TELESAT

COMMENTS OF TELESAT

In response to the consultation paper on
Licensing Framework for Establishing Satellite Earth Station Gateway
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Telesat is grateful to the Telecom Regulatory Authority of India ("TRAI") for the opportunity to respond to the "Consultation Paper on Licensing Framework for Establishing Satellite Earth Station Gateway". The TRAI has provided ample information relating to the current licensing framework for satellite earth station gateways and spectrum authorisation, including an overview of the licensing processes in some other countries/regions.

Telesat's reply are in view of Telesat's Low Earth Orbit ("LEO") satellite constellation, Telesat Lightspeed, a brief outline of which is provided prior to Telesat's replies to the specific questions. In general, Telesat is aligned with TRAI's preliminary views in the consultation document, particularly on the consideration for a separate authorisation process for establishing gateway earth stations and the removal of such a requirement for service provider licensees.

Telesat Lightspeed

Backed by a legacy of engineering excellence, reliability and industry-leading customer service, Telesat[1] is one of the largest and most successful global satellite operators. Telesat works collaboratively with its customers to deliver critical connectivity solutions that tackle the world's most complex communications challenges, providing powerful advantages that improve their operations and drive profitable growth.

Headquartered in Ottawa, Canada with offices and facilities around the world, Telesat has recently become a public company, trading on the Nasdaq Global Select Market ("NASDAQ") and the Toronto Stock Exchange ("TSX").

Continuously innovating to meet the connectivity demands of the future, Telesat Lightspeed[2] , the company's Low Earth Orbit satellite system, will redefine global satellite connectivity with ubiquitous, affordable, high-capacity links with fiber-like speeds.

Telesat Lightspeed is a highly innovative global network consisting initially of 298 state-of-the-art Low Earth Orbit satellites, in polar and inclined orbits, seamlessly integrated with on-ground advanced data networks, which will facilitate low latency and a fibre-equivalent experience globally at any time.

The first satellite of the constellation, Telesat's Phase 1 LEO (LEO1), was launched aboard a Polar Satellite Launch Vehicle (PSLV) operated by the Indian Space Research Organization (ISRO). Telesat has also been the first satellite operator to demonstrate 5G backhaul using LEO1. Since the launch of LEO1, Telesat continues to collaborate and interact within the Indian ecosystem.

A variety of fixed and mobile user terminals across different industry verticals would access Telesat Lightspeed constellations via the user links. Feeder link connectivity will be ensured via "landing stations" consisting of sites with multiple full motion antennas accessing the satellites within the landing stations' field of view. Each of these landing stations would be connected to a Point of Presence which would meet the customers' point of interconnect.

Telesat Lightspeed will be compliant with Metro Ethernet Forum standards, allowing Telesat Lightspeed services to be integrated seamlessly into existing telecommunications networks. This standards-based approach will make it easy for Telesat's potential customers to implement Telesat Lightspeed as a core component in their broadband infrastructure and operations.

This is also a future-proof solution for backhaul cellular/5G traffic and will provide high-speed broadband access to rural and remote communities, planes, ships,

[1] https://www.telesat.com/

[2] https://www.telesat.com/leo-satellites/, https://www.telesat.com/press/press-releases/manufacturer-announcement/

enterprise and government users. Furthermore, as a highly advanced and efficient system with unparalleled economies of scale (multiple Tbps of usable capacity with global coverage), Telesat Lightspeed will deliver to target markets at significantly lower cost vs traditional alternatives.

In terms of frequency bands, Telesat Lightspeed uses the 17.8 – 18.6 GHz and 18.8 – 20.2 GHz bands in the space-to-Earth direction, and the 27.5 – 29.1 GHz and 29.5 – 30.0 GHz bands in the Earth-to-space direction for user terminals such as Earth Stations in Motion ("ESIM"), VSATs and the landing stations (i.e. the gateway earth stations).

To maximise system efficiency, Telesat Lightspeed is also designed as a highly flexible system that will dynamically allocate capacity based on demand. In terms of coverage, each satellite in the constellation will be provided with steerable beams and inter-satellite links, and, in terms of bandwidth and power assignment, of the system will benefit from onboard processing.

Specifically:

• Direct Radiating Array – Provide independent agile beams, each with steering and forming capabilities, allowing beams to be generated where and when required based on traffic demand;

• On-board Processing – Perform signal regeneration (i.e. demodulation and re-modulation), routing of traffic;

• Optical Inter-Satellite Links ("ISL") – Multiple ISL beams on each satellite will connect to other satellites in the Telesat Lightspeed Constellation enabling a highly resilient mesh network.

Satellite user beams will be formed using active array antennas with state-of-the-art beam-forming capability. Each Telesat Lightspeed satellite will have several independently steerable beams that allow frequency reuse.

In order to serve user terminals, which may be randomly scattered across the entire field of view of the satellite, each satellite beam may hop to different beam locations at a rate fast enough that all user terminals share full access to the satellite. Beam hopping is a powerful capability that will allow the Telesat Lightspeed to efficiently serve both highly distributed and highly concentrated demand.

For maximum flexibility, each beam can be assigned variable spectrum and power, in order to adjust for the local demand and spectrum regulatory constraints.

Responses to questions in the Consultation Paper

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.

Yes, for NGSO there is such a need to have a specific license to establish a satellite Earth Station Gateway in India. The current model in the unified license, which requires the service provider to establish a gateway earth station (hub), can lead, as also noted by TRAI, to infrastructure redundancy and solutions which are not cost-effective. The current model also leads to a tiering in the service providers structure, with the service provide deploying the gateway potentially in control of service distribution in the country.

It is therefore appropriate for NGSO, also as it is the custom elsewhere, for the Gateway Earth Station license to be separate and independent from the service provision license. It should be possible for either the satellite operator, a teleport operator or a service provider to acquire it. This, in addition to optimizing the gateway deployments, will also allow a level playing field for service providers, encouraging a more vibrant and competitive environment.

Such a business operation model would also reduce the barriers of entry for potential start-ups or small/medium domestic companies interested in venturing in offering satcom services. It is also aligned with the Draft New Spacecom Policy 2020 of the Department of Space to *"… provide(s) an environment for increased private (non-governmental) participation in offering satcom services"*.

Potential service providers would be able to partner directly with satellite operators of their choice, pending authorization of the space segment, based on competitive prices and/or technological edge, thereby customising the service packages to end users.

In parallel, the requirement for establishing an earth station gateway as part of a service licence should be eliminated.

Telesat also agrees that an Earth Station license would not confer any right to the licensee for the provision of services to the end users.

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.

It is common for countries to implement Earth Station Licenses which encompass the overall operation of the Earth Station, including the use of the spectrum.

From a technical perspective, the Earth stations can be coordinated with other co-primary services in the same frequency band, including terrestrial fixed and mobile services.

To leverage the advantages of evolving satellite technology and the reduction of unnecessary overheads in an optimized administrative process, the requirement for compliance with TEC technical standards should be reconsidered for NGSO gateway earth stations. This would also be in line with international practices, as there are typically no applicable technical standards for NGSO gateway earth stations (while standards exist for the user terminals).

All the required technical information can be provided by the applicant by filling in, for instance, a template form[3]..

In terms of fees, a gateway earth station is not directly linked to revenue generation and, as such, a revenue related fee is not appropriate.

Telesat suggests an application fee on a cost-recovery basis

so that the overall fee structure is kept reasonable, streamlined and does not unnecessarily inflate the overall licensing costs which would, eventually, be passed on to the end users.

NOCC charges, if applicable at all, should be a flat fee on a cost recovery basis.

For NGSO systems it is also important to note that the gateway function will be ensured via "antenna farms" consisting of multiple full motion antennas at the same site, using the same spectrum and accessing the satellites within the field of view.

While each antenna will be tracking a different satellite at any one time, the overall range of antenna pointing angles, transmitted power and operating frequency range will be within the same envelope (i.e. additional antennas do not significantly add to the spectrum denial of a single one - in other words the interference scenario and spectrum use with multiple antennas is not different from a single antenna).

In such case, no multiple fees should be imposed for the additional antennas on the same site. This principle, in spite of being new (as the deployment of these NGSO "antenna farms" is new) is gaining traction: it has already been adopted by Australia, Italy, Portugal, UK, US) and is being considered by other regulators (e.g. Colombia, Canada).

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 operator? Do justify your answer

[3] An example of the Australian Earth Apparatus Licence may be found at https://www.acma.gov.au/sites/default/files/2020-02/Earth-Application-for-apparatus-licences.docx

For the reasons stated in Q1 above, Telesat is of the view that the Earth Station license should be made available to the satellite operator, via a legal representative, or its affiliated companies, the teleport owner and the service providers, while eliminating the mandatory requirement from service providers to establish an earth station. This would provide maximum flexibility and reduce the need for unnecessary gateway earth stations in India, while favoring a level playing field between service providers.

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?

Telesat believes that an open competitive market, without requiring governmental distribution intermediaries would be the most beneficial to end users. Such common practice worldwide, driven by market demand, leads to the efficient and fair allocation of resources, promotes competition in the industry and maintains the affordability of satellite services.

Satellite operators should therefore be able to negotiate and establish commercial agreements directly with service providers.

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.

Yes, the earth station licensee should be also permitted to install baseband equipment, so that satellite capacity can be provided in 'MHz' or 'Mbps' depending on the business model and the contractual agreements between the service licensees and the satellite operator.

This should not of course prevent baseband to be installed by the service licensee, based on the agreement with the satellite operator.

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

The Unified License framework needs to be revised entirely in order to remove the reference to the service provision licensee needing to establish a gateway/hub.

Rather than only publishing the amendments to the specific sections of the license, this could be the chance for the overall Unified License to be re-published in totality in a single document to reflect all revisions made in the last few years. This would simplify references to the text by providing a consolidated view.

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

Telesat is supportive of the idea of allowing sharing of earth stations among licensees (between earth station licensee and service licensee and among service licensees) while not mandating the need for such a sharing requirement for the purpose of maximum flexibility and optimal use of the infrastructure to suit different types of commercial agreements and contractual requirements.

The sharing mechanism can enable a satellite operator to work with several service licensees on an equal footing and the service licensees to purchase connectivity and/or lease capacity from satellite operators without incurring in unnecessary and substantial capital costs, while avoiding redundant infrastructure.

In the case of gateways already deployed, it is appropriate that the Earth Station could be shared between different licensees.

In any case, leaving the possibility of sharing open, covers for all cases, with no prejudice to security aspects.

Q 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.

As it has been correctly observed by TRAI, in the international scenario, administrations separate the Earth Station operation and the service provision with a separate Earth Station license. Spectrum gets assigned administratively to the Earth Station licensee for the Earth Station operation based on an individual license for the gateway. Therefore, the Earth Station licensee and the service licensee should be authorised separately for the use of the required spectrum. It is important to emphasize that there is no need for exclusive spectrum assignment (as gateway earth stations from different satellite operators can share the same frequency band among themselves and can coordinate with terrestrial systems). Furthermore, in novel systems there is no longer the concept of carriers/

transponders, as the spectrum can be assigned dynamically and flexibly across the entire available range (pending of course compliance with local regulations).

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

Spectrum assignment for satellite services should be based on an administrative process, which is standard procedure elsewhere. In fact, spectrum assignment by auction is not suitable for spectrum that can be shared between multiple satellite operators (such as in Ku/ Ka band). Such efficient sharing of spectrum is made possible also thanks to the directivity of antennas.

There are no precedents of spectrum assignment by auction to satellite services in these bands in any country, as this would lead to unnecessary spectrum segmentation and, therefore, a terribly inefficient use of spectrum, contrary even to common sense.

It is an entirely different situation from spectrum assignment to terrestrial mobile operators where spectrum cannot be shared amongst the mobile operators and has to be managed by a single operator.

In summary, a spectrum auction for satellite spectrum would artificially limit the number of satellite operators sharing the spectrum and exclude them from the market, while satellite operators can (differently from terrestrial mobile operators) coexist in the same frequency range.

Furthermore, as mentioned before, earth stations can be coordinated individually for coexistence also with terrestrial services in the same frequency band, making a spectrum auction even more unjustifiable.

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

Telesat is of the view that departing from reasonable and proportionate fees for spectrum assignment restricts service providers to render affordable cost to end users in India.

The current spectrum formula in the calculation of fees involving the Royalty *R* is not applicable in today's context where large bandwidths are utilised, as it leads to disproportionate amounts.

Also, a revenue related formula, while suitable for service providers, is not applicable to a gateway earth station, as the gateway is not directly linked to service provision and revenue generation, but is infrastructure deployment.

As such, Telesat is supportive of the idea for Administrations to charge a yearly administrative fee to cover overhead costs of the spectrum management and safeguard its use. Either a fixed fee or a reasonable spectrum dependent fee for the gateway could be viable ways forward.

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

As highlighted in this consultation reply, Telesat has plans for the deployment of Telesat Lightspeed in the near future for global satellite communications. As one of the key markets, Telesat has plans to invest heavily in India with the decision to site at least two landing stations in-country, pending, of course, the availability of spectrum and governmental regulatory approvals.

Spectrum access directly affects satellite capacity and thus the ability to serve India in a cost-effective manner. For this reason, Telesat respectfully requests that satellite access is retained for the full 28 GHz band (27.5 – 29.5 GHz) for earth stations operating under the Fixed Satellite Services, also as they can be coordinated with terrestrial systems if needed, allowing an overall optimized use of spectrum. This will ensure that India will be able to exploit the full capabilities that could be harnessed from Telesat Lightspeed and other satellite systems with gateway earth stations in this band.

Conclusion

Overall, Telesat is very supportive of a review in the licensing framework for Earth Station Gateways in India.

In the consultation paper, TRAI has provided solid reasons and considerations on the need for a separate license for gateway earth stations and the need for revision of licensing fees, as advancement in technology supports the use of satellite systems in higher order frequency bands and larger bandwidths. TRAI is also addressing the very important issue of spectrum allocation.

Telesat thanks the TRAI for the consideration of the replies provided and looks forward to further collaboration. Should there be any additional queries or discussion, Telesat remains fully available and looks forward to a continued engagement and cooperation.