

8 April 2021

Consultation Paper
on
Licensing Framework for Satellite-based Connectivity for Low Bit Rate
Applications

Comments by Swarm Technologies, Inc.

Swarm Technologies, Inc. (“Swarm”) would like to thank the Telecom Regulatory Authority of India (“TRAI”) for the opportunity to submit comments on the consultation Paper on Licensing Framework for Satellite-based connectivity for low bit rate applications.

Swarm is a low-earth orbit (“LEO”) satellite operator with headquarters in the U.S.A., providing low data rate connectivity for Machine-to-Machine (“M2M”) and Internet-of-Things (“IoT”) sensors. Swarm’s system is optimized to send messages of about 200 bytes (about the size of a tweet) up to 25 times per day or 750 times per month.

Swarm’s mission is to provide satellite connectivity at unprecedented low prices to enable new applications and make it affordable for small businesses that were previously not able to afford it. Swarm is designing and manufacturing its own satellites, which are only 11cm x 11cm x 2.8cm in size (¼ Unit). The small size of our satellites allows us to also drastically reduce the manufacturing and launch cost, which typically contribute substantially to the overall of satellite communications.

Swarm congratulates TRAI on recognizing the importance of low-bit-rate satellite applications for India and for further recognizing that low-bit rate connectivity might warrant a different regulatory approach than that for satellite broadband services. We further welcome the consideration to open up this segment of satellite services to foreign satellites.

Please find below Swarm’s comments on the consultation. We have only commented on the questions where we had meaningful input, as some questions were outside of our area of operation or expertise.

Sincerely,

Annette Purves
Head of Market Access

Issues for Consultation

Q1. 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.

(i) Swarm advocates that both models should be permitted. Each model has different advantages and disadvantages and allows for optimization and customization. Depending on the situation of the customer and the application one model might be more advantageous in terms of attributes or cost than the other.

We do not see a reason for the regulatory authorities to permit only one of both models.

(ii) There are other hybrid models available which are cost-efficient for customers

These hybrid models consist of an aggregator which can aggregate data from surrounding sensors (typically up to 100 sensors) via bluetooth, Wifi, or other low power mesh networks.

The aggregator collects the data from the surrounding sensors and then transmits it to the satellite. These aggregators are typically powered by solar panels. They also have two-way capabilities and will receive data from the satellite and distribute the data to the surrounding sensors via bluetooth, Wifi, or other low power mesh networks

Q2. Satellite-based low-bit-rate connectivity is possible using Geostationary, Medium and Low Earth orbit Satellites. Whether all the above types of satellites should be permitted to be used for providing satellite-based low-bit-rate connectivity? Please justify your answer.

Swarm advocates not to restrict the type of satellites that will be permitted to provide low-bit-rate connectivity. We believe that it is beneficial for customers to have choices and to allow customers to pick the most suitable and cost-efficient solution for their needs.

Q3. 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.

Swarm advocates not to restrict the provisioning of satellite-based IoT connectivity to certain bands. We believe that customers and the market benefit from a variety of choices.

In addition to the above mentioned bands, the VHF and UHF bands are also ideal to offer satellite-based IoT connectivity for truly low-data-rate applications. VHF and UHF bands have the advantage of allowing extremely affordable and reliable solutions. Please include these bands in your list. Parts of the VHF and UHF bands have allocations for mobile satellite services (“MSS”) in the ITU and national frequency allocation tables.

Q4 (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.

Swarm is not sufficiently familiar with the current licensing framework to comment as to whether a new framework would be better than amending the existing licensing framework. Given that enabling affordable satellite connectivity for IoT and M2M devices, can facilitate cost savings and improve efficiencies for many small businesses, improve environmental conditions, help to improve the lives of those in rural and remote areas (e.g. monitoring water pump in rural villages), we would like to advocate for a fast implementation of appropriate licensing conditions. It might make sense to have an interim or temporary regulatory framework, to enable low-data satellite connectivity as soon as possible, while a formal licensing framework is being ratified.

As a company our philosophy is to provide the most affordable hardware and monthly subscription to customers throughout the world. We do this by utilising minimum spectrum and other resources. Our request is that the licensing framework in India should aid this by having affordable licensing terms for Indian service providers and companies.

Regardless, of which option will be chosen by TRAI, we would like to offer the following best-practise principles.

- Transparency: Clear guidelines, which are publicly stated on the website, indicating applications forms and requirements as well as fees.
- One-stop Window: Swarm would like to congratulate the Indian authorities on the establishment of IN-SPACE to act as a one-stop-shop agency, which will handle all licensing requirements.
- “Open Skies”: Equal treatment of national and foreign satellite systems

- Low cost: given the low data rate of the connectivity, and in an effort to keep prices for customers as low as possible and make them accessible to all, license fees should be kept as low as possible .

Q5. 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.

Swarm has no comment.

Q6. 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? (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.

Swarm has no comment.

Q7. (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? (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? (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?

Swarm has no comment.

Q8. 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.

Swarm has no comment.

Q9. (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. (ii) What measures should be taken to facilitate such services? Please justify your answer.

Swarm has no comment.

Q10. 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.

Swarm would like to advocate that licensees should be permitted to obtain satellite bandwidth from foreign and domestic systems on equal terms. An “open skies” policy will allow for competition in terms of availability, pricing and quality. This will allow businesses in India to be able to obtain the best suited service at the best price in order to enable their services and applications, which will benefit the whole population of India. This will aid “AtmanirbharBharat” and also create innovative applications “made in India for the world”.

Q11. 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.

In order to answer this question, it would be helpful to better understand the reasoning for transponder bandwidth from foreign satellites to be treated differently than that of national satellites.

Swarm advocates to make a distinction as to whether the data will be used for end-users having access to the internet or whether transponder bandwidth is used to connect Machine-to-Machine or Internet-of-Things sensors, which are far from cities and cell coverage. The Swarm satellite network for example is typically used for soil moisture sensors in agriculture, propane tank level monitoring, water pump status in remote villages, etc..

It therefore would seem that there is no or less of a security concern regarding the data being transmitted, and that for pure M2M and IoT satellite connectivity solutions the routing of traffic through an earth station in India might not be required.

Q12. 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.

Open, fair competition, with an “open skies” policy allowing Indian service providers and users the same access to foreign satellite systems as they have to national satellites, will certainly help to make satellite-based services more affordable in India.

For low-cost, low-data rate services, regulatory fees should be as low as possible. In the case where due to low power and extremely low risk of interference, a blanket license can be issued, a fee might even be waived.

Regulatory fees overall are typically intended to cover the administrative costs of regulators. When trying to cover the regulatory administrative costs, it would only be fair if services that require more bandwidth and create revenue, would pay a proportionately larger share of that cost recovery fee (licensing fee). Similarly in order to allow small and new operators to enter the market, the regulatory fees should not present an obstacle to entry into the market. For instance, rather than having a large one-time upfront license fee, it would be better to have lower ongoing (e.g. annual) fees allowing the operator to grow.

Any regulatory fees will ultimately be passed on by satellite operators and service providers to the customers.

Q13. 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.

As a new satellite connectivity provider, Swarm has no experience with the existing Indian licensing system. However, based on our experience in other countries, we would like to advocate for the following principles:

- One single window - one-stop shop licensing: Swarm welcomes the establishment of IN-SPACE as an entity which in our understanding will be able to serve as a single point of contact for all satellite licensing requirements. This step in itself should help to simplify the current system and aid transparency.
- Transparency: Swarm advocates for transparency in the regulations to the point of making all guidelines, applications forms, fees and timelines and contact points publicly available.
- Fast processing times: A processing time of 60 days is desirable for any applications for satellite communication services.
- Online capabilities: Application It would be helpful if application forms would be available online and could also be submitted online or electronically.

Q14. If there are any other issues/suggestions relevant to the subject, stakeholders are invited to submit the same with proper explanation and justification.

We would like to point out at this stage that we are not clear about the definition of “low-bit-rate connectivity”. It will be great to specify upper limits for the low-bit-rate connectivity. For example, in the case of Swarm, we use only up to 5 Kbits/s band width. This allows spectrum to be utilised very effectively across multiple customers and applications.

Swarm also advocates for a regulatory framework that considers the low risk of interference from low-power, low-duty cycle mobile earth stations that infrequently transmit and are often capable of withstanding a connection latency. Swarm's system is designed to listen-before-talking on the network, to prevent interference, and also to withstand a delay in transmission. Most devices will transmit only once per day (up to 25 times per day) for up to 1700 msec. In these scenarios, a blanket license that allows for deployment of large numbers of devices is essential, since applying for a license for each device would be too burdensome.