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Networks, Spectrum and Licensing,
Telecom Regulatory Authority of India

OneWeb India Communications Pvt. Ltd.
Response to TRAI consultation on Satellite Gateway Licensing

Dear Sir,

At the onset, OneWeb would like to commend TRAI to take this important initiative to update the satellite gateway licensing regime, and thanks TRAI for this opportunity to provide our view.

About OneWeb

OneWeb is a global communication company with a mission to bring high-speed, low-latency satellite broadband connectivity to everyone everywhere, even the most remote and disconnected areas, using the new technology of Low Earth Orbit (LEO). OneWeb believes that satellite systems have a key role to play in a multi-network broadband ecosystem, often in a complementary way to terrestrial telecommunication solutions.

OneWeb is building a ground network of 40+ Gateway Ground Stations distributed around the world in specific locations in order to enable optimal coverage across the planet. OneWeb has 2 Gateway Ground Stations planned in India subject to authorities' approvals.

Figure: OneWeb Gateway Earth Station in Svalbard, Norway

OneWeb utilises 'feeder links', which are high throughput point-to-point radio links between OneWeb satellites and large Gateway Ground Stations at a relatively small number of sites around the planet.

The Gateway Ground Stations on the OneWeb network create relatively narrow beams (less than 0.5° half-power Beamwidth) capable of being steered over almost the entire visible part of the Earth's surface, in order to minimize the number of gateway sites needed around the planet. Each OneWeb gateway site is therefore equipped with multiple antennas so that it can track a number of visible OneWeb satellites with typically minimum elevation angle for the gateway links of 5 to 15 degrees.

Gateway Ground Stations are 3.4 m in diameter and the Beamwidth of the gateway earth stations is therefore very small (typically < 0.5^{o}) and their gain is relatively high (typically 55 dBi transmit and 51.5 dBi receive).

1. **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.**

   Yes, it is increasingly important for Low Earth Orbit satellite operators to establish more dense ground infrastructures. OneWeb needs a total of 40+ gateway across the globe to provide full global coverage. OneWeb operate a wholesale business model, where it does not intend to provide service to end consumer directly but sell capacity to the Telecom Service Providers.

   Decoupling licensing of the gateway will be allowing the possibility for a satellite operator to provide service to multiple service providers (and vice versa: allowing local licensees to access all possible satellites) ensures the capacity utilized over India is maximized, and end consumers 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.

2. **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.**

   The Authority should consider recommending a separate Satellite Gateway Earth Station Authorization under Section 4 of the Indian Telegraph Act at a nominal fee (e.g. like IFMC Authorization).

   Scope of the authorization should be limited to the ground infrastructure for the gateway and its spectrum license utilized for the gateway. Application information should include: ITU filling information of the satellite, coordination status of the constellation with systems preceding it in MIFR.

   Since we recommend a simple authorization like IFMC, the authorization fee should also be on the similar lines. This will encourage investment and promote satellite services for universal connectivity.

   NOCC charges should only be applicable in case the NOCC is located in India.

3. **Whether such Earth Station license should be made available to the satellite operator or its subsidiary or any entity having a tieup with the satellite operator? Do justify your answer.**

The entity holding the Earth Station authorization has to be locally incorporated entity in India and should provide proof that it has either legal relationship with the satellite operator or has entered into partnership agreement with the operator.

4. **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?**

With the introduction of this new authorization, Satellite operator, Earth station operator and the service operator will all be authorized/licensed accordingly. As discussed in 3. above it is necessary to provide legal proof that either the operators are related or have partnership agreement to provide the earth station authorization, this should be sufficient.

Agreement between earth station operator and service licenses should be purely market driven, and no additional regulation is necessary. As stated in Q1, this type of competition has been proven time and again to provide a better quality of service at lower retail prices.

5. **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.**

BBU is an integral part of the ground infrastructure and necessary element of the earth station. BBU should be installed by Earth station operator if and when necessary. NGSO earth stations usually contains 10-15 antennas on a single site.

6. **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.**

As the current Unified License allow the Gateway Earth Stations to be authorized under NLD or GMPCS licenses, OneWeb believes that such licenses have to only cover the services part and accordingly reference that any ground infrastructure should be authorized under the new “Gateway Earth Station authorization”. Furthermore, Spectrum fees relevant to the gateway Earth Station have need also to be moved under the new authorization bearing in mind that such fees are operational and in support of providing the connectivity required to provision the services; hence OneWeb strongly recommends that such fees are administrative only in order to promote investment and make sure competitive prices are available to the market at the end.

7. **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.**

It must be noted that Gateway Earth Station authorizing 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 authorization separately. However, satellite earth station operator should be allowed to provide service to multiple service providers (and vice versa: allowing local licensees to access all possible satellites) ensures the capacity utilized over India is maximized, and end consumers 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

8. **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.**

Service license use the capacity provided by the earth station operator and they are not required, and should not be managing the spectrum resource. Moreover, several service operators can be using the same earth station.

In this regard, and to ensure most efficient usage of the spectrum, earth station operator should be the entity holding the spectrum as well.

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

Spectrum for earth station would be assigned administratively, and on a case by case basis, as those are used only at very specific location rather than a nation-wide assignment. Please refer to answer 6 above.

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

The cost for NGSO gateway spectrum should be determined in a way that is aligned with opportunity cost of spectrum. In a typical NGSO earth station setup, a co-located array of antennas using the same frequency, does not deny more spectrum from other users than a single antenna would and should be billed as a system with similar fee as a single antenna. This gateway "system" authorization approach has been adopted in many countries around the world. For example, the US considers that "Multiple antennas in an NGSO FSS gateway earth station complex located within an area bounded by one second of latitude and one second of longitude may be regarded as a single earth station for purposes of coordination with terrestrial services." Recently, Australia has adopted such approach as well.

Moreover, given one of the primary objectives for LEO broadband is to serve the currently unconnected and underserved population, higher operation cost will lead to higher price and lower penetration, and would result in a negative social impact. For this reason, it is proposed the spectrum is assigned on a cost recovery basis and not based on revenue.

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

Existing applications

Existing service licensees should have the opportunity and migration path available to move under the new Gateway specific Authorization once latter is notified, and at no worse off basis.

NGSO gateway coexistence

While GSO and NGSO gateways can coexist in most case, it is extremely 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.

In the absence of a coordination agreement between two NGSO sys-tems, OneWeb believes that new gateway earth station licenses should not be issued for locations within a certain distance of a licensed gateway earth station. Alternatively, DoT could consult with the operator of the licensed gateway and request that they conduct analyses to determine what separation distance is feasible.

28GHz

In the case of OneWeb, 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 our current satellites design. Access to the full bandwidth at each gateway location is required for the continuity of our operation in India and South Asia region. OneWeb would reiterate that the 28 GHz was not accepted as a potential IMT band at ITU WRC-15 and WRC-19. ITU Members States has instead harmonised a total of 17 GHz of other mmWave band for 5G, and those bands should be exhausted before additional mmWave band is considered for mobile.

Please do not hesitate to contact us if you would like to discuss the content further.

Yours truly,

Christopher McLaughlin

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OneWeb Communications Ltd