TRAI Consultation Paper on Licensing Framework for Satellite-based connectivity for low bit rate applications

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.

- India has a diverse geographical and socio-political amalgamation of technological needs. Data transmission over Wireless backbone are being extensively deployed in commercial and residential use. Devices transmit metadata information on network control and maneover as internet of Things (IoT) which are intelligently interlaced. Majority of IoT networks are terrestrial connecting to remote areas that lack terrestrial infrastructure additional capacity on GEO (geostationary) satellites in C-, Ku- and Ka-band for direct or backhaul connectivity to deploying new LEO (low earth orbit) or HEO (highly elliptical orbit) constellations, optimized for the IoT market. Therefore LPWAN has to be in place in near future.
- Direct to home satellite connectivity is growing fast and expanding from urban to suburban and will reach rural interiors.

Q2. 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.
- A strategic mix of this type/s of satellites will give India a quality-cost based selection (QCBS) advantage.
   The basic focus should be on QCBS to tap the tremendous international market potential with the MADE-IN-INDIA branding.

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. a
- Linear imaging self scanning (LISS)-I sensor satellites ne used to obtain images with different resolution, swath width and sensor channels s rebuilt the excluding the darker images. This enhance the transmission. Ku and Ka suffer from rain fade (Ka more than Ku) – this is not usually a problem at 35,000 feet, but high levels of humidity in tropical areas can also affect signals. S-Band should be the most preferred band considering the Indian constellation and satellite orientation/s.

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. 47
- Currently this infrastructure is maturing from its infancy to child hood, therefore intricate licensing policies will deter the growth. Down the line licensing policies can be framed.
- INDIA has shown it's capabilities in the PSLV series. Lucid licensing policies to attract the European and US continents and evolving market of CANADA will play a vital revenue role for us.
- The Indian policies has to be simplified to prima facie superior technology – cost effective – manageability – security.

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.

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- The satellite enhanced IoT domain is per se an expanding opportunity. We have already seen how technology convergence upbeat of the mobile market. Therefore is needless to explicitly mention that GMPS authorisation be extended to secured IoT devices.

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.

- (i) Secured & proven technology – wherein INDIA can play a vital technology leader can be allowed for IoT devices. I anticipate a definite misuse of technology will be done by neighbouring countries but that should be a technological challenge for INDIA to show case it to world market.
- (ii) CUG group should be there to keep a security control.

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?

- Captive licensing should be there for vital services before opening it up in general.
- Charging mechanism should be on the bands and nature of service demanded.

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.

- INSAT MSS –R service has its inherent limitations of asynchronous (mono), licensing intricacies, connectivity limitations and usage.
The INSAT MSS-R service authorization should be modified in line with the evolving technological trend adaption.

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.

- Wired NLD connectivity is in the verge of extinction. Existing infrastructure of NLD should be revamped to upscale and use satellite-based connectivity.

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.

- Limited services not available to us can be permitted based on requirement analysis and annual approval under stringent security features.

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.

- Same will be based on requirement analysis and annual approval under stringent security features. Uplink and downlink should be done through authorised Earth station in India under continuous vigil by event management and case back tracing facility.

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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.

- Satellite-based services are maturing from infancy to childhood. We proved it in PSLV, Mission Mars and Covid vaccines etc. I am sure indigenously developed technology can lower the prices and make India in become the world leader.
- At this point of time we need to absorb and focus on into research and development to meet the need.

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.

- We must follow a minimum and relevant documentation, continuous process of communication to the applicants processing progress and fast and steadfast.

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

- INDIA must make use of this enormous potential by :
  - Developing indigenous technology.
  - Effective encryption technologies.
  - High level of quality and consistency.
  - Scalability.
  - Secured and durable.
  - Explore newer patented bandwidths.