

October 17, 2024

To,
Telecom Regulatory Authority of India
Advisor (Networks, Spectrum and Licensing)
advmn@traai.gov.in

Attention: Shri Akhilesh Kumar Trivedi

Subject: Comments from Globalstar, Inc. on Consultation Paper No. 13 / 2024 on the Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services

Dear Sir,

We have enclosed comments from Globalstar, Inc. on the Consultation Paper No. 13/ 2024 on the Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services.

Thank you for giving us the opportunity to provide comments on this consultation paper.

Sincerely,



L. Barbee Ponder IV
Globalstar, Inc.

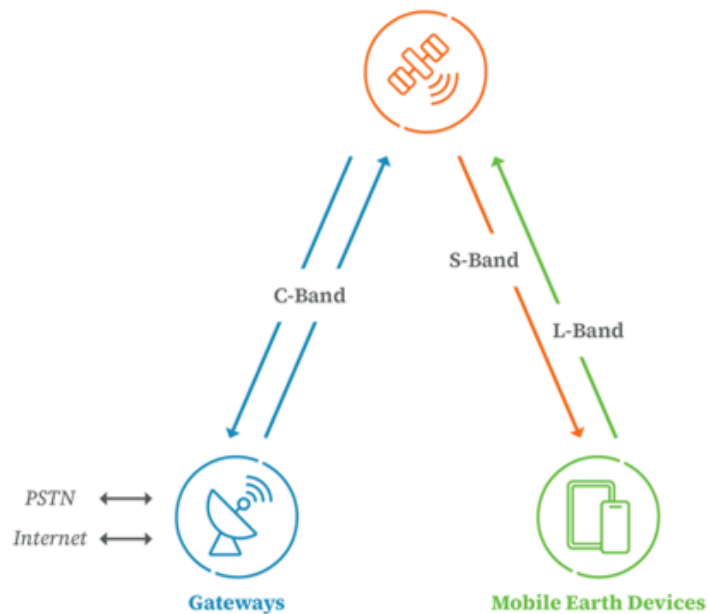
ANNEXURE

1. COMMENTS OF GLOBALSTAR, INC.

- 1.1. Globalstar, Inc. ("**Globalstar**") appreciates the opportunity to provide comments in support of the consultation paper issued by the Telecom Regulatory Authority of India ("**TRAI**") regarding the Consultation Paper on Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services dated September 27, 2024 ("**Consultation Paper**").
- 1.2. Globalstar is a US publicly traded company (NYSE: GSAT) duly registered in the State of Delaware. It owns and operates a Low Earth Orbit ("**LEO**") satellite system providing near global coverage, including India ("**Globalstar System**"). Founded in 1995, Globalstar has been providing mobile satellite services ("**MSS**") to the public for more than 20 years, having invested approximately US \$5 billion in its satellite network and ground operations during this period.
- 1.3. The Globalstar System consists of three separate components: (i) a constellation of LEO satellites, properly notified to the International Telecommunications Union ("**ITU**"); (ii) a global network of 28 gateway Earth Stations located in eighteen countries; and (iii) mobile devices and terminals operating over Globalstar's MSS network, including those used by over 760,000 of Globalstar's own end-user customers in over 120 countries worldwide to meet their communications needs.
- 1.4. In a significant breakthrough, Apple Inc. in 2022 announced a revolutionary, direct-to-handset "Emergency SOS *via* satellite" feature using Globalstar's MSS network that is now available to users of the iPhone 14, 15 & 16 family of devices. Apple's Emergency SOS *via* satellite feature allows users to initiate emergency communications through MSS transceivers contained in the Apple iPhone 14, 15 & 16 family of devices. This satellite-enabled feature is now available in the US, Canada, 12 European countries, Australia, New Zealand, and most recently Japan. The iPhone 14, 15 & 16's Emergency SOS *via* satellite feature is being used daily to request emergency assistance in the countries where the feature has been introduced. Most recently, Apple announced that with iOS 18, users in the United States and Canada will be able to send non-emergency messages via satellite, including texts, SMS, emoji and tapbacks.
- 1.5. As Globalstar grows its satellite communication business, it has embarked on a comprehensive global strategy to develop its direct presence and regulatory compliance in numerous countries around the world. India represents the single largest market that Globalstar has been previously unable to enter. It is Globalstar's hope that this consultation results in the TRAI instituting regulatory reforms in satellite spectrum that ease its proposed entry in India.

2. THE GLOBALSTAR SYSTEM

- 2.1. Globalstar operates a "bent-pipe" system with its satellites relaying messages between a global network of ground stations and millions of mobile earth terminals.



Licensed FSS Spectrum		Licensed MSS Spectrum	
C-Band:		L-Band:	S-Band:
5091-5250 MHz	6875-7055 MHz	1610-1618.725 MHz*	2483.5-2500 MHz

* 0.95 MHz shared with Iridium Satellite Communications

Globalstar’s global MSS system supports reliable, essential services to consumers, public safety personnel, and customers covered by its network. Since initiating commercial MSS in 2000, Globalstar has focused its MSS products and services on individual consumer and commercial industrial applications. Reflecting its strong emphasis on the retail consumer market, Globalstar’s MSS devices are easy to use and have long provided consumers with inexpensive, life-saving services.

Over its history, Globalstar has been dedicated to providing state-of-the-art, mission-critical, and safety-of-life services in remote, unserved, and underserved areas not reached by terrestrial deployments. Globalstar’s MSS network provides critical back-up capabilities for public safety personnel during disasters, when terrestrial networks can be rendered inoperable. In situations where all terrestrial wireless facilities are down in an affected area, Globalstar’s global MSS network will continue to function normally. Public safety entities involved in relief efforts around the world have relied on Globalstar’s satellite services after earthquakes, hurricanes, and other disasters.

Over the past fifteen years, Globalstar has developed the affordable and innovative “SPOT” family of MSS devices, which has played a critical role in providing emergency and safety-of-life services to individual consumers beyond terrestrial wireless reach. SPOT products work virtually everywhere in the world, offering communication through satellite connectivity to hundreds of thousands of people who travel off the grid. In recent years, Globalstar’s SPOT-X product has enabled two-way satellite communications, allowing, for example, remote workers to check in and provide detailed status of their situation when working at distant jobsites. Overall, the SPOT family

of products to date is responsible for initiating over 10,000 emergency rescues via satellite in over 100 countries on six continents – often lifesaving, on land and at sea.

Globalstar has also developed an array of satellite IoT solutions for customers in a wide range of industries, including oil and gas, mining, construction, transportation, agriculture, emergency management, government, maritime, and commercial fishing. Globalstar's satellite IoT products allow enterprises to streamline their operations and intelligently manage, monitor, and track their mobile assets remotely via Globalstar's MSS network. Globalstar's commercial IoT products include its SmartOne asset tracking solutions and IoT satellite transmitters, which enable its customers to manage their remote assets utilizing motion sensors, comparative GPS positions, and custom-configured sensors. Globalstar complements its IoT devices with a centralized cloud-based platform that provides live or historical tracking of personnel, vehicles, and assets on-demand.

Globalstar is also providing wholesale services to Apple in order to deliver transformational direct-to-device features for users of the iPhone 14, 15 and 16 families of devices. Since its rollout in November 2022, the Emergency SOS via satellite feature has led to numerous emergency and lifesaving rescues. Most recently, two-way messaging via satellite has been introduced in North America, allowing non-emergency text communications via satellite. These first commercially available direct-to-device satellite features have drawn a renewed focus on MSS spectrum and the potential offered by satellite connectivity.

Use of these Big LEO MSS frequencies will increase in the future as consumers take advantage of potential new direct-to-device features. With the increasingly widespread availability of Apple's direct-to-device features, the Big LEO MSS frequency band is already the most broadly available MSS frequency band in existence and can be used by more people than any other.

The availability of these direct-to-device satellite features along with other technological developments supporting the convergence of satellite and terrestrial services present substantial growth potential for MSS. As described, Globalstar allocates substantial network capacity to support these new Apple communications features and hopes to support potential additional features, while continuing to retain capacity to support its existing and future duplex, SPOT and IoT subscribers.

3. GLOBALSTAR'S RESPONSES TO THE SELECT ISSUES FOR CONSULTATION

3.1. *Q 2. Which frequency band(s)/ range(s) should be considered for the assignment to GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet service. Please provide a detailed response separately for the user link and feeder link.*

Response: We submit that frequencies that enable provision of societal and large-scale benefits, such as disaster recovery, emergency communication and universal connectivity should be prioritized for administrative based frequency assignments. By concentrating on the social advantages of satellite services, regulators can develop policies that promote the well-being of the nation. The existing MSS allocations given below provide a good basis for direct to device connectivity since they are harmonized worldwide for MSS already and have a stable and well-defined regulatory regime associated with them.

Globalstar is keen on providing emergency communication services in India, and each satellite of Globalstar is equipped with multiple receivers and transceivers, operating in the L and S bands, as well as in the C band for communications with the gateway earth stations. In particular, our gateway link and user link require the following frequencies:

GATEWAY LINK AND USER LINK	FREQUENCIES
User terminal to satellite (earth-to-space)	1610 – 1618.725 MHz
Satellite to user terminal (space-to-earth)	2483.5 – 2500 MHz
Gateway earth station to satellite (earth-to-space)	5091 – 5250 MHz
Satellite to gateway earth station (space-to-earth)	6875 – 7055 MHz

3.2. **Q3. What should be the maximum period of assignment of spectrum for –**

(a) ...

(b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

Please provide a detailed response along with international practice in this regard.

Response: We submit that the period of assignment of spectrum should be in line with the period of service authorization, i.e. at least 15 up to 20 years, as it will enable licensees to operationalize and provide their services in an optimum manner as they will benefit from a level of certainty regarding their business plans. In our view, introducing differential and shorter period of spectrum assignment will disincentivize licensed entities from investing in an appropriate level of ground and terminal infrastructure, which is necessary for reliable standard of services being available to Indian users.

It is also submitted that entities who have an established record of many years of operations in the satellite communication business in other countries and are known to provide reliable satellite services in such countries should be offered the longest permitted period of spectrum assignment, being at least 15 years and up to 20 years.

Specifically for Globalstar, we first obtained authorization from the United States Federal Communications Commission (“FCC”) to construct, launch, and operate a constellation of up to 48 satellites in 1995, (“HIBLEO-4”) and initiated commercial service in 2000. In 2007, Globalstar deployed eight additional HIBLEO-4 satellites to provide support for its duplex, simplex, and SPOT services. Additionally, Globalstar invested over \$1 billion in the development and deployment of its second-generation MSS space stations (HIBLEO-X), licensed by the Republic of France. Globalstar deployed these HIBLEO-X satellites in a series of launches from October 2010 to February 2013, and all 24 of these satellites have been in continuous service. In September 2014, the FCC granted Globalstar’s application for modification to extend the first-generation HIBLEO-4 license term to October 4, 2024. In June 2022, Globalstar launched one additional HIBLEO-X satellite to serve as an in-orbit spare. Most recently, the FCC granted another application for modification, extending HIBLEO-4’s license term to October 2039. The National Telecommunications Agency of Brazil (“ANATEL”) has also agreed to license the spectrum listed above to Globalstar through 2039.

For the past 30 years, Globalstar has been making substantial investments and developments of its ground and space infrastructure. Most recently, Globalstar entered into a procurement contract with MDA Space in February 2022 to acquire up to 26 replacement HIBLEO-4 MSS satellites. MDA’s sub-contractor Rocket Lab Ltd. is designing and manufacturing the bus subsystem for these satellites. The first batch of 8 satellites are due to be launched in 2025. Globalstar will control these

replacement satellites through its existing three Satellite Operations Control Centers in Aussaguel, France; Covington, Louisiana USA; and Milpitas, California USA.

As a result of this continued investment and development, Globalstar has more than enough capability to provide reliable, high-quality coverage to India through 2039.

Globalstar is keen on entering into the Indian market by establishing a wholly owned subsidiary and procuring relevant authorizations in order to provide satellite-based emergency communication services for the benefit of a large number of users in India, which will include users engaged in emergency and disaster management sectors. It is pertinent to note here that Globalstar's technology is well developed and aligned with its expansion plans into India and a shorter period (such as 5 years) for the validity of spectrum assignment will be counterproductive to our objective. Therefore, we suggest that a longer time period of at least 15 years or more should be considered for administrative assignment of the spectrum for space-based communications in the MSS sector. This would align India's spectrum assignment period with the license terms from the FCC and ANATEL.

- 3.3. ***Q4. For assigning spectrum for NGSO-based communication services, whether every ITU filing should be treated as a separate satellite system? Please provide a detailed response along with international practice in this regard.***

Response: In the NGSO sector, multiple filings can be used in many ways depending on the intended use of the satellite licensee. It is quite common for NGSO satellite operators to submit multiple International Telecommunication Union ("ITU") filings for various frequency bands. This practice is aimed at supporting various gateway links and / or user links to provide constant and broader coverage. Therefore, the responsibility for managing these multiple ITU filings should rest with such satellite operators, especially in the absence of explicit regulations from the ITU regarding multiple filings. Therefore, we submit that every ITU filing should not be treated as a separate satellite system for NGSO based communication services.

- 3.4. ***Q5. Whether the provisions of ITU-RR are sufficient to resolve interference related challenges and coordination issues? If not, what additional conditions should be prescribed while assigning frequency spectrum for –***

(a) ...

(b) ***GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?***

Please provide a detailed response along with international practice in this regard.

Response: We submit that the current provisions of the ITU Radio Regulations ("ITU-RR") provide for an elaborate framework which is sufficient to address issues in relation to interference and coordination for space-based communications. As reference, the ITU-RR provide for interference and coordination-related rules such as:

- (a) Article 5 provides for regional allocation of frequencies to be followed by member countries for frequency assignment. Additionally, within each frequency band, radiocommunication services are allocated on the basis of primary and secondary services to avoid harmful interference.
- (b) Article 9 provides for the procedure to effect coordination amongst administrations to ensure interference-free operation.
- (c) Article 21 deals with how to manage choice of sites and frequencies for space services sharing frequency bands above 1 GHz to limit interference.
- (d) Article 22 prescribes conditions required to be followed by NGSO satellite operators to control interference related issues. The ITU-RR provide that NGSO satellite systems shall

neither cause unacceptable interference nor claim protection from geostationary satellite networks in the fixed-satellite service and the broadcasting-satellite service. Additionally, Article 22 provides for detailed power flux density requirements for the protection of terrestrial services.

Accordingly, the ITU-RR already prescribes an elaborate framework relating to resolution of interference related challenges and coordination issues that are considered sufficient in other countries, and therefore no new conditions need to be proposed at the time of allocating spectrum in India.

3.5. ***Q6 For satellite earth station gateways of different satellite systems operating in the same frequency range, whether there is a need to prescribe a protection distance or any other measures to avoid interference from each other–***

(a) Between the gateways of GSO and NGSO systems; and

(b) Between the gateways of NGSO systems?

If yes, please provide a detailed response along with international practice in this regard.

Response: As with Q5, we submit that the current provisions of the ITU-RR adequately address both international (cross-border) and national coordination of gateway locations. As reference,

- (a) Appendix 4 provides the characteristics needed for earth stations to comply with Chapter III coordination procedures
- (b) Appendix 7 provides for methods for the determination of the coordination area around an earth station in frequency bands between 100MHz and 105 GHz.

Accordingly, we recommend that India adopt national coordination rules aligned with the ITU-RR framework. These regulations already identify adequate safeguards for protection distance between different satellite operators.

3.6. ***Q7 In case the spectrum assigned for satellite gateway links is also assigned to terrestrial networks such as Fixed Service, IMT etc., what protection distance or criterion should be included in the terms and conditions of the assignment of spectrum for satellite gateway links to avoid any interference to/ from terrestrial networks? Please provide a detailed response along with international practice in this regard.***

The ITU is in the process of developing guidelines to safeguard MSS and fixed satellite service (“FSS”) gateways from interference from new allocations to IMT. It is therefore clear that ITU is keen on protecting the MSS frequency ranges and ensuring that it is free of any interference in its allocated frequency range, given their emergency SOS service. As reference,

- (a) Resolve 3 of Resolution 220 of WRC-23 directs administrations wishing to implement IMT in the frequency band 6 700-7 075 MHz to ensure the protection, continued use and future development of FSS (space-to-Earth) stations through the adoption of site-specific coordination,
- (b) Resolution 220 also invites the ITU sector to update existing ITU-R Recommendations/Reports or develop new ITU-R Recommendations/Reports, as appropriate, to provide information and assistance to the administrations concerned on possible coordination of stations in the fixed service with IMT stations

Accordingly, we recommend for India to wait for these ITU guidelines to ensure India’s terms and conditions of the assignment of spectrum are consistent with international practices. Further, we would like to submit that in case a frequency band is allocated to more than one service, emergency & disaster recovery services such as the one offered by Globalstar should be given priority / categorized as "primary" service so that gateways engaged in providing other type of services are

restricted from causing any harmful interference to gateways providing the aforesaid emergency services.

- 3.7. ***Q8 In case the spectrum assigned to the satellite user link is also assigned to terrestrial networks such as Fixed Service, what criterion should be included in the terms and conditions of the assignment of spectrum for satellite user links to avoid any interference to/ from terrestrial networks? Please provide a detailed response along with international practice in this regard.***

Response: Globalstar delivers safety-of-life mobile satellite services over Big LEO MSS bands. Exclusive licensing terms are standard practice for this portion of the spectrum due to the nature of the user terminals. MSS terminals are mobile devices with omnidirectional antennas that can be subject to international roaming. Sharing spectrum with multiple operators is not feasible under such circumstances as Globalstar's system would receive harmful interference, preventing the delivery of critical, safety-of-life mobile satellite services. Therefore, Globalstar requests India adopt exclusive licensing terms within the Big LEO MSS bands.

- 3.8. ***Q9 Whether there is a need to prescribe any conditions to mitigate the risk of scarcity of satellite gateway sites? If yes, please provide a detailed response along with international practice in this regard.***

Globalstar has a detailed requirements document outlining the characteristics and conditions that any specific site must meet in order to be approved for the construction of a gateway Earth station.

Globalstar currently expects to install two gateway Earth stations in India in order to ensure full coverage. As of today, Globalstar does not expect there to be a risk of scarcity of satellite gateway sites.

- 3.9. ***Q10 In addition to the roll-out conditions recommended by TRAI for satellite-based Telecommunication Service Authorisation through its recommendations on the Framework for Service Authorisations to be Granted Under the Telecommunications Act, 2023 dated 18.09.2024, whether there is a need to impose certain additional roll-out obligations for the assignment of frequency spectrum for –***

(a) ...

(b) ***GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?***

Please provide a detailed response along with international practice in this regard.

Response: We believe that no additional roll-out obligation is required to be imposed at the time of assignment of frequency spectrum for NGSO based MSS. The present conditions for GMPCS authorization ensure that the licensee provides the services in a timely manner after obtaining the GMPCS authorization. Under the current rollout conditions of the GMPCS authorization, the licensee is *inter-alia* required to: (i) commission the earth station gateway switch within 12 months from the date of frequency allotment by WPC, (ii) register with the Network Operations Control Centre of Department of Telecommunications ("**DoT**"), and (iii) obtain the clearance from the Standing Advisory Committee on Frequency Allocation. Additionally, the GMPCS authorization conditions impose liquidated damage charges in the event the licensee fails to adhere to the roll out obligations. Similar obligations have also been recommended by TRAI in its recent recommendations on 'Framework for Authorisations to be Granted Under the Telecommunications Act, 2023'.

Upon establishing a wholly owned subsidiary in India, Globalstar intends to obtain the GMPCS authorization and comply with the applicable roll out conditions for the purpose of providing the emergency communication services in India. It is pertinent to note that Globalstar's emergency communication services provide coverage to areas where traditional terrestrial networks are not

reachable. Therefore, given the nature of public utility services that Globalstar intends to provide in India, imposing additional roll-out obligations will be counterproductive. Hence, we believe that the rollout obligations should be in line with either the current rollout obligations under the GMPCS authorizations or the TRAI's recommended obligations provided under the consultation paper 'Framework for Authorisations to be Granted Under the Telecommunications Act, 2023'.

3.10. **Q11 Whether there is a need to introduce a provision for surrender of frequency spectrum prior to the expiry of the period of validity of spectrum assigned for –**

(a) ...

(b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

If yes, what should be the process, and associated terms and conditions such as minimum period of spectrum holding, notice period, surrender fee, etc.? Please provide a detailed response with justifications.

Response: The current regime for the surrender of spectrum for certain space-based communication is provided under the DoT's order dated December 11, 2023, No. P-11014/34/2009 – PP wherein the assignees have an option to surrender the frequency assignment, if no longer required or utilized by such assignee. In such an event, the assignees can apply online for the surrender of the assigned frequencies. However, if the assignees do not surrender the unused frequencies, the relevant spectrum and late fee charges will be imposed by DoT.

We submit that the above spectrum surrender related process may be as is applied for MSS providers as well, which will not only ensure the utilization of the allocated spectrum but also provide an option to the assignees to surrender the spectrum if not required or utilized.

3.11. **Q12. Whether there is a need to prescribe timelines for processing the applications for the assignment of frequency spectrum for-**

(a) ...;

(b) **GSO/ NGSO based Mobile Satellite Services for providing voice, text, data, and Internet services?**

Please provide a detailed response with justifications

Response: Yes. It is necessary to prescribe timelines for processing applications in order to ensure regulatory certainty to satellite service providers and promote ease of doing business. We submit that a processing time of 3 – 6 months is appropriate to ensure that the provision of Globalstar's emergency communication services to users in India are not unnecessarily delayed. This, in our view, is critical to ensure the implementation of our emergency communication services in a time efficient manner.

3.12. **Q18 Should spectrum charges for GSO and NGSO-based MSS that provide voice, text, data, and Internet services be levied:**

i. On a per MHz basis,

ii. On a percentage of AGR basis, or

iii. Through some other methodology?

Please provide a detailed justification for your answer.

Response: Globalstar intends to provide public utility services such as the emergency communication services in India. Given the essential nature of these services and our objective to offer such services to users either on a zero cost or subsidized cost basis, we find it appropriate for

spectrum charges for NGSO-based MSS to be levied as a percentage of the revenue derived from such services (i.e., on a percentage of AGR basis).

Further, given that such emergency services will be provided for the benefit of the users at no cost (such as free service for emergency calling), this type of communication service should not be subject to extraneous or additional fees since it provides an important and valuable public service. We believe that zero or a nominal percentage (not more than 0.5%) of AGR is an appropriate basis for the computation of spectrum charges for providing emergency services. In our view, having a higher percentage of AGR as spectrum charges may dissuade entities like us from providing public utility services such as the emergency communication service in India.

- 3.13. ***Q19 If it is determined that spectrum charges for GSO/NGSO-based MSS providing voice, text, data, and Internet services should be levied on a per MHz basis, should these charges be calculated based on:***

i. The Department of Telecommunications (DoT) order dated December 11, 2023, or

ii. An alternative approach (please specify)?

Please provide a detailed justification to support your answer.

Response: As mentioned above in our response to Q18, spectrum charges for MSS used for public utility purposes should, if subject to spectrum fees, be based on a nominal percentage of AGR.

However, in the event TRAI believes that the charges should be on MHz basis, emergency communication services must be exempt from such charges or at least limited to minimal charges irrespective of the total assigned bandwidth for uplink or downlink purposes. This would enable safety of life services to be provided to the public at no or low cost. It will also create a level-playing field amongst satellite communication service providers and ensure that service providers involved in providing safety-of-life related services free of cost are not disincentivized and treated at par with satellite providers who intend to provide their services at a fee and/or for commercial purpose to their users.

- 3.14. ***Q20 If it is decided that spectrum charges for GSO/NGSO-based MSS providing voice, text, data, and Internet services should be levied on a percentage of AGR basis:***

i. What should be the appropriate percentage?

ii. Should a minimum spectrum charge be specified to address the issue of inefficient utilization of spectrum? If yes, what methodology may be used to determine the amount of the minimum spectrum charge?

iii. Is there an alternative approach that could be followed to address the issue of inefficient spectrum utilization?

Please provide a detailed justification for your answers.

Response: Please see our response above.