VIL/P&O/TRAI/2023/ 064
June 01st, 2023

Advisor (Networks, Spectrum and Licensing)
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhawan,
Jawaharlal Nehru Marg (Old Minto Road),
New Delhi – 110002

Kind Attn: Shri Akhilesh Kumar Trivedi

Subject: Comments on the TRAI's Consultation Paper on "Assignment of Spectrum for Space-based Communication Services" dated April 06, 2023

Dear Sir,

This is with reference to the above mentioned consultation paper from TRAI on "Assignment of Spectrum for Space-based Communication Services" dated April 06, 2023.

In this regard, kindly find enclosed herewith comments from Vodafone Idea Limited to the said consultation paper.

We hope our comments will merit your kind consideration please.

Thanking you,

Yours sincerely,

For **Vodafone Idea Limited**

Ajay Mehta
Vice President – TRAI Policy and Operations

Enclosed: As stated above

myvi.in

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VIL Comments to the TRAI Consultation Paper on "Assignment of Spectrum for Space-based Communication Services"

At the outset, we are thankful to the Authority for giving us this opportunity to provide our comments to the TRAI Consultation Paper on "Assignment of Spectrum for Space-based Communication Services" dated 06.04.2023.

Executive Summary:

1. **The spectrum, for space-based communication services, should not be fragmented and be auctioned on a LSA wise basis only**.

2. **Level playing field should be upheld for all the licensees and spectrum assignment should be done through auction on a LSA basis, without any separate treatment for any service.**

3. **We recommend model#1 i.e. exclusive spectrum assignment to be implemented for assignment of spectrum for space based communication services (irrespective of the spectrum bands), similar to the auction of the IMT spectrum.**

4. The validity of spectrum should be kept at 20 years only. The spectrum for space-based communication services should also be made part of annual auction, which is being done presently for IMT spectrum.

5. For the minimum networth or any other eligibility condition for assignment of spectrum for each type of space-based communication service, same service, same rules, same commercials should apply and thus, such conditions should be same across different services and should be as is applicable for the existing licensees operating terrestrial services.

6. Prescribing spectrum cap is a prerequisite to prevent large holdings of spectrum taken by one/few TSPs, which will lead to concerns of inadequate competition in the market.

7. **Ku and Ka band should be considered under this consultative process for space-based communication services at this stage, after excluding the frequency ranges along with sufficient guard bands in mmWave bands, E&V bands, MWA-MWB bands as well as C-band (4 GHz - 8 GHz), which are being utilized or reserved for IMT services or is in evolution path of IMT services**.

8. The **spectrum from 27.5 GHz to 29.5 GHz (including 27.5 GHz to 28.5 GHz) should be put to a fair and transparent auction** in line with the Hon'ble Supreme Court Judgment of 2012 and principle of same service same rules.

9. **Consistency should be ensured in all principles and policies for determination of valuation of spectrum band for commercial entities. Thus, the valuation models and approaches being used over the last decade for spectrum for terrestrial networks, should also be considered for user links and gateway links.**

10. The **reserve price of spectrum for user links and gateway links should be set at 70% of the valuation of spectrum**, as has been recommended by Authority during last recommendations dated 11.04.2022.

11. The payment options and terms and conditions should remain same as have been provided under the NIA 2022 as well as TRAI's recommendations dated 11.04.2022.

Question-wise Comments

Q1. For space-based communication services, what are the appropriate frequency bands for (a) gateway links and (b) user links, that should be considered under this consultation process for different types of licensed telecommunications and broadcasting services? Kindly justify your response with relevant details.

VIL Comments to Q. no. 1

In our view, before arriving at appropriate frequency bands for gateway links and user links, for space-based communication services, following areas will require thoughtful and comprehensive considerations:

1. **Spectrum being finite resource, balance between new and existing services:**

   a. Balance Spectrum is a valuable and inexhaustible natural resource, which has an element of public good, hence, it is vital to ensure efficient management and use of the spectrum.

   b. To begin with, we would like to submit that the Government should work towards making sufficient spectrum available to deliver even greater benefits in the future while ensuring spectrum is used efficiently. This includes finding the right balance

between enabling new and innovative services as well as ensuring existing services can continue to provide valuable services to consumers.

c. The arrangement should be such that giving someone the right to use the spectrum does not deny someone else the right to use it.

d. In our view, any exclusive reservation of spectrum for space based communication services will lead to unavailability of adequate spectrum availability for IMT networks in longer term, thus leading to deterioration of network quality and experience.

2. **Effects of Reserving the Spectrum bands for non-terrestrial networks:**

Exclusive reservation of spectrum bands for space-based communication services (especially the spectrum reserved for IMT or in its evolution path) will lead to following significant disadvantages:

a. Inefficient utilization of a finite resource, from national utilization across all sectors and sizes of enterprises through terrestrial networks, to space-based communication services which are at nascent stage.

b. Adversely impacting success of 5G with lesser spectrum availability.

c. Increased complexity of spectrum management for interference mitigation.

d. Reserving spectrum from bands where demand is high, can lead to creation of inadequate spectrum supply and holdings.

e. Impact on IMT services which utilizes spectrum in 15 GHz, 18 GHz, 23GHz and 7GHz for backhaul purposes and is also growingly going to utilize E&V bands as well for backhaul purposes.

3. **Spectrum should be technology neutral**:

a. As is being witnessed globally, there is a convergence happening between various services like telecommunication and broadcasting and OTT content, etc.

b. Similarly, even though space-based communication services are in nascent stage, there are already new technologies shaping up globally, which will lead to convergence of terrestrial and space-based networks. In this regard, an innovative

technology company is building a space-based cellular broadband network[1]. As per the website of the company, they are building the first and only space-based cellular broadband network to be accessible by standard smartphones. Also, said ultra-powerful network is being designed to provide connectivity at 4G/5G speeds everywhere on the planet – on land, at sea and in flight.

c. Said technologies will provide benefit of directly connecting ordinary mobile phones (unmodified) to space-based cellular broadband satellite network.

d. **Therefore, in our view, the spectrum should be treated as truly technology neutral.**

4. **Importance of mmWave / E&V bands / MWA-MWB bands /C-Band for terrestrial networks:**

a. The shift to higher technologies is not possible without complementary support in the form of higher capacity of mobile backhaul. Mobile broadband service requires a major upgradation in the capacity of mobile backhaul. Mobile broadband services require a quantum increase in the capacity of mobile access as well as backhaul network.

b. The access technologies have evolved over a period of time which has resulted in better use of access spectrum in terms of improved spectral efficiencies and increased capacity. However, the higher data carrying capacity of access technologies can only be effective in providing mobile broadband services to the customers, if these are complemented by equally supportive & capable backhauls.

c. The mobile backhaul is an integral part of the network which connects cell site BTSs with BSCs. In India, currently 13 GHz (12.750-13.250 GHz), 15 GHz (14.5-15.5 GHz), 18 GHz (17.7-19.7 GHz) and 21 GHz (21.2-23.6 GHz) bands are used for the assignment of frequencies for MWA carriers. In India, currently 6 GHz (5.925-6.425 GHz) and 7 GHz (7.425-7.725 GHz) bands are used for frequency assignment for MWB carriers.

d. The mmWave band and E&V bands are very important and inseparable part of true 5G journey, as has been seen globally.

e. The entire mmWave band i.e. till 29.5 GHz should be reserved for IMT/5G service and no chunk of the same should be opened for standalone space-based communication services. mmWave band is expected to be deployed in the high traffic areas as such,

[1] https://ast-science.com/spacemobile-network/

TSPs would require significantly higher bandwidth to provide the required huge capacity. Fragmentation of the mmWave bands into non-contiguous chunks should be avoided, for proper utilization of its capabilities under IMT services.

f. Furthermore, 5G networks would require huge backhaul capacity coupled with network densification. The tower fiberization which is presently at 35%, would have to either move to 85% or else wireless backhaul has to be opted for. Tower fiberization will take considerable time due to inherent issues in building infrastructure, time to take local permissions and its disproportionate costs.

g. To overcome this, E & V bands be reserved and given only for backhaul purposes of IMT services, to support high bandwidth traffic over 5G spectrum. These bands offer wireless fibre type backhaul option / experience, which can mitigate the concerns of time required to fiberize the 5G sites and offer superior customer experience.

h. **Thus, it would be crucial to keep frequency ranges in mmWave band, E&V bands and MWA-MWB spectrum bands along with sufficient guard bands, reserved for IMT.**

i. The frequency range of C-band has been taken as the basis of the very first implementation of 5G services globally. The critical fact about the said frequency range is the balancing act it offers between the coverage and capacity, which is integral for the development of 5G services across the country.

j. While other bands, e.g. sub-1 GHz band and mmWave bands are essential to cater for the coverage requirement (mainly for rural coverage) and demand of high capacity, respectively; however, the mid-band frequency, i.e. 1-6 GHz especially C-band including higher frequency range from 4GHz to 8GHz, holds the key for the success of 5G deployment. Availability of C-band is most critical due to its wide adoption across various countries and the available ecosystem of devices and equipment, which is vital for mass uptake and success of 5G services.

k. Kindly also find below our comments to the band ranges recommended by DoT for Space, basis IMT interests considering spectrum requirements for future IMT deployments:

Band	DoT Recommended Ranges for Space	Comment
Ku	10.7 – 12.75 GHz Space to Earth	This band is being considered for IMT and shall be studied for shared access between IMT and Satellite.
Ku	12.75 – 13.25 GHz Earth to Space	
Ku	13.75 – 14.5 GHz Earth to Space	Mostly exclusive for sitcom.
Ka	17.1 – 18.6 GHz Space to Earth	IMT access backhaul links shall be protected in case sharing is allowed.
Ka	18.8 – 19.3 GHz Space to Earth	IMT access backhaul links shall be protected in case sharing is allowed.
Ka	19.3 – 19.7 GHz Space to Earth	
Ka	19.7 – 21.2 GHz Space to Earth	
Ka	28.5 – 29.5 GHz Earth to Space	27.5 GHz – 28.5 GHz is planned for IMT. 28.5 GHz - 29.5 GHz also should be shared with IMT.
Ka	29.5 – 31 GHz	

5. Considering all above, we would like to recommend that:

   a. The Authority should adopt a well-thought-out approach before deciding the matter of spectrum for space-based communication services.

   b. **As the space based communication services are still at the nascent stage in India as such, it would be apt to consider opening limited bands for the same.**

   c. **At this stage, only Ku and Ka band should be considered under this consultative process for space-based communication services, after excluding the frequency ranges along with sufficient guard bands in mmWave bands, E&V bands, MWA-MWB bands as well as C-band (4 GHz - 8 GHz), which are being utilized or reserved for IMT services or is in evolution path of IMT services.**

   d. **Spectrum should be assigned as technology neutral and existing spectrum assigned for IMT services should also be allowed to be utilized for space-based communication services.**

Q2. What quantum of spectrum for (a) gateway links and (b) user links in the appropriate frequency bands is required to meet the demand of space-based communication services? Information on present demand and likely demand after about five years may kindly be provided in two separate tables as per the proforma given below:

Type of service	Name of the satellite system	Type of satellite (GSO/ LEO/ MEO)	Frequency range and quantum of spectrum required							
			User Link (Earth to space UL)		User Link (Space to Earth DL)		Gateway Link (Earth to space UL)		Gateway Link (Space to Earth DL)	
			Frequency Range	Quantum (in MHz)	Frequency Range	Quantum (in MHz)	Frequency Range	Quantum (in MHz)	Frequency Range	Quantum (in MHz)
Access										
Internet										
NLD										
ILD										
GMPCS										
VSAT CUG (Commercial)										
Captive VSAT CUG										
Machine to Machine (M2M)										
DTH										
Teleport										
DSNG										
HITS										
IFMC										
Any other relevant service (please specify)										

VIL Comments to Q. no. 2

No comments.

Q3. Whether there is any practical limit on the number of Non-Geo Stationary Orbit (NGSO) satellite systems in Low Earth Orbit (LEO) and Medium Earth Orbit (MEO), which can work in a coordinated manner on an equitable basis using the same frequency range? Kindly justify your response.

VIL Comments to Q. no. 3

1. The number of Non-Geo Stationary Orbit (NGSO) satellite systems in Low Earth Orbit (LEO) and Medium Earth Orbit (MEO), which can work in a coordinated manner on an equitable basis using the same frequency range, should be decided after duly considering the challenges being faced internationally.

2. As space based communication services are still at a nascent stage in our country hence, it would be apt to examine environmental concerns thoroughly, considering its international deployments.

Q4. For space-based communication services, whether frequency spectrum in higher bands such as C band, Ku band and Ka band, should be assigned to licensees on an exclusive basis? Kindly justify your response. Do you foresee any challenges due to exclusive assignment? If yes, in what manner can the challenges be overcome? Kindly elaborate the challenges and the ways to overcome them.

VIL Comments to Q. no. 4

1. We submit that with the change in dynamics and technology advances in the telecom industry, spectrum should be technology neutral. With technology neutrality in place, the TSPs will be able to offer services through any technology using any of the frequencies in their possessions. This neutrality allows spectrum to be used more efficiently, which should always be the overarching spectrum management goal for the Government. As a result, users benefit from better mobile broadband coverage, higher data speeds and lower mobile data prices than would otherwise be the case. The socio-economic benefits stemming from these improvements make it a win-win for Government and all the subscribers as well as enterprises.

2. **Given the amount of spectrum required for meeting the future demands for IMT and amount of spectrum available in the Low & Mid bands for IMT, we would like to submit that C-band (4GHz - 8 GHz) should be reserved/prioritized for IMT services.**

3. In addition to the above, some parts of the bands, as mentioned in the question, are being used by TSPs as backhaul spectrum to deliver services to the consumers. For example: VI is using 7GHz, 15 GHz, 18 GHz and 23 GHz for MWA and MWB. These services are very critical for the operations and continuity of the communication services as they together with the fiber network form the critical part of the backbone of the communication infrastructure and hence, needs to be adequately protected else will have serious issues in the network availability and the QoS of the network.

4. **Therefore, bands which are being used as backhaul by licensees under Access authorization should be reserved for IMT bands. Further, adequate guard band should be ensured along with such parts to mitigate the possibility of interference in communication services being offered through different technologies.**

5. **Further, as explained in our comments to question no. 1 above, at this stage only Ku and Ka band should be considered under this consultative process for space-based communication services, after excluding the frequency ranges along with sufficient guard bands in mmWave bands, E&V bands, MWA-MWB bands as well as C-band (4GHz - 8 GHz), which are being utilized or reserved for IMT services or is in evolution path of IMT services.**

6. **Exclusive basis:** We submit that the frequency spectrum, should be assigned to licensees on an exclusive and on a LSA basis only.

Q5. In case it is decided to assign spectrum in higher frequency bands such as C band, Ku band and Ka band for space-based communication services to licensees on an exclusive basis,

(a) What should be the block size, minimum number of blocks for bidding and spectrum cap per bidder? Response may be provided separately for each spectrum band.
(b) Whether intra-band sharing of frequency spectrum with other satellite communication service providers holding spectrum upto the prescribed spectrum cap, needs to be mandated?
(c) Whether a framework for mandatory spectrum sharing needs to be prescribed? If yes, kindly suggest a broad framework and the elements to be included in the guidelines.

(d) Any other suggestions to ensure that that the satellite communication ecosystem is not adversely impacted due to exclusive spectrum assignment, may kindly be made with detailed justification.

Kindly justify your response.

VIL Comments to Q. no. 5

No comments.

Q6. What provisions should be made applicable on any new entrant or any entity who could not acquire spectrum in the auction process/assignment cycle?

(a) Whether such entity should take part in the next auction/ assignment cycle after expiry of the validity period of the assigned spectrum? If yes, what should be the validity period of the auctioned/assigned spectrum?
(b) Whether spectrum acquired through auction be permitted to be shared with any entity which does not hold spectrum/ or has not been successful in auction in the said band? If yes, what measures should be taken to ensure rationale of spectrum auction and to avoid adverse impact on the dynamics of the spectrum auction?
(c) In case an auction based on exclusive assignment is held in a spectrum band, whether the same spectrum may again be put to auction after certain number of years to any new entrant including the entities which could not acquire spectrum in the previous auction? If yes,
  (i) After how many years the same spectrum band should be put to auction for the potential bidders?
  (ii) What should be the validity of spectrum for the first conducted auction in a band? Whether the validity period for the subsequent auctions in that band should be co-terminus with the validity period of the first held auction?
  Kindly justify your response.

VIL Comments to Q. no. 6

1. **To ensure level playing field and for using existing time-tested policies, in our view the existing robust licensing and regulatory framework should be equally applicable for space-based communication services as well. This will put forth a licensing and regulatory framework which is truly technology neutral.**

2. While participation in future auction is one option, there can other options like spectrum trading, sharing and leasing, depending upon the need of the licensees.

3. Further, the validity period of the auctioned spectrum should be 20 years, as applicable for present spectrum being auctioned.

4. Also, in our view, if spectrum acquired through auction is permitted to be shared with any entity which does not hold any spectrum in the said LSA, it would go against the rationale of auction and also have adverse impact on the market dynamics.

5. **Most importantly, inter-band spectrum sharing should also be allowed across terrestrial and non-terrestrial uses, as it will help increase competition and provide optimum utilization of a finite resource.**

Q7. Whether any entity which acquired the satellite spectrum through auction/assignment should be permitted to trade and/or lease their partial or entire satellite spectrum holding to other eligible service licensees, including the licensees which do not hold any spectrum in the concerned spectrum band? If yes, what measures should be taken to ensure rationale of spectrum auction and to avoid adverse impact on the dynamics of the spectrum auction? Kindly justify your response.

VIL Comments to Q. no. 7

1. The guidelines issued by DoT dated October 12, 2015 on trading of access spectrum by Access Service Providers, states the benefits of trading as below:

   The spectrum trading leads to greater competition, provides incentives for innovation, better/new services being available to consumers at cheaper tariffs, better choice to consumer, etc. This also facilitates ease of doing business in India by allowing free play in the commercial decisions and leads to optimization of resources apart from improving the spectral efficiency and quality of service.

2. Further, the continued rise in data traffic means reliability on access to growing amounts of spectrum to meet demand. However, it is increasingly difficult to clear new frequency bands for future mobile use. Spectrum sharing may be a way to help, when clearing a band is not possible in time, by enabling mobile access to additional bands in areas, and at times, when other services are not using them.

3. Supporting the same, we recommend that any entity which acquired the satellite spectrum through auction/assignment should be permitted to trade and/or lease their partial or entire satellite spectrum holding to other eligible service licensees as permitted in case of access spectrum held by access service licensees.

Q8. For the existing service licensees providing space-based communication services, whether there is a need to create enabling provisions for assignment of the currently held spectrum frequency range by them, such that if the service licensee is successful in acquiring required quantum of spectrum through auction/ assignment cycle in the relevant band, its services are not disrupted? If yes, what mechanism should be prescribed? Kindly justify your response.

VIL Comments to Q. no. 8

In our view, the policy being followed in case of IMT spectrum expiry, should be followed in case of spectrum for space based communication services as well. There are precedence and clear recommendations made by TRAI, upholding need of fair and transparent auctions.

Q9. In case you are of the opinion that the frequency spectrum in higher frequency bands such as C band, Ku band and Ka band for space-based communication services should be assigned on shared (non-exclusive) basis, -

(a) Whether a broad framework for sharing of frequency spectrum among satellite communication service providers needs to be prescribed or it should be left to mutual coordination? In case you are of the opinion that broad framework should be prescribed, kindly suggest the framework and elements to be included in such a framework.
(b) Any other suggestions may kindly be made with detailed justification.

Kindly justify your response.

VIL Comments to Q. no. 9

Please refer to our comments to question no. 4.

Q10. In the frequency range 27.5-28.5 GHz, whether the spectrum assignee should be permitted to utilize the frequency spectrum for IMT services as well as space-based communication services, in a flexible manner? Do you foresee any challenges arising out of such flexible use? If yes, in what manner can the challenges be overcome? Kindly elaborate the challenges and the ways to overcome them.

And

Q11. In case it is decided to permit flexible use in the frequency range of 27.5 - 28.5 GHz for space-based communication services and IMT services, what should be the associated terms and conditions including eligibility conditions for such assignment of spectrum? Kindly justify your response.

And

Q12. Whether there is a requirement for permitting flexible use between CNPN and space-based communication services in the frequency range 28.5-29.5 GHz? Kindly justify your response.

And

Q13. Do you foresee any challenges in case the spectrum assignee is permitted to utilize the frequency spectrum in the range 28.5-29.5 GHz for cellular based CNPN as well as space-based communication services, in a flexible manner? What could be the measures to mitigate such challenges? Suggestions may kindly be made with justification.

VIL Comments to Q. no. 10 – 13

1. Ensuring level playing field in policies should be a joint and collective effort of all stakeholders including the Regulator and Licensor.

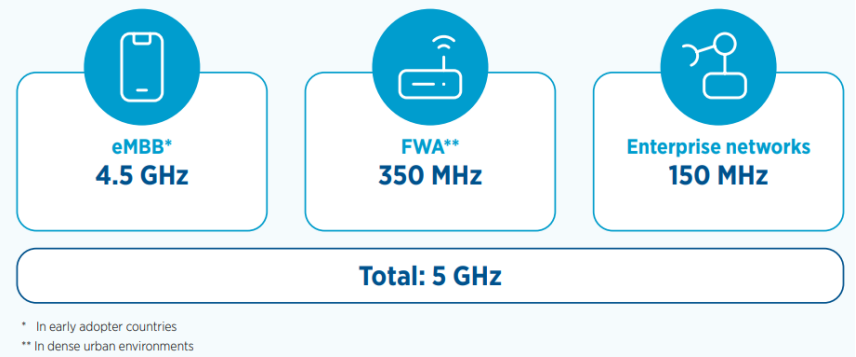
2. TSPs support requirements across sectors, enterprise categories, diverse use-cases and have been working with enterprises to deliver innovation, deployment & operations scale along with security requirements.

3. Most benefits of 5G for CNPN can be delivered through a range of technical and commercial solutions by the access operators and does not require spectrum to be set aside separately for CNPN. For example, 5G capabilities with slicing, dynamically configurable resources, low latency etc. help to support diverse industry needs over public networks.

4. Further, it should also been seen that whether the use cases of new network technologies can be dealt only through reserved spectrum or through any alternate technological means. There are alternate technological means available with mobile network operators to support such use cases like through network slicing, spectrum sub-leasing etc. 5G spectrum is attractive to TSPs only when it is able to fulfill its needs of eMBB, mMtc & uRLLC, which implies that TSPs shall be able to provide and monetize the Industry 4.0 applications.

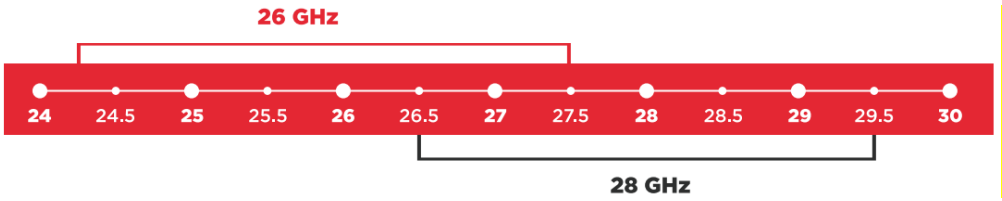
5. An enabling framework should be created to support such alternate technological means instead of reserving the spectrum for isolated private networks leading to inefficient utilization. Further, setting the right conditions to favor 4G/5G solutions to be adopted by verticals can include approaches where cooperation between mobile operators and access seekers is incentivized.

6. In addition to above, access to sufficient spectrum is the key to 5G/IMT success by minimizing operator deployment costs and enable countries to benefit from the potential growth in GDP afforded by mobile services. As per the GSMAi estimates[2], current 5G network capacity worldwide, based on low and mid-band spectrum, will not be sufficient to satisfy demand for 5G services by 2030, and an average of 5 GHz of mmWave spectrum will be needed by 2030 per market to satisfy demand for different 5G use cases, including eMBB, FWA and enterprise networks.



26 GHz and 28 GHz have emerged as two of most important band in the mmWave range and may offer the widest harmonization with minimised user equipment complexity. As shown in the chart below, the whole range between 24.25 GHz to 29.5 GHz is important to enable operators to meet the speed, latency, reliability and capacity requirement of 5G.

[2] https://www.gsma.com/spectrum/wp-content/uploads/2022/06/5G-mmWave-Spectrum.pdf



While the Government has already auctioned the 26 GHz range i.e. 24.25-27.5 GHz in the 5G auctions in 2022, the remaining part of this whole range i.e. from 27.5-29.5 GHz is not yet available for 5G/IMT.

7. 28 GHz band has already been assigned for IMT/5G in many countries including Australia, Hong Kong, Japan, Korea, and US, and the same should also be made available in India for 5G/IMT to enable mobile operators to acquire adequate quantity of spectrum, to support present and future needs of variety of use cases.

8. As mentioned in our comments to Question no. 1, spectrum is a valuable and inexhaustible natural resource, utilization of which is clearly linked to public good. Thus, it is important to put the spectrum in areas, which supports more public good thereby ensuring efficient management and use of the spectrum; while also keeping certain spectrum for new technologies like space based communication services.

9. We strongly recommend that TRAI should ensure the capability of this range for providing terrestrial 5G/IMT services is not affected due to any proposed flexible use of this frequency range.

10. **Therefore, the spectrum from 27.5 GHz to 29.5 GHz (including 27.5 GHz to 28.5 GHz) should be put to a fair and transparent auction (irrespective of type of authorization) in line with the Hon'ble Supreme Court Judgment of 2012 and principle of same service same rules and same commercials should apply.**

11. **Further, the spectrum should not be fragmented and be auctioned on a LSA wise basis only.**

Q14. Whether space-based communication services should be categorized into different classes of services requiring different treatment for spectrum assignment? If yes, what should be the classification of services and which type of services should fall under each class of service? Kindly justify your response. Please provide the following details:

a) Service provider-wise details regarding financial and market parameters such as total revenue, total subscriber base, total capital expenditure etc. for each type of service (as mentioned in the Table 1.3 of this consultation paper) for the financial year 2018-19, 2019-20, 2020-21, 2021-22, and 2022-23 in the format given below:

Type of service: _____				
Financial Year	**Revenue (Rs. lakh)**	**Subscriber base**	**CAPEX for the year (Rs. lakh)**	**Depreciation for the year (Rs. lakh)**
2018-19				
2019-20				
2020-21				
2021-22				
2022-23				

b) Projections on revenue, subscriber base and capital expenditure for each type of service (as mentioned in the Table 1.3 of this consultation paper) for the whole industry for the next five years starting from financial year 2023-24, in the format given below:

Type of service: _____			
Financial Year	**Revenue (Rs. lakh)**	**Subscriber base**	**CAPEX for the year (Rs. lakh)**
2023-24			
2024-25			
2025-26			
2026-27			
2027-28			

VIL Comments to Q. no. 14

1. No, there should not be any different treatment for spectrum assignment for different classes of services.

2. Spectrum is a valuable and inexhaustible natural resource, which has an element of public good, hence, it is vital to ensure efficient management and use of the spectrum, while maintaining level playing field.

3. Spectrum must be assigned only through auction on a LSA basis. The entities and competitive market conditions should decide as to how they want to utilize their spectrum and for which services.

4. Further, scope of certain authorizations like GMPCS, VSAT CUG, INSAT MSS-R and PMRTS includes services which are overlapping/substitutable in nature if compared with services allowed under access authorization. Scope under these different authorizations is given below for reference:

GMPCS Service Authorization:

The licensee may provide, in its area of operation, ***all types of mobile services including voice and non-voice messages, data services by establishing GMPCS Gateway utilizing any type of network equipment including circuit and/or packet switches.***

INSAT MSS-R Service Authorization:

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.*

VSAT CUG Service Authorization:

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.***

PMRTS Service Authorization:

The licensee is permitted to provide Public Mobile Radio Trunk Service (PMRTS). The PMRTS refers to:
(i) ***a two way land mobile service in which users communicate among themselves*** *through a pair of radio frequencies out of a pool in a designated frequency band, assigned to the system using pair of radio frequencies and*
(ii) the pair of frequencies is allocated on placement of call request and returned to the pool on completion of call and
(iii)the communication usually takes place through repeater station (also called base station). Once user is assigned a channel (a pair of frequencies) by the system, no one else can interfere with the communication.

5. **Hence, we strongly urge the Authority to uphold level playing field for all the licensees and recommend spectrum assignment only through auction on a LSA basis, without any separate treatment for any service.**

Q15. What should be the methodology for assignment of spectrum for user links for space-based communication services in L-band and S-band, such as-
(a) Auction-based
(b) Administrative
(c) Any other?
Please provide your response with detailed justification.

And

Q16. What should be the methodology for assignment of spectrum for user links for space-based communication services in higher spectrum bands like C-band, Ku-band and Ka-band, such as
(a) Auction-based
(b) Administrative
(c) Any other?
Please provide your response in respect of different types of services (as mentioned in Table 1.3 of this consultation paper). Please support your response with detailed justification.

And

Q17. Whether spectrum for user links should be assigned at the national level, or telecom circle/ metro-wise? Kindly justify your response.

And

Q18. In case it is decided to auction user link frequency spectrum for different types of services, should separate auctions be conducted for each type of services? Kindly justify your response with detailed methodology.

And

Q19. What should be the methodology for assignment of spectrum for gateway links for space-based communication services, such as
(a) Auction-based
(b) Administrative
(c) Any other?
Please provide your response in respect of different types of services. Please support your response with detailed justification.

And

Q20. In case it is decided to auction gateway link frequency spectrum for different types of services, should separate auctions be conducted for each type of services? Kindly justify your response with detailed methodology.

And

Q21. In case it is decided to assign frequency spectrum for space-based communication services through auction,
(a) What should be the validity period of the auctioned spectrum?
(b) What should be the periodicity of the auction for any unsold/ available spectrum?
(c) Whether some mechanism needs to be put in place to permit the service licensee to shift to another satellite system and to change the frequency spectrum within a frequency band (such as Ka-band, Ku-band, etc.) or across frequency bands for the remaining validity period of the spectrum held by it? If yes, what process should be adopted and whether some fee should be charged for this purpose?
Kindly justify your response.

And

Q22. Considering that (a) space-based communication services require spectrum in both user link as well as gateway link, (b) use of frequency spectrum for different types of links may be different for different satellite systems, and (c) requirement of frequency spectrum may also vary depending on the services being envisaged to be provided, which of the following would be appropriate:

(i) to assign spectrum for gateway links and user links separately to give flexibility to the stakeholders? In case your response is in the affirmative, what mechanism should be adopted such that the successful bidder gets spectrum for user links as well as gateway links.

(ii) to assign spectrum for gateway links and user links in a bundled manner, such that the successful bidder gets spectrum for user link as well as gateway link? In case your response is in the affirmative, kindly suggest appropriate assignment methodology, including auction so that the successful bidder gets spectrum for user links as well as gateway links.

VIL Comments to Q. no. 15 – 22

A. <u>Spectrum assignment through Auction only</u>

1. **In our view, any new spectrum being put up for assignment, should be done only through a transparent and fair auction mechanism.**

2. We understand that there are international examples of administrative assignment of spectrum for satellite based services. However, it cannot be a reason to completely discard an existing transparent and fair auction mechanism being held in India, for spectrum pricing and assignment.

3. Conducting an auction for spectrum assignment for space-based communication services would be aligned with the Hon'ble Supreme Court Judgment as well as Authority's consistent position on valuation and spectrum allocation through auction.

4. **Further, as the industry is grappling with non-level playing field in a certain way between licensed communication service providers and OTT communication providers, another non-level playing field between terrestrial communication service providers and space-based communication service providers, should be avoided at all costs.**

5. **Introducing competitive and substitutable services on different terms with high-level impact (like administrative spectrum assignment with low prices), in the name of support to new technology, will give rise to regulatory uncertainty and non-level playing field.**

6. All policy decisions should be tested on the principle of same service, same rules and same commercials. Therefore, just like spectrum allocation for terrestrial operators have been assigned through fair and transparent auction, same should be followed for spectrum to be assigned for space-based communication providers in any band. Any spectrum, if allocated administratively to satellite providers will disrupt level playing field amongst terrestrial and satellite based services, based on a regulatory intervention instead of its value to the consumers and society.

7. **Further, before reserving any spectrum for space based communication providers from the IMT spectrum bands, detailed opportunity cost and value analysis should be carried out before fragmenting spectrum.**

B. Norms for Auction of spectrum

1. LSA based auction of spectrum is a tested methodology and principle.

2. Even in recent auction, spectrum in mmWave band was auctioned on a LSA basis, whereas we all understand that its utility is majorly towards deployment for enterprise segment and dense areas, and no sub-LSA option was introduced. This maintained the robustness of auction process as well as level-playing field.

3. Further, providing differential treatment in spectrum assignment by categorizing services in different classes, is bound to create non-level playing field and departure from a robust auction mechanism.

4. **Therefore, the spectrum for gateway links and user links should be assigned on a LSA basis only without any categorization into different classes of services.**

5. Further, bundling of E-band (required for adequate backhaul capacity) with access spectrum was proposed during the last consultation on auction of 5G/IMT spectrum. However, no views were given by Authority in the recommendations and it stated that DoT may appropriately examine the same as such, it can be inferred that it was not accepted.

6. **Therefore, no bundled spectrum approach should be carried out for space-based communication services, to maintain consistency in the policies.**

7. The spectrum presently is assigned through auction with a validity of 20 years, which provides both certainty to the bidder as well as obligation of launch of services. Any

period lesser than 20 years, can impact competitive activity in the market and may invite fly-by-night operators, who might hoard lucrative spectrum.

8. **Therefore, the validity of spectrum should be kept at 20 years only. The spectrum for space based communication services should also be made part of annual auction, which is being done presently for IMT spectrum.**

Q23. Whether any protection distance would be required around the satellite earth station gateway to avoid interference from other satellite earth station gateways for GSO/ NGSO satellites using the same frequency band? If yes, what would be the protection distance (radius) for the protection zone for GSO/ NGSO satellites?

VIL Comments to Q. no. 23

No comments.

Q24. What should be the eligibility conditions for assignment of spectrum for each type of space-based communication service (as mentioned in the Table 1.3 of this Consultation Paper)? Among other things, please provide your inputs with respect to the following eligibility conditions:

(a) Minimum Net Worth
(b) Requirement of existing agreement with satellite operator(s)
(c) Requirement of holding license/ authorization under Unified License prior to taking part in the auction process.

Kindly justify your response.

VIL Comments to Q. no. 24

1. With regard to minimum networth as an eligibility condition for terrestrial networks, following has been specified in UL:

   The Licensee shall have a minimum Networth equal to the sum of the networth required for each Service opted by the Licensee as per Annexure-II. The requirement under this license for the combined minimum Networth shall be limited to Rs. 25 Crore (Rupees Twenty five crore only). Net worth shall be as

defined in the Companies Act 2013 and as amended from time to time. The networth of promoters/equity shareholders shall not be counted for determining the networth of the company.

Annexure-II

Details of Minimum Equity, Minimum Networth, Entry Fee, PBG, FBG and Application Processing Fee for various service authorizations

Sl No.	Service	Minimum Equity (Rs. Cr.)	Minimum Networth (Rs. Cr.)	Entry Fee (Rs. Cr.)	PBG (Rs. Cr.)	FBG (Rs. Cr.)	Application Processing Fee (Rs. Cr.)
1	UL(All services)	25.000	25.000	15.000	220.000	44.000	0.010
Service Authorization wise requirements							
1	Access Service (Telecom Circle / Metro Area)	2.500	2.500	1.000 (0.5 for NE & J&K)	10.000	2.000	0.005
2	NLD (National Area)	2.500	2.500	2.500	2.500	5.000	0.005
3	ILD (National Area)	2.500	2.500	2.500	2.500	5.000	0.005
4	VSAT (National Area)	Not Prescribed	Not Prescribed	0.300	0.500	0.300	0.005
5	PMRTS (Telecom circle/Metro)	Not Prescribed	Not Prescribed	0.005	0.010	0.010	0.0015
6	GMPCS (National Area)	2.500	2.500	1.000	2.500	1.000	0.005
7	INSAT MSS-R (National Area)	Not Prescribed	Not Prescribed	0.300	0.020	0.020	0.005
8	ISP "A" (National Area)	Not Prescribed	Not Prescribed	0.300	2.000	0.100	0.005
9	ISP "B" (Telecom circle/Metro Area)	Not Prescribed	Not Prescribed	0.020	0.100	0.010	0.0015
10	ISP "C" (SSA)	Not Prescribed	Not Prescribed	0.002	0.005	0.001	0.001
11	Resale IPLC(National Area)	2.500	2.500	1.000	2.000	1.000	0.005

2. Further, NIA issued by DoT on June 15, 2022 also lists down the eligibility criteria to participate in the Auction for terrestrial networks, as below:

3.1 Eligibility criteria to participate in the Auction

(i) Any licensee that holds a UASL/ UL with authorization for Access Services for that LSA; or

(ii) Any licensee that fulfils the eligibility criteria for obtaining a Unified License with authorization for Access Services, and gives an undertaking to obtain a Unified License with authorization for Access Services; or

(iii) Any entity that gives an undertaking to obtain a Unified License with authorization for Access Services through a New Entrant Nominee as per the DoT guidelines/ license conditions, can bid for the Spectrum in 600 MHz, 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300 MHz & 26 GHz Bands subject to other provisions of the Notice.

3. In our view, for the minimum networth or any other eligibility condition for **assignment of spectrum for each type of space-based communication service, same service, same rules, and same commercials should apply and thus, such conditions should be same across different services and should be as is applicable for the existing licensees operating terrestrial services.**

Q25. What should be the terms and conditions for assignment of frequency spectrum for both user links as well as gateway links for each type of space-based communication service? Among other things, please provide your detailed inputs with respect to roll-out obligations on space-based communication service providers. Kindly provide response for both scenarios viz. exclusive assignment and non-exclusive (shared) assignment with justification.

VIL Comments to Q. no. 25

1. Given the fact that spectrum is a limited resource, it becomes essential to ensure that the available spectrum is put to efficient use. In such a market if roll out obligations are not defined for the spectrum that is purchased in auction, it may result in licensees buying the spectrum in auction and hoarding it to realize speculative gains at later stage.

2. TRAI in its Recommendations on "Auction of Spectrum in frequency bands identified for IMT/5G" dated April 11, 2022 had stated as below:

   Since 24.25-28.5 GHz band is likely to be used for 5G in India, to maintain level playing field, it will be appropriate that minimum roll-out obligations specified are made applicable for both the existing as well as the new operators.

3. Hence, we would like to submit that roll-out obligations as mandated for the spectrum assigned to the TSPs, should be mandated for non-terrestrial networks as well. Spectrum being a finite and valuable resource, every spectrum holder should be obliged equally to discharge its duty to the society at large.

Q26. Whether the provisions contained in the Chapter-VII (Spectrum Allotment and Use) of Unified License relating to restriction on crossholding of equity should also be made applicable for satellite-based service licensees? If yes, whether these provisions should be made applicable for each type of service separately? Kindly justify your response.

VIL Comments to Q. no. 26

1. As per the Chapter-VII (Spectrum Allotment and Use) of Unified License,

   In the event of holding/obtaining Access spectrum, no licensee or its promoter(s) directly or indirectly shall have any beneficial interest in another licensee company holding "Access Spectrum" in the same service area.
   For the purpose of this clause:
   (a) Promoter shall mean legal entity other than Central Government, financial institutions and scheduled banks, which hold 10% or more equity in the licensee company.
   (b) Beneficial interest shall mean holding of any equity directly or indirectly including through chain of companies in the licensee company.
   (c) Any arrangement contrary to above shall be made consistent with the above stipulations within a period of one year from the date of grant of UL.
   (d) Exception granted in para 1.4 of UAS licensee in respect of basic and CMTS licenses existing on 11.11.2003 shall end on the expiry of CMTS/UAS/Basic Service license held by such licensee. They shall comply with the above stipulation within a period of one year from the date of migration to UL.

2. These conditions are necessity as it takes care of possibility of anti-competitive activities, which could happen due to common promoters in different license companies holding access spectrum.

3. **In our view, the licensing norms should continue to be robust enough and should provide a common restriction, to be applicable jointly for spectrum for space-based communication services as well as present access spectrum.**

Q27. Keeping in view the provisions of ITU's Radio Regulations on coexistence of terrestrial services and space-based communication services for sharing of same frequency range, do you foresee any challenges in ensuring interference-free operation of space-based communication network and terrestrial networks (i.e., microwave access (MWA) and microwave backbone (MWB) point to point links) using the same frequency range in the

same geographical area? What could be the measures to mitigate such challenges? Suggestions may kindly be made with justification.

VIL Comments to Q. no. 27

1. Interference-free operation of space-based communication network and terrestrial networks (i.e., microwave access (MWA) and microwave backbone (MWB) point to point links) using the same frequency range in the same geographical area seems challenging. In case any TSP owns and shares the frequency with any satellite provider, this will lead to interference.

2. The conditions of co-existence between Terrestrial and Satellite based communications are very specific to bands. For bands where IMT is the terrestrial service and if it is expected to co-exist, the corresponding ITU-R regulatory conditions to be followed.

3. For cases where satellite-services are expected to co-exist with FS links, the requirements depend on the satellite uplink/downlink and specific to frequency bands. Unlike mmWave where propagation from IMT base stations are expected to be limited, fixed services utilize high gain antenna in ranges where space communication spectrum allocation is being considered.

4. We would like to recommend avoiding the spectrum ranges which are presently being used by fixed services as interference mitigation can be challenging depending on band or type of MWA deployments in the band.

5. In addition, current deployed telecom network infrastructure is highly dependent on the access microwave links due to low fiber presence. The services would be highly impacted in case the existing fixed Access MW links are not protected.

6. **Therefore, we would strongly urge the Authority that the spectrum bands allocated to TSPs for backhaul, should be protected for use by existing TSPs with terrestrial networks, along with sufficient guard band.**

Q28. In what manner should the practice of assignment of a frequency range in two polarizations should be taken into account in the present exercise for assignment and valuation of spectrum? Kindly justify your response.

VIL Comments to Q. no. 28

1. The existing practice of assignment/allocation and evaluation of spectrum shall continue to be considered.

2. Using more than one polarization boosts the efficiency of the allotted spectrum which is a scarce resource and any efforts to improve on the spectrum efficiency should be encouraged.

Q29. What could be the likely issues, that may arise, if the following auction design models (described in para 3.127 to 3.139) are implemented for assignment of spectrum for user links in higher bands (such as C band, Ku band and Ka band)?

a. Model #1: Exclusive spectrum assignment
b. Model#2: Auction design model based on non-exclusive spectrum assignment to only a limited number of bidders

What changes should be made in the above models to mitigate any possible issues, including ways and means to ensure competitive bidding? Response on each model may kindly be made with justification.

And

Q30. In your opinion, which of the two models mentioned in Question 29 above, should be used? Kindly justify your response.

And

Q31. In case it is decided to assign spectrum for user links using model # 2 i.e., non-exclusive spectrum assignment to limited bidders (n+ Δ), then what should be

(a) the value of Δ, in case it is decided to conduct a combined auction for all services
(b) the values of Δ, in case it is decided to conduct separate auction for each type of service
Please provide detailed justification.

VIL Comments to Q. no. 29 – 31

1. **Model #1: Exclusive spectrum assignment as mentioned in the TRAI Consultation Paper in para 3.127 states:**

   Spectrum assignment on exclusive basis, wherein satellite spectrum bands, excluding the spectrum range which will be decided to be permitted with flexible use, can be split into a number of blocks basis total bandwidth available and bandwidth requirement for each class of services. Spectrum cap can be defined in terms of number of blocks. Satellite spectrum may be auctioned in blocks in a manner similar to the auction of IMT spectrum with spectrum cap.

2. **We recommend model#1 i.e. exclusive spectrum assignment to be implemented for assignment of spectrum for space based communication services (irrespective of the spectrum bands), similar to the auction of the IMT spectrum.**

3. Spectrum caps are vital to implement competition framework in communications markets, to help ensure that a single licensee or couple of licensees are not able to acquire almost all spectrum on offer, rendering entry of new/additional licensee as infeasible.

4. **Therefore, prescribing spectrum cap is a prerequisite to prevent large holdings of spectrum taken by one or couple of licensees, which will lead to concerns of inadequate competition in the market.**

Q32. Kindly suggest any other auction design model(s) for user links including the terms and conditions? Kindly provide a detailed response with justification as to how it will satisfy the requirement of fair auction i.e., market discovery of price.

VIL Comments to Q. no. 32

We recommend assignment of spectrum using model #1 as mentioned in question no. 29. Kindly refer to our comments to question no. 29 and 30.

Q33. What could be the likely issues, that may arise, if Option # 1: (Area specific assignment of gateway spectrum on administrative basis) is implemented for assignment of spectrum for gateway links? What changes could be made in the proposed option to mitigate any possible issues?

And

Q34. What could be the likely issues, that may arise, if Option # 2: Assignment of gateway spectrum through auction for identified areas/ regions/ districts is implemented for assignment of spectrum for gateway links? What changes could be made in the proposed option to mitigate any possible issues? In what manner, areas/ regions/ districts should be identified?

And

Q35. In your view, which spectrum assignment option for gateway links should be implemented? Kindly justify your response.

And

Q36. Kindly suggest any other auction design model(s) for gateway links including the terms and conditions? Kindly provide a detailed response with justification as to how it will satisfy the requirement of fair auction i.e., market discovery of price?

And

Q37. Any other issues/suggestions relevant to the subject, may be submitted with proper explanation and justification.

And

Q38. In case it is decided for assignment of spectrum on administrative basis, what should be the spectrum charging mechanism for assignment of spectrum for space-based communications services

i. For User Link
ii. For Gateway Link

Please support your answer with detailed justification.

VIL Comments to Q. no. 33 – 38

1. **As submitted in our comments to various questions above, we would like to reiterate that any future assignment of spectrum should be done only through auction and on LSA basis.**

2. By adopting Option-1, there could be some short term concerns for 1-2 years related to allocation for a LSA etc. however, spectrum's commercial assignment can't be looked at from a short term perspective as the services are substitutable to present terrestrial mobile service and its ecosystem can be expected to improve in longer term making its business case strong. Also, the concerns of user links and gateway links being separate, can be taken care off by allowing spectrum trading, sharing and leasing.

3. **Thus, from a longer term perspective where space based communication services would co-exist with terrestrial communication services, the spectrum must be assigned through a fair and transparent auction with pricing as per TRAI's earlier adopted methodologies and on a LSA basis only.**

Q39. Should the auction determined prices of spectrum bands for IMT /5G services be used as a basis for valuation of space-based communication spectrum bands

i. For user link

ii. For gateway link

Please support your answer with detailed justification.

And

Q40. If response to the above question is yes, please specify the detailed methodology to be used in this regard?

And

Q41. Whether the value of space-based communication spectrum bands

i. For user link

ii. For gateway link

be derived by relating it to the value of other bands by using a spectral efficiency factor? If yes, with which spectrum bands should these bands be related to and what efficiency factor or formula should be used? Please support your response with detailed justification.

And

Q42. In case of an auction, should the current method of levying spectrum fees/charges for satellite spectrum bands on formula basis/ AGR basis as followed by DoT, serve as a basis for the purpose of valuation of satellite spectrum

i. For user link

ii. For gateway link

If yes, please specify in detail what methodology may be used in this regard.

And

Q43. Should revenue surplus model be used for the valuation of space-based spectrum bands

i. For user link
ii. For gateway link

Please support your answer with detailed justification.

And

Q44. Whether international benchmarking by comparing the auction determined prices of countries where auctions have been concluded for space-based communication services, if any, be used for arriving at the value of space-based communication spectrum bands:

i. For user link
ii. For gateway link

If yes, what methodology should be followed in this regard? Please give country-wise details of auctions including the spectrum band/quantity put to auction, quantity bid, reserve price, auction determined price etc. Please support your response with detailed justification.

And

Q45. Should the international administrative spectrum charges/fees serve as a basis/technique for the purpose of valuation in the case of satellite spectrum bands

i. For user link
ii. For gateway link

Please give country-wise details of administrative price being charged for each spectrum band. Please specify in detail terms and conditions in this regard.

And

Q46. If the answer to above question is yes, should the administrative spectrum charges/fees be normalized for cross country differences? If yes, please specify in detail the methodology to be used in this regard?

And

Q47. Apart from the approaches highlighted above which other valuation approaches can be adopted for the valuation of space-based communication spectrum bands? Please

support your suggestions with detailed methodology, related assumptions and other relevant factors.

And

Q48. Should the valuation arrived for spectrum for user link be used for valuation for spectrum for gateway links as well? Please justify.

And

Q49. If the answer to the above is no, what should be the basis for distinction as well as the methodology that may be used for arriving at the valuation of satellite spectrum for gateway links? Please provide detailed justification.

And

Q50. Whether the value arrived at by using any single valuation approach for a particular spectrum band should be taken as the appropriate value of that band? If yes, please suggest which single approach/ method should be used. Please support your answer with detailed justification.

And

Q51. In case your response to the above question is negative, will it be appropriate to take the average valuation (simple mean) of the valuations obtained through the different approaches attempted for valuation of a particular spectrum band, or some other approach like taking weighted mean, median etc. should be followed? Please support your answer with detailed justification.

VIL Comments to Q. no. 39 – 51

1. **Spectrum assignment methodology:** We reiterate that any spectrum being considered for allocation, should be only through a transparent and fair auction, which provides equal chance of participation to all stakeholders.

2. **Valuation exercise:**

    a. Many a times Authority has dealt with new spectrum bands for which any historical auction data is not available. It has also been seen that certain spectrum bands deployment also show NIL incremental revenue growth.

b. Despite all such constraints, Authority has consistently been able to put forth valuation for different bands based on various valuation methodologies like auction determined prices (duly indexed), technical efficiency method and other valuation models like Multiple regression model etc., depending upon availability of information in respective spectrum bands.

c. While VIL supported incremental revenue based model during last consultation on Auction of 5G/IMT spectrum however, same was not accepted by TRAI while making recommendations.

d. Since 2013, the Authority has been conducting spectrum valuation by taking the simple mean of the valuations obtained from the various valuation approaches, on the assumption of equal probability of occurrence of each valuation approach. Related extract of TRAI's recommendations dated 11.04.2022 is given below:

3.57 It has been the Authority's position over the years that the various approaches used in the valuation of different spectrum bands have their respective merits and constraints. ***Rather than relying on one valuation approach, it is prudent and rational to rely on a number of approaches to arrive at the final valuation.*** *It is not possible to claim deterministically that any one of these models/ approaches is absolutely the right approach to arrive at the valuation, since no single approach can completely and exactly capture every variable that influences the valuation of spectrum.*

3.61 The Authority has carefully considered the comments of the stakeholders. The Authority is inclined to continue with its consistent and considered view that it is not possible to say deterministically that any one methodology/ approach is the right method for determining the value of spectrum in various bands. *Each method/ approach/ model has certain strengths as well as limitations. Some models capture intrinsic technical features better, whereas others are based on economic and market realities. No particular model completely captures every variable related to technical, economic, sectoral, geographic and regulatory realms that influence the valuation of spectrum.* ***Equally, as stated earlier, it is not possible to model the complete range of possible valuations, as the non-availability of relevant data is a binding constraint.***

3.62 Since September, 2013, the Authority has been conducting spectrum valuation by taking the simple mean of the valuations obtained from the various valuation approaches, on the assumption of equal probability of occurrence of each valuation approach.

e. Further, in case of a new spectrum band i.e. 3300-3670 spectrum band, the valuation was arrived as equivalent to 30% of average valuation of 1800 MHz spectrum band.

f. We understand that there are international examples of administrative assignment of spectrum for satellite based services. However, it cannot be a reason to completely discard an existing transparent and fair auction mechanism being held in India, for spectrum pricing and assignment.

g. Conducting an auction for spectrum assignment for space-based communication services would be aligned with the Hon'ble Supreme Court Judgment as well as Authority's consistent position on valuation and spectrum allocation through auction.

h. To maintain level playing field and to ensure certainty in regulatory principles and policies, it is imperative that valuation exercise is done by TRAI for the spectrum for space based communication services, as has been consistently being done during the last decade.

i. This valuation exercise should be based on spectral efficiency of the spectrum band being auctioned as compared to an existing auctioned spectrum band. The valuation of spectrum should be done basis the empirical data and auction determined price of already auctioned spectrum.

j. Also, the pricing for spectrum should be in correlation with the recent auction prices and should be on licensed service area wise basis only.

3. Further, the telecom industry is moving towards technology neutral usage of spectrum, allowing TSPs to deploy new services/ multiple technologies within the same spectrum band. The TSPs are given the freedom to provide access services using any technology in any of the spectrum bands acquired by them through auction. There are certain innovative technologies[3] being developed globally, which allows further optimum use of the spectrum being deployed over terrestrial network, to be used for space based communication services as well. **Accordingly, any spectrum auctioned so far or being put to auction in future, should be made truly technology neutral i.e. for terrestrial or space based communication services.**

[3] https://ast-science.com/spacemobile-network/

4. **Considering all above, we urge the Authority that consistency should be ensured in all principles and policies for determination of valuation of spectrum band for commercial entities. The valuation models and approaches being used over the last decade for spectrum for terrestrial networks, should also be considered for user links and gateway links.**

Q52. Should the reserve price for spectrum for user link and gateway link be taken as 70% of the valuation of spectrum for shared as well as for exclusive assignment? If not, then what ratio should be adopted between the reserve price for the auction and the valuation of the spectrum in different spectrum bands in case of (i) exclusive (ii) shared assignment and why? Please support your answer with detailed justification.

VIL Comments to Q. no. 52

1. The Authority in its recommendations on "Auction of Spectrum in frequency bands identified for IMT/5G" dated April 11, 2022 recommended that the reserve price for the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2500 MHz bands should be set as follows:

   a*) At 70% of the average valuation;*
   b) In the LSAs where spectrum in a band was completely sold in the March, 2021 auction, the reserve price shall be the higher of the two figures – (1) 70% of the average valuation; and (2) auction determined price of the March, 2021 auction, duly indexed.

2. **It is to be noted that while many stakeholders including all three private access TSPs recommended reserve price at 50%, TRAI recommended 70% citing that such price would go a long way in helping discover the market clearing price of the spectrum. Also, the Authority was of the view that a reserve price set at the level of 70% of average valuation in view of the context of the 2022 auctions, will ensure healthy competition, leading to the discovery of the true market price.**

3. It has been realized over the years that high reserve price may discourage competitiveness of the auction and low participation leading to low sales and revenue. Also, on the other hand, too low a reserve price may hamper the realization of the true value of the underlying asset by incentivizing collusive behavior among participants.

4. A balanced intermediate reserve price satisfies the basic objectives of reserve price setting viz., ensuring realization of the underlying value of the asset being auctioned and

deterring collusive behavior among bidders. Further, in order to ensure competitive bidding and price discovery, the reserve price should not be too close to the expected/predicted valuation of the object put up for auction. The level at which reserve prices are set has implications for each of the objectives normally set for spectrum auctions: efficiency, competition, transparency, market development, and Government revenue.

5. We understand that there have been enough deliberations and reserve price of 70% was set as an optimal level to ensure efficiency of the auction process and has been exercised in the recent auctions.

6. **Considering above, the reserve price of spectrum for user links and gateway links should be set at 70% of the valuation of spectrum, as has been recommended by Authority during last recommendations dated 11.04.2022.**

Q53. If it is decided to conduct separate auctions for different class of services, should reserve price for the auction of spectrum for each service class be distinct? If yes, on what parameter basis such as revenue, subscriber base etc. this distinction be made? Please support your answer with detailed justification for each class of service.

VIL Comments to Q. no. 53

We support technology neutral and service neutral auction of spectrum, to ensure optimum utilization of this finite resource as well as full benefits of spectrum reaching the end consumers.

Q54. In case of auction based and/or administrative assignment of spectrum, what should the payment terms and associated conditions for the assignment of spectrum for space-based communication services relating to:

i. Upfront payment
ii. Moratorium period
iii. Total number of installments to recover deferred payments
iv. Rate of discount in respect of deferred payment and prepayment

Please support your answer with detailed justification.

VIL Comments to Q. no. 54

1. TRAI, in its last recommendations i.e. on "Auction of Spectrum in frequency bands identified for IMT/5G" dated April 11, 2022 had recommended the following flexible payment options:

    a. ***Option I:*** *Full or part upfront payment of the bid amount within 10 days of declaration of final price;*
    Where part upfront payment has been made, the buyer shall have the option of availing moratorium for the proportionate number of years for which the upfront payment has been made, and the balance amount shall be payable in equal annual instalments over the remaining period in advance at the beginning of the year, after the period of moratorium if any (duly protecting the net present value of the bid amount at the applicable rate of interest); the annual instalments shall become due and payable on the same date of each year.

    b. ***Option II:*** *Payment of 30 equal annual instalments of the bid amount (duly protecting the net present value of the bid amount at the applicable rate of interest) in advance at the beginning of the year, the first instalment becoming payable within 10 days of declaration of final price. The balance 29 instalments shall become due and payable on the same date of each following year.*

    (The Authority noted that the recent reform package announced by the Government had, inter alia, increased the duration of assignment of spectrum from 20 years to 30 years.)

2. While recommending these options, the Authority mentioned being cognizant of the need for the long-term growth and sustainability of the telecom sector, infusing liquidity and encouraging investment, and the need for TSPs to be in good health so as to make regular and substantial capital expenditure for transitioning to 5G technology.

3. In the NIA dated June 15, 2022, DoT provided the following two options to successful Bidders to make the payment:

    Option 1: *Full or part upfront payment of the bid amount within 10 days of declaration of final price. Where part upfront payment has been made, which can be a multiple of complete years with a minimum of two years, the buyer shall have the option of availing moratorium for the corresponding number of years for which the upfront payment has been made, and the balance amount shall be payable in equal annual instalments over the remaining period, payable in advance at the beginning of each year, after the period of moratorium if any, duly protecting the Net Present Value (NPV) of the bid amount at the applicable rate of interest. The*

annual instalments shall become due and payable on the Effective Date anniversary of each following year.

Option 2: *Payment of 20 equal annual instalments of the bid amount, duly protecting the NPV of the bid amount at the applicable rate of interest, in advance at the beginning of the year, the first instalment becoming payable within 10 days of declaration of final price. The balance 19 instalments shall become due and payable on the Effective Date anniversary of each following year.*

(Option 2 considered 20 equal annual instalments as the validity period of right to use of the spectrum in 600 MHz, 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300 MHz and 26 GHz bands won in the auction shall be twenty (20) years from the 'Effective Date' as per NIA)

4. **As submitted in comments to above questions, we request the Authority to maintain consistent policies and ensure level playing field as such, the payment options and terms and conditions should be same as has been provided under the NIA 2022 as well as TRAI's recommendations dated 11.04.2022.**

x ---------- End of Document ---------- x