PHD CHAMBER
OF COMMERCE AND INDUSTRY

Saurabh Sanyal
CEO & Secretary General

1st June 2023

Subject – Industry Comments on TRAI Consultation Paper on "Assignment of Spectrum for Space-based Communication Services"

Dear Sh. Trivedi Ji,

PHD Chamber of Commerce and Industry (PHDCCI) has been working as a catalyst for the promotion of Indian industry, trade and entrepreneurship for the past 118 years. It is a forward-looking, proactive and dynamic PAN-India apex organization. As a partner in progress with industry and government, PHDCCI works at the grassroots level with strong national and international linkages for propelling progress, harmony and integrated development of the Indian economy.

PHDCCI, acting as the "Voice of Industry & Trade" reaching out to more than 1, 50,000 large, medium and small industries, has forged ahead leveraging its legacy with industry knowledge across multiple sectors to take the Indian Economy to the next level. At the global level, we have been working with the Embassies and High Commissions in India and overseas to bring in the International Best Practices and Business Opportunities.'

This is with reference to TRAI Consultation Paper No 6/2023 dated 06-Apr-2023 on "Assignment of Spectrum for Space-based Communication Services"

In this regard, please find enclosed the consolidated issue-wise response on behalf of the industry as **Annexure-1** for your kind perusal.

We request you to kindly take on record our response and consider the same while finalising the recommendations.

With best regards,

Yours Sincerely,

(**Saurabh Sanyal**)

Shri Akhilesh Kumar Trivedi,
Advisor (Networks, Spectrum and Licensing),
Telecom Regulatory Authority of India
New Delhi - 110002

PHD CHAMBER OF COMMERCE AND INDUSTRY (PHDCCI) RESPONSE TO TRAI CONSULTATION PAPER ON "ASSIGNMENT OF SPECTRUM FOR SPACE-BASED COMMUNICATION SERVICES"

PREAMBLE

1. Over the past decade, Digital Inclusion has emerged as a significant priority for the country, serving as a vital medium for the delivery of diverse services ranging from knowledge dissemination and governance to e-education, e-commerce, and financial services. As a result, the telecommunications sector holds a crucial strategic position, demanding the utmost attention of policymakers in order to foster an enabling environment that promotes the adoption of new technologies and attracts fresh investments into the sector.

2. While technological adoption is an inherent progression, and service providers continuously embrace new technologies to stay competitive in the market, **attracting investments necessitates a foundation of regulatory certainty within the sector**. Such certainty assures investors that their investments will not be undermined by arbitrary policy changes, and they will retain access to vital resources and means essential for their services. To foster the competitiveness and growth of the space based communication services, it is imperative to establish a clear, stable, and predictable regulatory framework. This framework should provide a conducive environment that enables service providers to efficiently utilize spectrum resources while ensuring interference-free operations.

3. As with any infrastructure sector, telecommunications demands significant capital investment and relies on long-term access to resources in order to realize returns on investments. Therefore, ensuring long-term access to resources serves as a crucial motivator for investors to continue investing in the sector.

4. Spectrum represents a crucial resource for wireless networks, particularly in the realm of cellular mobile services where its assignment is carried out through auctions. The adoption of auction-based spectrum assignment has been a well-considered process, grounded in principles of transparency, non-discrimination, and the pursuit of the common good. This approach is reinforced by the legal framework, as established by the Supreme Court's ruling in the 2G spectrum case, affirming that the allocation of scarce natural resources should be conducted through auctions.

5. Under the auction-based assignment regime, significant advancements have been made in cellular mobile services, and service providers are approaching a nationwide rollout of 5G technology, placing the country on par with the rest of the world. The progress observed in cellular mobile services underscores the fact that **a transparent and non-discriminatory auction process, facilitating long-term spectrum assignments, fosters regulatory certainty and encourages increased investments in the sector.**

6. Therefore, this consultation marks a significant milestone in the space communication sector as it provides an opportunity to move away from the current practice of administratively assigning spectrum based on a first-come-first-serve approach. This

approach can raise legitimate concerns regarding transparency and potential discrimination.

7. The **timing of this consultation also aligns with groundbreaking innovations such as Non-Geostationary Satellites and Very High Throughput Satellites, which introduce new capabilities to space communication services and enable them to render direct service to retail consumers at their homes and on their mobile devices, while on the move**.

8. The **DoT has referred the matter to TRAI, seeking recommendations on the modalities of conducting auctions for space-based communication services**. However, The reference **does not explore the possibility of administrative assignment versus auction-based assignment.**

9. **The inclusion of administrative assignment of spectrum, as suggested in the queries presented in the Consultation Paper, contradicts the legal position established by the Honourable Supreme Court in our country. The court has explicitly mandated auctions as the designated method for assigning scarce natural resources like spectrum. Any departure from this established principle will raise concerns regarding transparency and the potential for discrimination, issues that were specifically addressed by the Honourable Supreme Court through its judgment.**

10. **Considering the context of the DoT's reference, the technological advancements in space communication services, the merits of auction-based assignments, and the prevailing legal position in India, it is imperative that spectrum for space communication services be assigned exclusively through auctions.**

11. Apart from its benefits for space communication services, **the adoption of auction-based assignments will also establish regulatory parity between cellular mobile services in terms of spectrum assignment.** This is essential given the current state of technological advancements, where space communication services and terrestrial services have reached a comparable level. Both **sectors not only compete in the market for the same consumers but also contend for the same spectrum bands**. The 3GPP framework, which governs the standards for cellular mobile networks, has found a way to utilize higher frequency bands for mobile cellular services. Historically, satellites have primarily occupied these higher frequency spectrum bands

12. Similar developments have already begun to unfold in other markets, and it is only a matter of time before they are witnessed in India as well. Therefore, it is logical **to establish a unified spectrum assignment methodology, namely auctions, for both terrestrial and space communication networks**. Furthermore, **allowing for a flexible and neutral use of spectrum, where multiple networks can simultaneously utilize the same spectrum, regardless of the technology employed, will ensure efficient spectrum utilization**. This approach will also promote fair competition, innovation, and ultimately enhance the overall efficiency of spectrum allocation.

13. **The practice of sharing spectrum among service providers through market-based mutual agreements has also proven to enhance efficiency in spectrum utilization**. This approach has been successfully implemented in terrestrial networks and has been widely accepted by service providers who willingly engage in spectrum sharing based on their mutual interests and technical feasibility. Extending this approach to the space communication sector would provide similar benefits, granting service providers the freedom to enter into agreements based on their specific requirements while relieving the government of the obligation to facilitate or mediate in these spectrum-sharing arrangements.

ISSUE WISE RESPONSES

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.

Response:-

The lessons learned from spectrum auctions for cellular networks indicate that the following approach should be adopted:

a. **Auction all available spectrum**: By auctioning all available spectrum, artificial scarcity is avoided, and service providers are discouraged from engaging in irrational bidding. This approach helps to save costs and allows for faster and more extensive network rollouts, ultimately benefiting consumers.

b. **Technology neutrality:** Allowing technology-neutral use of spectrum enables multiple networks to simultaneously utilize the same frequency, and it also permits service providers to repurpose the spectrum for advanced technologies during the assigned spectrum term.

Based on these considerations, it is suggested to auction all available spectrum bands for technology-neutral use. This approach promotes flexibility for service providers and maximizes the efficient utilization of spectrum resources. By decoupling the spectrum from specific service types or technologies, service providers are empowered to innovate and adapt to changing market demands. Auctioning spectrum on a technology-neutral basis encourages competition and allows service providers to choose the most appropriate technology and service offering for their business models.

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)										

Response:-

As indicated in the response to Question 1, **the spectrum that is assigned to service providers in the auctions should be open for deployment of any technology or network**. This technology-neutral approach allows service providers the flexibility to utilize the spectrum in a manner that best suits their requirements and promotes innovation in the telecommunications sector.

Additionally, it is imperative to auction all available spectrum without the need to estimate the demand for spectrum across various services. By adopting this approach, market-driven forces can naturally guide the auction process, leading to optimal utilization of spectrum and facilitating rational bidding by the service providers. This ensures that the allocation of spectrum aligns with the actual demand and promotes efficient use of this valuable resource.

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.

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.

Response:-

The exclusive assignment of spectrum through auctions is vital for ensuring interference-free operations in both space-based communication services and terrestrial services. While these two types of networks may appear different, they are governed by the same underlying principles that govern wireless networks.

In the case of NGSO constellations, where there can be thousands of satellites within each constellation, the shared use of spectrum among multiple constellations becomes highly complex. Therefore, it is essential to adopt an auction-based approach and assign segmented spectrum for exclusive use by service providers. It is worth noting that while some stakeholders may argue for spectrum sharing in space-based communication services, the reality is that these services require the same level of exclusive spectrum assignment as terrestrial services. Any form of sharing, if technically feasible, must be facilitated through mutual agreements between service providers who have obtained exclusive spectrum rights through auctions.

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.

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.

or

(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.

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?

Response:-

The following is regarding the broad framework that needs to be adopted for assignment of user links and gateway links through auction:

a. **Exclusive Use of Spectrum for User Links:**
   It is recommended that the spectrum be assigned exclusively to service providers through auctions. In the case of NGSO satellites, due to the movement of a large number of satellites, sharing the spectrum between two NGSO systems becomes challenging. Therefore, a pragmatic approach is **to divide the spectrum into smaller portions and assign them for the exclusive use of service providers. However, if service providers decide to share the spectrum after considering the technical and business aspects, they should be free to do so. The government will not play any role in this sharing arrangement as the rights to use these spectrum segments have already been assigned to the respective service providers.**

In the case of GSO satellites, a similar approach should be adopted with a slight change. Two satellites in GSO can share the same frequency when they are positioned at a minimum angular separation. This aspect is also mentioned in the consultation paper. Therefore, **in the case of GSO, segments of spectrum can be auctioned for exclusive use by service providers, but the same segment can also be auctioned for exclusive use by other satellites positioned at some angular separation, enabling the reuse of the same frequency by various GSO satellites**.

b. **Exclusive Use of Spectrum for Gateway Links:**
Gateway links serve as the fundamental infrastructure of satellite networks, requiring a larger bandwidth compared to user links as they handle the traffic of multiple user links. Due to this demand, **gateway links may necessitate the entire spectrum within a specific band but limited to a particular region/district**. Consequently, it is crucial to allocate the entire spectrum within a band to service providers for gateway links and frequencies can be auctioned for gateway link zones situated in different locations. These designated zones will be excluded from serving user links, ensuring that they are dedicated solely to supporting gateway functions. The protection distance may be finalized by WPC for gateways operating in different spectrum bands.

Due to the different spectrum requirements and process of allocation the frequencies for user and gateway, the spectrum assignment should be conducted separately to give flexibility to the bidders for selecting the frequency blocks in auction.

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.

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.

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.

Response:-

The proposed framework should support the entry of new service providers by allowing existing service providers, who have acquired spectrum through auctions, to share trade or lease the spectrum with/to new entrants, taking into account technical considerations. Market forces should drive this sharing arrangement. Needless to mention, the new service provider seeking such sharing/leasing/trading with existing service provider should hold valid service license.

The government has already made the decision to conduct spectrum auctions on an annual basis, which should adequately meet the requirements of new entrants or for the existing players to migrate to new frequencies upon requirement. To incentivize service providers and enable them to realize returns on their infrastructure investments, the spectrum assignment period should align with the current 20-year period applicable to terrestrial services.

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.

Response:-

The allocation of frequency spots within a band should be based on the final ranking of bidders in the auction process. The bidder with the highest rank should have the priority to secure their preferred frequency slot in the band, followed by the bidder with the second-highest rank, and so on.

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.

Response:-

We do not agree for assigning the spectrum on non-exclusive basis. The higher frequency bands such as C band, Ku band, Ka band and other bands put to auction should be assigned through auction process.

To ensure efficient utilization of spectrum assigned through auction, it is crucial to allow service providers to enter into sharing agreements with each other. This approach encourages optimal resource allocation and facilitates innovation within the industry. The sharing of spectrum resource maximizes the utilization of available spectrum for the sector and promotes a more efficient use of the allocated frequencies. Hence, the auction design should empower the successful bidder to share their spectrum holdings with other service licensees.

This sharing provision allows for greater flexibility and enables the successful bidder to leverage their spectrum resources for optimum utilization and foster partnerships and synergies within the industry and to provide improved quality of services to customers.

The Government plays a crucial role in establishing appropriate sharing guidelines for satellite services, facilitating effective coordination between parties involved. It is important to develop a framework that allows for mutual compliance with these sharing guidelines, enabling seamless sharing of spectrum resources.

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.

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.

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.

Response:-

The questions raised in the context clearly emphasize the frequency overlap in 27.5-28.5 GHz and 28.5-29.5 GHz between IMT/CNPN and satellite-based services. This overlap necessitates the assignment of these frequencies through an auction process to service providers, enabling the utilization of these frequencies for both IMT/CNPN and satellite-based services.

The usage of these frequencies for both IMT/CNPN and satellite-based services by the service providers offers numerous benefits. It promotes efficient spectrum utilization by allowing multiple services to operate in the same frequency bands in flexible manner, thereby maximizing the use of scarce resources. Additionally, it facilitates technological advancements, innovation, and the introduction of services by many players in both the terrestrial and satellite domains.

Any interference issues resulting from spectrum usage on flexible use between terrestrial and satellite networks should solely be mitigated by the services providers. In case of the spectrum sharing, the parties in agreement should resolve the interference issues through mutual coordination basis.

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.

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.

Response:-

Referring to the detailed background provided in the preamble of this response, it is evident that the **auction-based assignment of spectrum is the recommended approach for space-based communication services**. The administrative assignment of spectrum has not been included in the DoT's reference. Therefore, the queries related to administrative assignment of spectrum fall outside the purview of this consultative exercise.

The inclusion of administrative assignment of spectrum, as suggested in the queries presented in the Consultation Paper, contradicts the legal position established by the Hon'ble Supreme Court of India which held that – a) spectrum is a natural resource and b) auctions is the best way for allocation of natural resources. In Union of India & Ors. v. Centre for Public Interest Litigation [Writ Petition (Civil) No. 423 OF 2010], it was held that "*Spectrum has been internationally accepted as a scarce, finite and renewable natural resource which is susceptible to degradation in case of inefficient utilisation".* It was also held that "*Natural resources belong to the people but the State legally owns them on behalf of its people and from that point of view natural resources are considered as national assets, more so because the State benefits immensely from their value. The State is empowered to distribute natural resources. However, as they constitute public property/national asset, while distributing natural resources, the State is bound to act in consonance with the principles of equality and public trust and ensure that no action is taken which may be detrimental to public interest."*

The Court has further held "*In our view, a duly publicised auction conducted fairly and impartially is perhaps the best method for discharging this burden and the methods like first-come-first-served when used for alienation of natural resources/public property are likely to be misused by unscrupulous people who are only interested in garnering maximum financial benefit and have no respect for the constitutional ethos and values. In other words, while transferring or alienating the natural resources, the State is duty bound to adopt the method of auction by giving wide publicity so that all eligible persons can participate in the process."*

The court has explicitly mandated auctions as the designated method for assigning scarce natural resources like spectrum. Any departure from this established principle will raise concerns regarding transparency and the potential for discrimination, issues that were specifically addressed by the Honourable Supreme Court through its judgment.

Therefore, considering the context described in preamble, including DoT's reference, the advancements in space communication services, the advantages of auction-based

assignments, and the prevailing legal position in India, it becomes crucial to **exclusively assign spectrum for space communication services through auctions**. This approach ensures transparency, fairness, and efficient utilization of spectrum resources in line with the evolving needs of the sector.

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

Response:-

The satellite service providers offer Pan-India coverage, enabling them to reach and serve users across the entire country. Given the extensive coverage capabilities of satellite networks, it is therefore essential that the auction process for user link spectrum should be assigned to service providers on national level. This approach recognizes the need for seamless connectivity and access to satellite services throughout the country, irrespective of circle/metro wise boundaries.

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.

Response:-

As mentioned in the previous response to Q1, it is crucial to allow service providers the flexibility to utilize the spectrum assigned through auctions for any type of service. By enabling service providers to offer a wide range of services, the auction process promotes innovation, fosters competition, and ensures efficient utilization of spectrum resources. Granting service providers the freedom to provide any type of service aligns with the principles of technology neutrality and promotes efficient utilization of spectrum resources.

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.

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.

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?

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?

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

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?

Response:-

As mentioned in the previous response to Q5, the gateway link spectrum should be assigned through auction for the identified gateway locations situated in different areas/regions/ districts. The consultation paper highlighted that separate auction of identified locations could result in a situation where a service licensee who has acquired spectrum for user links through auction, may not be able to acquire spectrum at the desired location(s) for gateway links.

However, this is not true since, the gateway location would be isolated zones and the entire spectrum in band can be made available to the service provider through auction process at the identified gateway location. In these exclusion zone, the user links may not be permitted for use to avoid interference to the gateway terminal.

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.

Response:-

The consultation paper rightly highlighted that in case flexible use spectrum is assigned to Access service licensee, some mechanism may have to be put in place such that another entity of the same group with relevant license could also use the same spectrum for providing satellite-based services. The access service licensee who obtains the right to use of the flexible use spectrum may lease the said spectrum to another company of the same group having the requisite license/ authorization.

Hence, the spectrum assigned to service provider through auction should be permitted to be shared between other service providers operating under the same parent organization without any restrictions on crossholding of equity.

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.

Response:-

The assignment of spectrum for satellite services should be conducted through an exclusive spectrum assignment i.e Model #1, as it offers several advantages in terms of legal clarity and efficient utilization by service providers.

Under the exclusive spectrum assignment model, specific frequency bands are allocated to individual service providers, granting them exclusive rights to use the assigned spectrum. This exclusive access ensures that service providers have full control over the spectrum resources, allowing them to plan and optimize their networks accordingly.

By adopting an exclusive assignment model, potential legal issues and conflicts arising from shared or non-exclusive spectrum usage can be avoided. Exclusive assignment provides clear ownership and rights, minimizing the risk of interference and disputes between different service providers operating within the same frequency bands.

Additionally, exclusive spectrum assignment supports investment and innovation in the satellite industry. Service providers can make informed investment decisions, secure financing, and deploy advanced technologies with confidence, knowing that they have exclusive access to the assigned spectrum. Further the spectrum sharing regime would fosters competition, encourages infrastructure development, and promotes the introduction of new services and technologies in the market.

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.

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.

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.

Response:-

The valuation of any spectrum band should be done using multiple methods rather than relying on any single valuation approach. The authority may appropriately use the spectrum efficiency factor in arriving at the value of new spectrum bands for auction. The prices determined by past auction for terrestrial service may serve as a reference for valuation based on spectrum efficiency.

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.

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.

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?

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

Response:-

The reliance on international benchmarks for spectrum valuation may not always be appropriate, especially in the context of the Indian space based communication services. The valuation of spectrum should consider multiple factors, including the unique characteristics and growth potential of the Indian market.

In evaluating the value of spectrum resources for user links, considering the average value of various valuations can provide a balanced and comprehensive perspective. When it comes to gateway links, the current prices paid by service providers to government for spectrum use by gateway can serve as basis for valuation.

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.

Response:-

The spectrum in both user links and gateway links be assigned on exclusive basis through auction. The authority should consider 50% of valuation of spectrum as the reserve price for any of the band assigned for space based services.

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.

Response:-

The allocation of spectrum through auctions should not be tied to a specific class or type of service. Instead, service providers should be granted the flexibility to utilize the spectrum for any service that is permitted under their licenses.

By decoupling the spectrum from specific services, service providers are given the freedom to adapt to changing market demands and technological advancements. It allows them to explore new services and business models without being restricted by predetermined classifications. This flexibility is particularly important in the rapidly evolving telecommunications industry, where new services and applications constantly emerge. This approach of allowing service providers to use the spectrum for any permitted service aligns with the principle of technology neutrality.

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.

Response:-

A moratorium period of 5 years, upfront payment of 10% irrespective of spectrum band and balance amount on yearly instalment basis on lower rate of discount (< 5%) be prescribed.