23rd April, 2021

Shri Syed Tausif Abbas
Advisor (Networks, Spectrum and Licensing),
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110 002

Subject: Tata Communications Ltd. response to TRAI Consultation Paper on Licensing Framework for Satellite-based connectivity for low bit rate applications

Dear Sir,

This is with reference to the TRAI Consultation Paper No. 1/2021 dated 12-03-2021 on aforementioned subject.

In this regard, please find enclosed herewith Tata Communication Limited's response to the Consultation Paper your kind consideration. The same is attached herewith as Annexure -I.

We request you to kindly consider our inputs while finalizing the recommendations and would be happy to provide any additional information, if required.

Thanking You,
Yours Sincerely,

For Tata Communications Limited,

Praveen Sharma
Authorized Signatory

Enclosed: As mentioned above

Annexure -I

Tata Communications Limited's response to TRAI Consultation Paper on 'Licensing Framework for Satellite-based connectivity for low bit rate applications'

At the outset, we welcome the issuance of this Consultation Paper, as this comes at an opportune time, when Department of Space (DoS) is also in the process of reviewing its policies, through Spacecom-2020 policy, with a view to encourage the participation of private sector in the space communication sector. Therefore, before responding to the issues raised in the consultation paper, we feel that it is important to mention the factors which have been inhibiting the growth of satellite-based communication services.

Despite being recognized as one of the most advanced countries in the world in the space sector, it is a matter of disappointment that there is a very low usage of Satellite Technology to provide telecommunication services in India. One of the major reasons for the same is lack of affordability of satellite bandwidth. We appreciate that the Consultation Paper aptly recognizes the lack of affordability of satellite-based services in India despite having lowest cost of launching of satellites. The paper has also rightly pointed out the barriers in the contracting for satellite bandwidth from foreign satellite service providers.

It is matter of pride that ISRO has created one of the largest Satellite systems in Asia, however, it may be appreciated that the current bandwidth created by ISRO is still not sufficient to meet the overall demand for Satellite Bandwidth in the country. We fully endorse the vision of achieving self-reliance in the space sector but at the same time, it is important to encourage competition by way of free and open markets to avoid artificial shortage, which may lead to higher cost of services for the end consumers.

In this regard, we would like to humbly submit that Spacecom-2020 policy should be aligned with the objective of creating conducive environment for proliferation of satellite-based communication services in the country in addition to achieving self-reliance in space sector. The Indian Service Providers, licensed by DoT and MIB, should be allowed to contract directly with foreign satellite providers, without any inhibitions, for promoting ease of doing business. This is particularly in context of new satellite technologies like LEO and MEO, which can be crucial in proliferation of broadband as well as low bit rate applications like IoT, which is a subject matter of this consultation.

We also appreciate that TRAI in this consultation paper has also focused on reduction of charges payable by way of levies, which has inhibited the service providers from using the satellite communication technologies. We fully support that the levies should be collected from service providers only up to the extent of recovering administrative costs; these should not be treated as a source of revenue for the exchequer. We would like to mention that for creating a conducive regulatory framework, a single window system should be created for granting approvals for using the satellite bandwidth by the licensed telecom service providers, so that they do not have to approach multiple departments for securing approvals.

Lastly, we would like to mention that the existing licensing framework is sufficient for the provisioning of Satellite-based low bit rate data applications. The existing licensees, including Access Service, NLD, ILD, ISP, Commercial VSAT CUG, GMPCS and INSAT MSS-R are permitted to use satellite bandwidth for provisioning of telecom services. As low bit rate is a kind of messaging service riding over the network, we feel that the scope of the abovementioned licensees should be amended, to enable them to provide Satellite based connectivity for low bit

rate applications. However, the organizations using the Satellite based connectivity for low bit rate applications for their own use i.e., captive use, there should not be any requirement to procure any license.

With the above submissions, we are hereby providing our inputs on the issues raised in the Consultation Paper:

Q.1 There are two models of provision of Satellite-based connectivity for IoT and low-bit-rate applications — (i) Hybrid model consisting of LPWAN and Satellite and (ii) Direct to satellite connectivity.

(i) Whether both the models should be permitted to provide satellite connectivity for IoT devices and low-bit-rate applications? Please justify your answer.

(ii) Is there any other suitable model through which the satellite-based connectivity can be provided for IoT devices? Please explain in detail with justifications.

TCL's Response:

We submit that both the models i.e. (i) Hybrid model consisting of LPWAN and Satellite and (ii) Direct to satellite connectivity should be permitted, subject to the technical feasibility and availability of resources. In the Consultation Paper, even though the Authority has noted that many of the existing satellite networks are not commercially suitable for supporting millions of direct connections, which are required in IoT application however, at the same time, it has been noted in the Consultation Paper that rapid developments have been taking place in Satellite communication technology particularly with the advent of LEO satellite systems, and it has thus become feasible to provide IoT services to end devices directly through satellites. In our view, there should not be any regulatory prohibition on either of the two models. For many LPWAN technologies the last mile is Sub-GHz ISM band, allowing direct to Satellite connectivity would allow same sensor nodes to be used across:

a. Device→ LPWAN GW→Satellite→Application in an urban/Semi urban area. This is suitable for nodes deployed in underground locations/tunnels etc. were direct to satellite from device would be difficult and Satellite can be used as backhaul to LPWAN GW.

b. Device→ Private Satellite→ Application (Cubesat size satellite takes the role of LPWAN GW). This is advantages in reaching remote area where terrestrial network deployment would be very costly.

This arrangement also allows better usage of existing sub-GHz ISM band.

With regard to the Hybrid Model, it is worthwhile to note that even today networks, for various services, use satellite links are used for various segments of the networks, including for their backhaul purposes. Similarly, satellites also provide connectivity for LPWAN services.

Q.2 Satellite-based low-bit-rate connectivity is possible using Geo Stationary, Medium and Low Earth orbit Satellites. Whether all the above type of satellites should be permitted to be used for providing satellite-based low-bit-rate connectivity? Please justify your answer.

TCL's Response:

We submit that all types of satellites (LEO, GEO, MEO) should be permitted to provide low bit rate applications. As the area covered on the ground increase the number of nodes expected to be addressed by each satellite will increase exponentially. Technology and market forces should be allowed to take its course, subject to the requirement that it meets relevant regulatory requirements, as may be specified. This would ultimately be beneficial in meeting the market requirements by avoiding unnecessary regulatory inhibition.

Q.3 There are different frequency bands in which communication satellites operate such as L-band, S-band, C-band, Ku-band, Ka band and other higher bands. Whether any specific band or all the bands should be allowed to be used for providing satellite-based IoT connectivity? Please justify your answer.

TCL's Response:

We submit that low bit rate applications require very low spectrum bandwidth due to very low data rate requirements. Thus, options should be explored to allocate small quantity of spectrum of the order of few MHz across various bands with proper guard band to avoid interference. This will enable to serve various types of end device, with varied specifications with regard to size, transmit and receive capabilities and antenna size.

Though L-band (1GHz-2GHz) and S-band (2GHz-4GHz) propagation characteristics are more favorable for low power, low bitrate IoT applications, it has been observed that all the bands are being put to use for connectivity and IoT applications by various satellite operators world over. Hence, IoT service authorization should be band agnostic and service providers should be allowed to use any band including L-band (1 GHz-2GHz), S-band (2GHz-4GHz), C-band (4GHz-8GHz), Ku-band (12GHz-18GHz), Ka-band (26.5 GHz – 40GHz) and other higher frequency bands.

Notwithstanding above submissions, if it is decided by Authority after duly considering all the factors to recommend allocation of spectrum from only a few specific bands then we suggest suitable quantity of spectrum should be allocated from Ka band due to the smaller antenna size requirement in this band. We also suggest allocation of spectrum from C Band (6 GHz range) for these applications as sufficient amount of unused spectrum is available in this band. Since, it is a matter of few MHz, it should also be explored to allocate unlicensed spectrum from L and S band, as these have suitable propagation characteristics.

Further, L Band, S band and C band are recommended along with subGhz ISM spectrum for direct to satellite IOT solutions. Higher bands being susceptible to atmospheric absorption would lead to higher transmission power nodes and this will directly impact the battery life of IoT devices and sensors used in low data rate applications.

Q.4 (i) Whether a new licensing framework should be proposed for the provision of Satellite-based connectivity for low-bit-rate applications or the existing licensing framework may be suitably amended to include the provisioning of such connectivity? Please justify your answer.

(ii) In case you are in favour of a new licensing framework, please suggest suitable entry fee, license fee, bank guarantee, NOCC charges, spectrum usage charges/royalty fee, etc.

TCL's Response:

There is no need for introducing any new licensing framework for Satellite-based connectivity for low-bit-rate applications / services. Instead, we are of the view that the existing licensing framework should be suitably amended to enable provisioning of Satellite-based connectivity for low-bit-rate applications. The existing Unified license Service authorizations namely, Access Service, NLD Service, ILD Service, Internet Service, Commercial VSAT CUG Service, GMPCS Service and INSAT MSS-R Service have already been permitted use of Satellite as a medium for providing telecom services, as per the clauses referred below.

Clauses from respective Licenses, which permit the use of Satellite bandwidth for providing telecom services are as follows for the reference:

Unified License (General Clauses):
28.3 In case of Satellite based services, the technical parameters & data rates mentioned in Interface Requirements for Satellite Communications namely No. TEC-IR/SCB-08/02-SEP.2009 issued by TEC are to be strictly compiled with. Any notification or modification issued by TEC from time to time in this regard shall be binding.

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

Internet Service Authorization in Unified License:
vii) Internet Service to any VSAT Service subscriber can be provided, if the VSAT is located within the Service area of the Licensee. For this purpose, a direct interconnection of VSAT Network Hub through leased line obtained from an authorized service provider to the Licensee's node/server shall be permitted only for the Internet traffic. The Licensee shall provide to the Licensor a monthly statement of VSAT subscribers served with their locations and details of leased line interconnection with the VSAT Hub. The VSAT Hub, however, need not be located in the service area of the Licensee.

Commercial VSAT CUG Service Authorization in Unified License:
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.

GLOBAL MOBILE PERSONAL COMMUNICATION BY SATELLITE SERVICE Authorization in Unified 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 Systems provided that the Land Earth Station Gateway Switch is established separately in India for each Satellite System.

INSAT Mobile Satellite System-Reporting (MSS-R) Service

2.1 The scope of service is to provide INSAT- Mobile Satellite System Reporting service, which is a one way Satellite based messaging service available through INSAT. The basic nature of this service is to provide a reporting channel via Satellite to the group of people, who by virtue of their nature of work are operating from remote locations without any telecom facilities and need to send short textual message or short data occasionally to a central station. The service provides one way message reporting (Transmit only) facility from anywhere in India (Restricted to Geographical boundaries of India). INSAT-MSS Reporting Service is a low speed data service with the maximum capacity limited to 300 bps.

Standalone National Long-Distance License:

(iii) For security reasons, domestic traffic of such entities as may be identified /specified by the licensor shall not be hauled/routed to any place outside India. For this purpose, location of satellites serving India for domestic traffic shall not be treated as outside India.

33. In case of use of Satellite, the necessary coordination and clearance is to be taken from Network Operations and Control Centre (ISOCC) in respect of setting up of Earth Station etc. apart from SACFA clearance and clearance 6om other authorities.

Standalone International Long-Distance License:

(iii) For security reasons, domestic traffic of such entities as may be identified/specified by the licensor shall not be hauled/routed to any place outside India. For this purpose, location of satellites serving India for domestic traffic shall not be treated as outside India.

31.7 In case of provision of band width by the LICENSEE through the Satellite media, the LICENSEE shall abide by the prevalent Government orders, regulation or direction on the subject like Satellite communication policy, V SAT policy etc.

Unified Access Service License:

43.8 In case of provision of band width by the LICENSEE through the Satellite media, the LICENSEE shall abide by the prevalent Government orders, regulation or direction on the subject like Satellite communication policy, VSAT policy etc.

43.9 For use of space segment and setting up and operationalisation of Earth Station etc., LICENSEE shall directly coordinate with and obtain clearance from Network Operations and Control Centre (NOCC), apart from obtaining SACFA clearance and clearance from other authorities.

In view of above, we summarize our views as follows:

- All the existing service authorizations permit data connectivity. The IoT is also a kind of data connectivity (albeit, a low data-rate). Therefore, there is no need to recommend a new authorization for a niche IoT service.

- The existing authorizations under Unified License should be suitably amended with enabling provisions for providing low bit rate Satellite Communication services on commercial as well as on captive basis at equitable terms as IoT is nothing but a messaging service which rides on the underlying network infrastructure.

- Suitable amendments should be affected to the existing authorizations so that the existing infrastructure, ground segment as well as space segment, may be effectively utilized to

provide niche IoT services. By expanding the scope of existing service authorizations, those can be made more commercially attractive.

- We are not in favor of a new licensing framework for the reasons as stated above.

Q.5 The existing authorization of GMPCS service under Unified License permits the licensee for provision of voice and non-voice messages and data services. Whether the scope of GMPCS authorization may be enhanced to permit the licensees to provide satellite-based connectivity for IoT devices within the service area? Please justify your answer.

TCL's Response:

Yes, scope of GMPCS authorization should be enhanced to permit licensees to provide satellite-based connectivity for IoT devices. This is due to the fact that the provision of connectivity to IoT devices is not mentioned in the scope of service. However, it will be easier for a GMPCS service provider, to provide connectivity to the IoT devices in its service area. Therefore, provisions should be incorporated in the scope of this authorization to enable the licensee to provide IoT connectivity. The existing infrastructure, ground segment as well as space segment, may be effectively utilized to provide this niche service. By expanding the scope of GMPCS service authorization, it can be made more commercially attractive.

Please also refer to our response provided above in response to Q4.

Q.6 Commercial VSAT CUG Service authorization permits provision of data connectivity using VSAT terminals to CUG users.

(i) Whether the scope of Commercial VSAT CUG Service authorization should be enhanced to permit the use of any technology and any kind of ground terminals to provide the satellite-based low-bit-rate connectivity for IoT devices?

TCL's Response:

Yes, the scope needs to be enhanced to permit the use of any technology and use of any kind of ground terminals to provide the satellite-based low-bit-rate connectivity for IoT devices. The current scope includes provision of data connectivity between various sites. Therefore, it is already within the scope of this authorization to provide satellite based IoT connectivity solutions. However, scope of services permitted under this authorization is to be made technology agnostic and data speed agnostic. VSAT is a specific technology through which the data connectivity solutions are being provided under this authorization. The service provider may like to use any other latest technology to provide data connectivity solutions and for any speed denominations.

Satellite-based IoT connectivity required in the hybrid model (LPWAN + Satellite) can be provided by the Commercial VSAT CUG service providers using the existing infrastructure of ground segment and space segment. For direct-to-satellite connectivity, the antenna size and the technology used may be different from VSAT technology. This will require liberal approach in prescribing the technology or antenna size. Requirement of 'antenna on moving platform' also needs to be considered under VSAT authorization. TEC's data rate requirements also need to be revised accordingly.

Please also refer to our response provided above in response to Q4.

(ii) Whether the condition of CUG nature of user group should be removed for this authorization to permit provision of any kind of satellite-based connectivity within the service area? Please justify your answer.

TCL's Response:

Yes, the condition of CUG requirement needs to be removed to permit any kind of satellite-based connectivity.

Currently, the Commercial VSAT CUG Service licensee is permitted to provide data connectivity solutions to a Closed User Group (CUG) only. Even in CUG, the connectivity may be point to point for a single link or many links in single CUG. While envisaging satellite-based low-bit connectivity for IoT devices, there may be a CUG nature of user or it may be a non-CUG also. It will depend upon the architecture being followed by the IoT provider who will obtain the satellite-based connectivity to its IoT devices through satellite. Hence, to overcome such difficulties in defining CUG, the condition of CUG requirement needs to be removed.

Q.7 (i) What should be the licensing framework for Captive licensee, in case an entity wishes to obtain captive license for using satellite-based low-bit-rate IoT connectivity for its own captive use?

TCL's Response:

Tata Communications recommends following framework for captive license for using satellite-based low-bit-rate IoT connectivity for its own captive use:

a) Network restricted to geographical boundaries of India.
b) Network only for internal and non-commercial use
c) No third-party data shall be carried on the network.
d) Authorisation shall be data-rate agnostic.
e) SUC to be charged on formula, independent of number of IoT devices.

(ii) Whether the scope of Captive VSAT CUG Service license should be modified to include the satellite-based low-bit-rate IoT connectivity for captive use?

TCL's Response:

Yes, the Captive VSAT CUG service license would also require certain changes and amendments, to enable the provision of captive data connectivity for low-bit-rate applications and IoT devices.

(iii) If yes, what should be the charging mechanism for spectrum and license fee, in view of requirement of a large number of ground terminals to connect large number of captive IoT devices?

TCL's Response:

Spectrum charges shall continue to be based on 'formula' mechanism. However, the existing license fee of Rs.10000 per VSAT terminal is unsuitable for low-bit rate IoT applications owing to its high numbers.

In view of this, Tata Communications suggests charging license fee only for VSAT terminals and not to the IoT devices.

Q.8 Whether the scope of INSAT MSS-R service authorization should be modified to provide the satellite-based connectivity for IoT devices? Please justify your answer.

TCL's Response:

Yes, the scope of the INSAT MSS-R service authorization should be modified to provide the satellite-based connectivity for IoT devices. This authorization, in the current form, did not succeeded due to following reasons:

a) Only one-way communication
b) Very low speeds (just 300 b/s) and
c) Absence of suitable use cases

However, if its scope is augmented to provide two-way data communication, it could be an ideal authorization for those who are interested in providing pure, low data IoT services like environmental sensors, agriculture sensors, livestock tracking, asset monitoring, connected vehicles, maritime, mining, Oil & Gas, smart metering, etc.

An emerging technology in the satellite domain called 'nanosatellites' is in the offering and is expected to be fully operational in the next 1-2 years. Nanosatellites are the low-cost, light weight (weighting 5-10kg) and are exclusively designed to support only low speed, low power IoT use cases as mentioned above. The MSS-R service authorization, with a modified scope, could be an IoT specific authorization for those interested in launching pure IoT services over nanosatellites (as against other authorizations that provide for multiple services).

Please also refer to our response provided above in response to Q4.

Q.9 (i) As per the scope mentioned in the Unified License for NLD service Authorization, whether NLD Service providers should be permitted to provide satellite-based connectivity for IoT devices.

TCL's Response:

Yes, NLD service providers are already permitted to provide satellite-based bandwidth and are entitled to provide WAN services in the entire country. Therefore, provision of satellite-based connectivity to IoT devices is well within the purview of scope of NLD service authorization.

(ii) What measures should be taken to facilitate such services? Please justify your answer.

TCL's Response:

The spectrum charges, under NLD authorization, are very high as it is calculated on a formula basis involving the quantum of spectrum and number of terminals deployed. As IoT service would consist millions of devices, calculating SUC based on number of terminals would render service cost prohibitive. Hence, in order to encourage satellite based IoT services in India and to make it affordable to consumers, Tata Communications suggests following measures:

a) Replacing the existing formula-based mechanism: Spectrum usage charges for using satellite frequencies under the NLD service license/authorization should be prescribed as 1% of AGR excluding the revenue from the licensed services other than satellite-based services.

b) The NLD service licensees should be asked to do the accounting separation and maintain the revenues accruing from the satellite-based services and other licensed services separately.

The above recommendations are in line with the recent TRAI recommendations suggested against '*Provision of Cellular Backhaul Connectivity via Satellite Through VSAT Under Commercial VSAT CUG Service Authorization*' dated 28th July 2020.

Please also refer to our response provided above in response to Q4.

Q.10 Whether the licensees should be permitted to obtain satellite bandwidth from foreign satellites in order to provide low-bit-rate applications and IoT connectivity? Please justify your answer.

TCL's Response:

Yes, permitting Satellite Operators to buy foreign satellite bandwidth is the best way forward in order to provide low-bit-rate applications and IoT connectivity to remote and inaccessible areas with difficult terrains.

It is necessary that Operators are allowed to buy satellite resources either over domestic satellites or foreign satellites. This would surely facilitate procuring desired bandwidth without delay and at a reasonable price.

Q.11 In case, the satellite transponder bandwidth has been obtained from foreign satellites, what conditions should be imposed on licensees, including regarding establishment of downlink Earth station in India? Please justify your answer

TCL's Response:

Yes, the licensees should be permitted to obtain satellite bandwidth from foreign satellites, as it would promote the interests of end customers by making services more affordable and would give more choices to licensees in terms of choosing the satellite service providers. To safeguard nation security interests, relevant security requirements, such setting up of satellite gateway earth station within India along with requisite facilities for monitoring etc., can be imposed on the service providers.

Further, use of capacity from foreign satellites shall be permitted after ensuring aspects like establishing a ground system within Indian territory for monitoring and control of space assets (Telemetry, Tracking & Command (TT&C) station and Satellite Control Centre (SSC)), mechanism to address cyber security concerns and availability of interference monitoring capability in India. Thus, we are of the view, these suggested measures would help in addressing 'national security' concerns as well as ensure smooth and safe operations of the space assets.

Q.12 The cost of satellite-based services is on the higher side in the country due to which it has not been widely adopted by end users. What measures can be taken to make the satellite-based services affordable in India? Please elaborate your answer with justification.

TCL's Response:

We submit that a free market with no restrictions on procurement of bandwidth from Foreign Satellites is the need of hour for proliferation of satellite-based services. We fully endorse the vision of achieving self-reliance in the space communication technologies and promotion of indigenous capabilities both in commercial usage and research and development. However, it is equally important to make available sufficient satellite capacity for telecommunication and broadcasting services in the country.

We believe that ISRO has done a stellar job in creating one of the biggest Satellite System in South East Asia. However, owing to the high demand and specific requirements of the service providers, in our view, Indian Satellite Capacity cannot alone meet the requirements of Indian market, which is why various service providers are dependent on foreign satellite capacity and have invested in ground-based infrastructure to support the same both for the broadcasting and telecom applications. While the participation from private satellite operators in India is certainly expected to bring more capacity into Indian Satellite System, it will still take some years to augment this capacity.

Therefore, we submit that the licensed telecom operators as well as entities providing teleport services and DTH services should be allowed to procure bandwidth directly from Foreign Satellite service provider companies by entering into agreement with them for both Indian Telecom and Broadcasting Industry as well foreign satellite operator companies to promote ease of doing business. This will further strengthen India's image in the international fora as a business-friendly country. This would of course be subject to fulfilment of any compliance requirement by Foreign Satellite service providers and onus for ensuring such compliance can be placed upon Indian Entity buying bandwidth from them.

This will also be in consonance with the global nature of satellite services where various satellites have coverage over multiple countries and are not always used to provide coverage in specific country. Needless to mention, that it will immensely benefit Indian economy and accelerate 'Digital India' vision.

Above requirement is particularly more important and relevant in context of newer technologies like Low Earth orbit (LEO) and Medium Earth Orbit Satellites (MEO), as these provide lower latency as compared to the GEO stationary satellites, which are placed at higher orbits. In India, these technologies can complement the GEO Satellite services and the BharatNet infrastructure deployed by the Government and can be used for providing the direct broadband access to end users as well as for providing backhaul services for spectrum starved terrestrial networks.

<u>5G & LEO Satellite Systems</u>:

LEO Satellites are expected to play a key role in extending cellular 5G networks across air, sea and other remote areas which are not covered by terrestrial networks. From the end user perspective, these satellites can offer a seamless extension of 5G services from ground to airplanes, to ships and other vehicles in remote locations. IoT devices and M2M connections on remote worksites such as mines can also take advantage of the wide coverage areas offered by 5G satellites.

Satellites with 5G infrastructure can support enhancing Quality of Experience of high-capacity applications. It would offer dynamic routing and offloading of traffic thereby saving valuable spectrum used in terrestrial networks.

In the event of disaster situations where terrestrial 5G infrastructure is damaged, satellite networks with built in 5G functionality can take over and provide redundancy. While they will not be able to provide a full set of services, they can still retain critical and life-saving communication services during such disasters.

Due to promising prospects of LEO, various companies around the world have revealed their interest in the LEO technology. However, it may be noted that:

a. There will be a requirement of encouraging the competition to ensure that end users are able to enjoy the services at the most affordable rates.
b. It will be required to maximize the satellite capacity available to operators by having as many numbers of satellite providers as possible.

Therefore, in the consideration of the above stated factors, it will be important to encourage the foreign LEO Satellite provider companies to provide the services in India by directly entering into agreement with Indian Service Providers in Telecom sector. For the policy to effective there should be a separate section dealing the process of approval for LEO Satellite technology-based telecom services in India from DoS perspective including stipulating various requirements and obligations and some timelines for grant of approvals.

To protect the interests of the nation, security related concerns should be addressed upfront by stipulating the required safeguards to be followed which can be prescribed in form of Guidelines in the Policy itself. Moreover, telecom and broadcasting services using satellite bandwidth will be provided to the end users by the licensed TSPs (under DoT License) and Entities authorized by Ministry of Information and Broadcasting (under Grant of Permission Agreement ie. GOPA) respectively, therefore the prescribed security requirements for the use of Satellite bandwidth and technology can be conveniently enforced through these licensed/authorized service providers, which are directly under the control of Indian jurisdiction.

In view of the above, following measures are recommended to make satellite-based services affordable:

a) Providing choice to the VSAT operators to directly negotiate and execute agreement with the satellite system providers, thus, avoiding the intermediaries.
b) Spectrum Usage Charges (SUC): that there should be a single rate of SUC and it should be only 1% of AGR (as against the current ceiling of 4%).
c) The NOCC charges should be rationalized and it should be independent of the number of carriers assigned.
d) There should not be any barriers to the speeds. The higher data rates, which are now possible in satellite communications with the use of latest technologies, should be permitted without any restrictions.
e) There is an involvement of multiple agencies for seeking clearances and approvals. There is a need to have a single window clearance for all kinds of satellite-based processes.

Q.13 Whether the procedures to acquire a license for providing satellite-based services in the existing framework convenient for the applicants? Is there any scope of simplifying the various processes? Please give details and justification.

TCL's Response:

In the present processes, service providers have to approach multiple ministries/ departments for seeking permissions, to provide satellite-based communication services including Department of Space (DoS), Network Operations Control Centre (NOCC), WPC wing of DoT etc. which not only makes the process cumbersome for service provider but also takes longer time for approval.

In this regard, we request that a Single Window Clearance System should be introduced for consolidating all the permissions/clearances, under a single body/department within DoT HQs as a nodal agency for authorizing the service providers for providing satellite communication services under existing Unified License regime.

Q.14 If there are any other issues/suggestions relevant to the subject, stakeholders are invited to submit the same with proper explanation and justification.

TCL's Response:

The 'Draft Spacecom Policy-2020', in context with use of non-Indian orbital resources, mandates bringing such orbital resources eventually under Indian administration. The extract is as follows:

> *"**B**. Establishment of space based systems for communications over India - using Non-Indian orbital resources.*
>
> > ***c)** Use of Non-Indian orbital resources shall be permitted subject to an appropriate arrangement by which such orbital resources are eventually brought under Indian administration, through Indian ITU filing. The authorization requires a satisfactory commitment by the applicant through an appropriate arrangement with the concerned foreign administration which has the priority for the use of the proposed orbital resources. In case of a leased space asset, apart from the applicant, the operator of such asset shall also agree and commit for the arrangement of bringing the orbital resources eventually under Indian administration."*

However, Tata Communications is of the view that there should not be any such need for Non-Indian orbital resources to be brought under Indian administration because this is expected to act as a major stumbling block for utilizing foreign space assets as no foreign administration would be willing to accede its orbital resource to India without any kind of mutual agreement for such an arrangement. This will discourage Indian operators from utilizing cheaper foreign satellite assets, thus rendering their services in the domestic market at a considerable disadvantage vis-à-vis the terrestrial options and also to the target market segment, that is, the unserved and the underserved rural and remote geographies of India.

****