationary and non-geostationary), on the one hand, allocate specific frequencies for various space applications, and

on the other hand, contain detailed technical provisions and regulatory procedures to ensure the rational, equitable, efficient, and economic use of spectrum/orbit resources. The orbit-spectrum resources for satellite communication are globally coordinated at the 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.

3.4 As per the constitution of ITU, Chapter VII: Special Provisions for Radio contains ARTICLE 44 regarding the use of the Radio-Frequency Spectrum and of the Geostationary-Satellite and Other Satellite Orbits. The same is reproduced below:

1. Member States shall endeavour to limit the number of frequencies and the spectrum used to the minimum essential to provide in a satisfactory manner the necessary services. To that end, they shall endeavour to apply the latest technical advances as soon as possible.

2. In using frequency bands for radio services, Member States shall bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries.

B. Current practice of spectrum assignment for Satellite Earth Station

3.5 As per the current licensing regime in India, the spectrum is assigned to the relevant service licensee for establishing the Earth Station and

user terminal station and for using the assigned transponder bandwidth. Though the orbit-spectrum (orbital slot and frequency band) proposed to be used by the satellite operator is coordinated as per the ITU procedure, the frequency carriers (Channels) are assigned to the service licensee based on the space segment acquired from the satellite operator.

3.6 The relevant clause related to frequency assignment as mentioned in the GMPCS Service authorization (Chapter XII of Unified License) states as below:

Clause 5.1 The Land Earth Station Gateway Switch for provision of GMPCS Service must be commissioned within 12 months from the date of frequency allotment by WPC. The Licensee shall approach WPC for frequency allotment within 1 month of date of allocation of transponder bandwidth in the concerned Satellite System.

The similar clause for VSAT Service authorization (Chapter XIV of Unified License) is as below:

Clause 5.1 The Licensee shall roll out the network by installing and commissioning a HUB Station for Star Network configuration or at least two VSAT Terminals in case of Mesh Network configuration within 12 months from the date of frequency allotment by WPC. The Licensee shall approach WPC for frequency allotment within 1 month of date of allocation of transponder bandwidth by Department of Space.

3.7 As the Service licensees are permitted to establish Earth Stations, they are assigned the relevant frequency carriers (channels) corresponding to the space segment obtained from the satellite operators. The question arises that in the scenario where the satellite Earth Station is being established by the satellite operator or any other independent Indian Entity and the service licensee has to obtain the satellite transponder bandwidth resources by connecting to the

said Earth Station, who should be assigned with the frequency carriers.

3.8 One argument is that the Earth Station established by the satellite operator is an integral part of the satellite system, and therefore 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. Accordingly, frequency carriers may be assigned to the service licensee only as per their needs based on the space segment allocated to them.

3.9 There may be another argument that Earth Station Licensee is managing the RF feeder link for the satellite and the service licensee is seeking the requisite bandwidth from the Satellite Earth Station, the frequency carriers should be assigned to the Earth Station Licensee.

3.10 In the International Scenario, it has been observed that many of the administrations separate the Earth Station operation and the service provisioning. Most of the administrations have provision for a separate Earth Station license. Spectrum gets assigned to the Earth Station licensee for the Earth Station operation based on an individual authorization/license.

3.11 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, usually known as feeder link. The frequency considerations 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.

3.12 In view of the above, the stakeholders are requested to provide their inputs on the following question:

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.

C. Methodology for spectrum assignment

3.13 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. Further, in the case of provision of services by the service licensee through the satellite media, the spectrum is assigned on an administrative basis.

3.14 For allotment of spectrum administratively at administrative pricing, Wireless Planning & Coordination (WPC) wing of DoT has issued an Office Memorandum (OM), as an interim measure, vide letter no. R-11014/15/2012-NT dated 1st October 2013. The same is reproduced as below:

1. *As an interim measure for period of six months from the date of OM, the allotment of spectrum administratively at administrative pricing may be as per following:*

a) *Allotment/assignment of spectrum in non-IMT bands (as per the NFAP provisions) may be made administratively at administrative pricing on formula basis for all captive usages, and satellite networks of broadcasting and captive VSATS, commercial satellite usages (DSNG/Commercial VSATS/teleport/DTH/NLD/ILD);*

b) *The annual spectrum usage charges be levied as per Orders No. P-11014/34/2009-PP(I), (II), (III) & (IV) dated 22nd March 2012 which is effective from 1st April 2012, till a final decision is taken on the pricing of spectrum for captive users;*

c) *Spectrum allotment may be made to Community Radio Station (CRS) and annual spectrum usage charges, i.e., royalty charges and licence fees be levied at rates prescribed in Order No. P*

11014/03/2012-PP (Pt.II) Dated 13th February, 2013, till a final decision is taken in the matter;

2. *The applicants would furnish an undertaking that they would agree for assignment of frequencies with the following conditions:*

i). *The allotment of spectrum is provisional and subject to Govt's decision on allotment & pricing of spectrum.*

ii). *In the event of final decision to allot spectrum only through auction process, the provisional allotment of spectrum shall be withdrawn.*

iii). *In case the provisional allotment of spectrum is withdrawn, payment made towards spectrum charges or part thereof shall not be refunded.*

iv). *In case the provisional allotment of spectrum is withdrawn, respective wireless users would obtain Non-Dealer Possession Licence (NDPL) for possessing the wireless equipment or return the equipment to a DPL holder or shall be disposed off the same as per the procedure.*

3. *Further, in respect of the commercial satellite users (viz. DSNG/ Commercial VSATS/teleport/DTH/NLD/ILD), before allotment/ assignment of spectrum as per this OM, an additional undertaking shall be obtained stating that they would pay the revised spectrum charges, as may be applicable, from the date of allotment of spectrum.*

4. *The above conditions in para 2 & 3 will be added in the Letter of Intent (Lol), Decision to grant License (D/L) and the Wireless Operating Licence (WOL) also.*

3.15 The spectrum is being allotted as per the same process reproduced above and the allotment window is being notified by DoT from time to time. The last window has been opened on 5th January 2021 vide OM

No. R-11014/15/2012-NT (pt.) dated 5th January 2021 for a period of six months.

3.16 As mentioned in the said OM, the allotment of the spectrum is provisional and subject to the Government's decision on allotment and pricing of the spectrum. In the event of a final decision to allot spectrum only through the process of auction, the provisional allotment of spectrum shall be withdrawn.

3.17 In view of the above, a question arises as to how the spectrum (used between Earth Station Gateway and Satellite) should be assigned to the licensees for provisioning of satellite-based resources. 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, usually known as feeder link. The frequency considerations 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.

3.18 The orbit-spectrum resources for satellite communication are globally coordinated at the 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. National Frequency Allocation Plan (NFAP) specifies the bands to be used for IMT services, satellite services, and other services. Once the different bands are allocated to different services, the methodology of assignment of frequencies within the bands may differ from service to service depending upon the demand, supply, possibility of shared use, and other social and economic considerations. Currently, satellite-based services are complementary to terrestrial services. It is mostly used in remote, hilly, far-flung, and inaccessible areas where the availability of the terrestrial network is

either nil or inadequate. For making satellite-based services affordable, it may need promotion and different considerations.

3.19 In the international scenario, most of the administrations are assigning spectrum administratively for the Earth Station license.

3.20 In view of the above, the following question is posed for inputs of the stakeholders:

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

D. Charging methodology for spectrum

3.21 For the spectrum being assigned administratively to the service licensees for using satellite-based resources, charges for the assigned spectrum are realized on a formula basis. DoT has prescribed the spectrum charges, termed as Royalty Charges for assignment of frequencies, vide its letter no. P-11014/34/2009-PP(III) dated 22nd March 2012. The same is reproduced below:

1. *In pursuance of power conferred by Section 4 of Indian Telegraph Act, 1885 (13 of 1885), and in suppression of this Ministry's orders no. J-19011/1/98-SAT dated 14th September 1998 and no. R-11014/26/2002-LR dated 6th May 2003, the Central Government has decided the following Royalty charges for Assignments of Frequencies to 'Captive Users' (users being charged on formula basis), including all Government Users, involving all Satellite based systems (i.e., Broadcasting: Radio, Television, DSNG etc; and ii. Other networks: ILD, INMARSAT, NLD, Teleport, VSAT etc):*

2. *The Standard Annual Royalty Factor shall be Rs.35000 per Frequency. It shall be applied to the total licensed bandwidth of each frequency of any type of satellite-based Radio-communication network (including ILD, NLD, Teleport, DSNG, DTH, VSAT,*

INMARSAT, and Satellite Radio), together with the relevant Bandwidth Factor (Bs) given in Table D below, to arrive at the amount of Annual Royalty per Frequency, R, payable for an Uplink or a Downlink as per the following formula:

Royalty, R (in Rs.) = 35000 x Bs

Table D: Bandwidth Factor (Bs) for Satellite Communications

Bandwidth Assigned to a Frequency (W KHz)	*Bandwidth Factor, Bs, for an uplink*		*Bandwidth Factor Bs, for a downlink*	
	Broadcast	*Others*	*Broadcast*	*Others*
Up to and including 100 KHz	*0.25*	*0.20*	*Nil*	*0.20*
More than 100 KHz and Up to and including 250 KHz	*0.60*	*0.50*	*Nil*	*0.50*
More than 250 KHz and upto 500 kHz	*1.25 @*	*1.00 @*	*Nil*	*1.00 @*
For every 500 kHz or part thereof	*1.25 @*	*1.00 @*	*Nil*	*1.00 @*

[@ for every 500 kHz or part thereof]

3. *In addition to above, the explanatory "Notes" on the applicability of royalty charges, are as follows:*

(i) As a principle, charges for radio spectrum be levied for both uplinks and downlinks, as the nature of the resource remains the same. Charging will however only be in respect of the frequencies transmitted from or into Indian Territory.

(ii) The DSNG, SNG, etc., be levied royalty charges for radio frequencies used on both Uplinks and Downlinks, because these are dedicated links that cannot be equated with broadcasting service.

(iii) For DSNG's, in case the same frequency carrier is used by the user (assignee of RF) from different OB vans belonging to him,

additional royalty @ 25% of the basic royalty be charged from him, however if the additional OB vans are located within the same premises additional royalty @ 25% of the basic royalty will not be charged.

(iv) For Temporary Uplinking, a minimum royalty equivalent to that for one month be charged.

4. For Charging of "Licence fee and other fees, Surcharge/late fee and Charging Methodologies for Royalty/licence fees, Order No. No. P-11014/34/2009-PP (IV) dated 22nd March 2012 shall be applicable.

5. This issues with the concurrence of the Wireless Finance Division, vide their Dy. No.482/Sr.PPG (WPF), dated 19th March 2012.

6. This order shall be applicable from 1st April 2012.

3.22 However, for Commercial VSAT CUG Service authorization, the spectrum charges are levied as a percentage of Adjusted Gross Revenue (AGR). Under the Commercial VSAT CUG Service Authorization, the Royalty Charges and spectrum License Fee is clubbed together and are termed as the Spectrum Usage Charges (SUC). DoT vide circular dated 16th April 2003 had migrated to the AGR-based mechanism for charging spectrum charges (Royalty and License Fee) for the Commercial VSAT service authorization. SUC in Commercial VSAT CUG license is charged on the AGR basis and varies from 3% to 4% of AGR depending upon the data rates.

3.23 In its recommendations of 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 of WPC fee (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.

3.24 Internationally, in most of the administrations, spectrum for Earth Station license is charged as an administrative fee generally to cover the administrative costs, and in addition to that few administrations charge license tax also.

3.25 In view of the above, inputs of the stakeholders are requested on the following question:

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

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

CHAPTER 4
ISSUES FOR CONSULTATION

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.

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.

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.

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?

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.

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.

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.

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.

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

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

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

Annexure-1

Government of India / भारत सरकार
Ministry of Communications / संचार मंत्रालय
Department of Telecommunications / दूरसंचार विभाग
Satellite Division, DoT HQ
Sanchar Bhawan, New Delhi – 110001

No. 824-201/TRAI-GWL/2021-SAT Date: 10.09.2021

To

The Secretary
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhawan,
Jawahar Lal Nehru Marg (Old Minto Road),
New Delhi-110002

Sub: TRAI recommendations on licensing framework on establishment of satellite gateway

With the advancement in the satellite technologies, new generation satellites like HTS and LEO/MEO satellites are currently getting operational. The infrastructure and architecture of these new generation system(s) are quite different from conventional satellites. While the conventional satellites operate with a single wide beam spanning a large area (say entire Indian territory), the satellite technologies like LEO and MEO operate through narrow beams with typical span of beam approximately 250 kms. This results into multiple narrow beams covering an area as compared to a single wide beam of conventional satellites. Consequentially, there may be a need to set up multiple gateways to control large number of beams.

2. The current licensing framework mandates a licensee to establish its own gateway for rendering any kind of satellite based communication services. At present, the Unified Licensing framework is existent and provides authorization for following satellite based services: i) VSAT CUG, ii) GMPCS and iii) MSS-R. The specific clauses relating to establishment of gateways are as follows:

(i) VSAT CUG license: *"4.3 The HUB Station shall be operated and maintained by the Licensee....."*

(ii) GMPCS license:*"2.2 The Licensee shall establish Land Earth Station Gateway in India for the purpose of providing Global Mobile Personal Communication by Satellite (GMPCS) Service. GMPCS Service may be provided using one or more Satellite*

Mavi Singh 10/09/2021

Systems provided that the Land Earth Station Gateway Switch is established separately in India for each Satellite System."

(iii) MSS-R license: There is no specific clause.

As per license conditions stipulated above, the service provider licensee is required to establish gateway itself for rendering satellite based communication services. There are no provisions in the existing licenses of VSAT CUG, GMPCS and MSS-R regarding usage of gateway by service provider established by a satellite constellation operator.

3. Given the current regulatory/licensing framework, a TSP may have to establish a gateway in compliance to the Unified License terms and conditions, even to utilize small chunk of bandwidth to render service. In case the TSP requires to use satellite bandwidth in multiple beam areas, then it is mandated to establish more gateways to utilize the bandwidth in different beam areas. Also, with a number of TSPs in operation, this may lead to multiplicity in set up of gateways. The advantage of higher bandwidth in HTS/LEO/MEO satellite will, however, require establishing a large number of gateways by each individual licensee to whom the bandwidth is allocated by the satellite constellation operator. On the other hand, sharing of the gateway established by the satellite constellation operator among different TSPs, wherein the service providers need only to deploy baseband systems at gateways to start harnessing the satellite capacity, may result in cost-effective and optimum use of resources.

4. TRAI in its recommendation dated 28.07.2020 on "Provision of Cellular Backhaul Connectivity via Satellite through VSAT under Commercial VSAT CUG Service Authorization" had, inter-alia, stated as follows:

   "3.6 (b) As the Gateway hub for HTS satellites will be managed and operated by the satellite provider itself and the satellite bandwidth seeker will have to share the common gateway functionality of the satellite provider, suitable enabling clause may be incorporated in the license to permit such shared use of Gateway hub."

   However, licensing framework for establishing gateways by the satellite constellation operators has not been covered in the said recommendations.

5. The current licensing conditions may pose a limitation to establish its own gateway for rendering satellite services thereby resulting in higher CAPEX and OPEX. Given the circumstances, it may be desirable to explore the possibility of a licensing framework for establishing gateway as an independent facility, set up either by a satellite constellation operator or any other entity. Under the new framework, the

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licensee who establish gateway should be able to deliver its services to other licensees, which in turn would render services to end users. Thus, the gateway establishing licensee may be thought of as a network operator which owns or controls the infrastructure necessary to deliver services to other licensed service operators providing services to end users.

6. In view of the above, TRAI is requested to give its recommendations in terms of clause 11(1)(a) of TRAI Act 1997, as amended from time to time, on the licensing framework for satellite gateway(s) operations encompassing aspects like license fee, entry fee, bank guarantee, NOCC charges, and any other issue(s) which may be relevant for the LEO/MEO/HTS systems.

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