

RJIL/TRAI/2023-24/92

22<sup>nd</sup> June 2023

To,

**Shri Akhilesh Kumar Trivedi,**  
**Advisor (Networks, Spectrum and Licensing)**  
**Telecom Regulatory Authority of India**  
Mahanagar Doorsanchar Bhawan  
Jawaharlal Nehru Marg, New Delhi - 110002

**Subject: RJIL's counter comments on TRAI's Consultation Paper dated 06.04.2023 on "Assignment of Spectrum for Space-based Communication Services".**

Dear Sir,

Please find enclosed the counter comments of Reliance Jio Infocomm Limited (RJIL) on the consultation paper dated 06.04.2023 on **"Assignment of Spectrum for Space-based Communication Services"**.

Thanking you,

Yours Sincerely,  
For **Reliance Jio Infocomm Limited**

**Kapoor Singh Guliani**  
Authorized Signatory

**Enclosure:** As above

[Reliance Jio Infocomm Limited's counter comments on TRAI's consultation paper on  
"Assignment of Spectrum for Space-based Communication Services"  
\(Consultation Paper No. 6/2023 dated 06<sup>th</sup> April 2023\)](#)

Preface

1. We have had the opportunity to go through the responses submitted by the various stakeholders to the TRAI's Consultation Paper on "Assignment of Spectrum for Space-based Communication Services" dated 06<sup>th</sup> April 2023.
2. Before proceeding with our counter comments, we would like to highlight that we have come across the below paragraphs in the consultation paper:-

*1.8 In response, DoT, through the **letter dated 16.12.2022**, conveyed that TRAI may provide suitable recommendations for each of the space-based communication services after detailed examination. Hence, the present consultation paper requires to consider all the spectrum bands relevant for space-based communication services as **indicated by DoT in the letter mentioned above.***

*3.35 TRAI through its letter dated 19.10.2022 to DoT requested, inter-alia, to clarify as to for which of licensed telecommunication and broadcasting services, spectrum for space-based communication has been envisaged to be granted through Auction. In response, **DoT through its letter dated 16.12.2022, mentioned that TRAI may provide suitable recommendations for each of the space-based communication services after detailed examination.***

*3.81 As already mentioned in para 1.7 of this consultation paper, TRAI, through the letter dated 19.10.2022 to DoT, sought information/ clarifications, wherein DoT was requested, inter-alia, to clarify as to for which kind of licensed services, spectrum for space-based communication has been envisaged to be granted through Auction. DoT was requested to provide information as per the Table 1.3 given under para 1.7 of this consultation paper. In response, **DoT vide its letter dated 16.12.2022 conveyed that TRAI may provide suitable recommendations for each of the space-based communication services after detailed examination.***

*3.105 In response, **DoT, through its letter dated 16.12.2022**, informed, inter-alia, as below:*

*"Satellite networks are coordinated and registered in the ITU to ensure interference-free operation with respect to networks of other countries. Coexistence of satellite networks or satellite-based communication within the country is ensured through various provisions in RR, ITU recommendations, WRC Resolutions, NFAP and License*

*conditions for the satellite and MW services. In some case standards for Interface Requirements (IR) and Generic Requirements (GR) have also been issued by TEC, DoT. Moreover, as per the current practice to assign spectrum administratively, all frequency assignments/ operations are issued on non-interference/ non-protection basis.”*

3. We would like to bring to the authority's attention that in our response to the consultation paper, we were unable to provide comments on the paragraphs mentioned above since the DoT's letter dated 16.12.2022, which is referred to in the above paragraphs, was not included in the consultation paper. We believe that the inclusion of this letter is crucial for the stakeholders to provide comprehensive comments. Therefore, we kindly request the authority to publish the DoT letter dated 16.12.2022 and grant us sufficient time to review and provide our further comments in our response to the consultation paper.
4. Based on the stakeholder responses, we have noted that several stakeholders have expressed a diverse array of concerns and arguments, specifically regarding the use of auction-based assignment method for space based communication services. Some of the key prevailing viewpoints among stakeholders include:-
  - a. **Satellite spectrum is a globally shared resource and differs from terrestrial spectrum, rendering the concept of exclusive assignment inapplicable.**
  - b. **The “right to use” of satellite spectrum is granted by International Telecommunication Union (ITU).**
5. It is essential to clarify that these arguments are rooted in an incorrect understanding of facts. Article 4 of the ITU Radio Regulations clearly envisage that member states have the power to assign spectrum resources, with the caveat that member states must ensure there is no harmful interference to services provided by stations in other countries. The relevant clause is produced below:-

***4.2 Member States undertake that in assigning frequencies to stations which are capable of causing harmful interference to the services rendered by the stations of another country, such assignments are to be made in accordance with the Table of Frequency Allocations and other provisions of these Regulations***

6. Further, in the matter of assignment of spectrum, the law has been laid by Hon'ble Supreme Court in '2G spectrum case'. The following observation of the Hon'ble Supreme Court addresses this issue:-

77. *“Spectrum has been internationally accepted as a scarce, finite and renewable natural resource which is susceptible to degradation in case of inefficient utilisation. It has a high economic value in the light of the demand for it on account of the tremendous growth in the telecom sector. **Although it does not belong to a particular State, right of use has been granted to States as per international norms.”***

7. In view of the above, it can be affirmed that any assignment of the right to use spectrum resources within a member states national boundaries lies solely within the domain of its national government. Hence, in the case of the satellite spectrum, similar to terrestrial spectrum, the right of assignment exists and is solely under the authority of the Government of India.
8. Having established that the right to assign exists, when such a significant right is held in public trust by the Government of India, the determination of the method for transferring such a right must be guided by the principle of equality. Consequently, it necessitates that the procedure employed for distribution is fair, devoid of arbitrariness, and characterized by transparency.
9. The auction-based assignment and administrative assignments are different methods for transferring the same right. The only difference between the two is that in the case of an auction, the price for alienation of the right is based on a transparent market driven process as opposed to the administrative assignment, which is generally done on first cum first serve basis on the price fixed by the Government.
10. An ‘exclusive right’ refers to a prerogative that exists to the exclusion of others. Therefore, by virtue of this definition, when spectrum is assigned (irrespective of whether its price is determined administratively or through auction), it is by default creating a right in favour of the assignee that is to the exclusion of this spectrum to other service providers. The right being alienated in through spectrum assignment, be it auction based or administrative, is always exclusive though the form of exclusivity may vary.
11. In this section, we have provided and explained some of the most popular forms of assignment of exclusive rights for the use of spectrum, including those for the satellite services:-
  - a. Exclusive frequencies are allocated for terrestrial networks such as IMT, MWA, PMRTS, etc., within a specific geographical area, such as a telecom circle. **When the same frequencies are assigned to another licensee in a different circle, it is not referred to as a shared assignment.** For instance, if the same frequency is utilized in both Haryana and Punjab, it is not considered a shared or non-exclusive

assignment since the frequency assignment is restricted to specific geographic areas.

- b. For Microwave Backbone (MWB), the government may exclusively assign certain frequencies for the link between points 'A' and 'B', while those same frequencies may be assigned to another entity for the link between points 'C' and 'D'. It is important to note that the **assignment of the same frequencies on a link-by-link basis within the same service area is not referred to as a shared assignment or non-exclusive assignment.**
- c. In the case of Geostationary Orbit (GSO) satellite systems, **exclusive frequencies are allocated for specific angular slots in space.** Similar to the geographic reuse of frequencies in terrestrial assignments, the frequencies assigned to GSO satellites are reused after a specified angular interval. This ensures that different satellites operating in different angular slots can utilize the same frequencies without causing interference. For example, Similar to the example of terrestrial assignment with two circles, the same frequencies can be used for two angular sectors, such as between 75 degrees and 85 degrees. **Each sector has the exclusive assignment of the frequencies, similar to how different circles on land have exclusive frequency assignments.**
- d. Therefore, such reuse of frequencies within an angular sector cannot be referred to as shared use, as each sector has an exclusive frequency assignment. **The assignment itself is limited to an angular sector and the same frequencies are assigned to different service providers in different angular sectors (circles in the sky).** Further, just as terrestrial service providers are assigned different frequencies within the same circle, the satellite based service providers are also assigned different frequencies within the same angular sector. The assignment of frequencies to different service providers within the angular sector ensures exclusivity and avoids any interference between the service providers.
- e. Hence, it can be concluded that **all assignments of GSO frequencies are made on an exclusive basis, albeit with different forms of exclusivity, such as frequency, polarization, or flux density.** Therefore, the claim that present spectrum assignments are non-exclusive and shared is both technically and factually incorrect and should be dismissed. In fact, the terms "assignment" and "non-exclusive" are oxymoron.
- f. There is a need for exclusive assignment based on a geographically isolated area for the gateway operation (feeder link), which requires a higher amount of frequencies but only at a few fixed locations. **These frequencies for gateway are**

**also assigned exclusively based on geographic exclusivity.** The holder of this spectrum is restricted from using them at any other location, and no other service provider is allowed to use the same frequencies in the designated gateway exclusion zone. Therefore, even the **gateway frequency assignment is exclusive and cannot be considered as shared or non-exclusive assignment by any stretch of the imagination.**

- g. **Even for the NGSO constellation, it is not possible to use the same frequencies between geographically spread fixed, nomadic, or mobile user terminals and satellites moving at high speeds on low/medium earth orbits.** Sharing frequencies while avoiding frequent inline interference events between thousands of satellites and millions of user terminals would pose an administrative nightmare for the government if a large number of NGSO operators (let's say 10 operators) were assigned the same frequencies. While some operators may argue that interference mitigation can be achieved with the help of technology, however, such mitigation would limit the number of operators in the NGSO space.
- h. One may argue that the Federal Communications Commission (FCC) in the USA has achieved spectrum sharing between NGSO operators for their user links. However, even the FCC has not allowed an infinite number of operators to utilize the same frequencies on a non-exclusive/shared basis. They have decided to limit the number of constellations to four in the first phase, where such limitation of a number of operators would introduce exclusivity.
- i. **In the arrangement proposed by FCC, the exclusivity is not based on frequencies or geography, but rather on the number of operators who can be part of such an exclusive club who only are allowed to share the frequencies through technical interconnections to avoid interference.** Such an arrangement also entails exclusivity through the membership in this exclusive club of a few operators. A non-exclusive/shared assignment would have meant no restrictions on the number of operators, and the assignment of such rights should have been done to a large number of operators without any restriction and without any priority over the assigned rights.

12. To summarize, the exclusivity of spectrum assignment can work in many ways. Some of the popularly known ways of exclusive assignment are summarized as follows:-

- a. **Geography based (circle based) assignment of particular frequencies within the country [as done in IMT and MWA terrestrial network].**
- b. **Angular sector based assignment of particular frequencies, their polarization and/or flux density [as done in the case of GSO satellite].**

- c. **Geography based assignment of feeder link (*gateway link*). Exclusivity of transmission is within the designated exclusion zone.**
  - d. **Point-to-point assignment of exclusive frequencies as done in case of MWB.**
  - e. **Creation of an exclusive club of limited number of operators who can utilize the same frequencies by the way of self-co-ordination. In this type of assignment, exclusivity is created by the way entry to the club to utilize a certain set of frequencies. Since such a club has a limited membership, its membership may be provided in a fair and transparent method.**
13. To conclude, the argument put forth by a large number of respondents to the consultation paper stating that satellite frequencies are always assigned in a shared mode and on non-exclusive basis are both factually and technically incorrect. **Such claims are a colourable misuse of the consultation process aimed at misleading the authority and confusing public** for the vested interest in obtaining the spectrum on first cum first serve basis at unreasonably low administrative price and compete with the services with the aid of such huge regulatory cost arbitrage.
14. As the exclusivity can be defined to each type of assignment of spectrum for satellite based communication, the arguments made by a large number of respondents that the spectrum is assigned only in shared mode on a non-exclusive basis does not have feet to stand.
15. **Hence , the only surviving question is how to assign such exclusive rights?**
16. This question needs to be answered from both Economic Ground and legal grounds.
- a. **Economic Ground:**
    - i. With the rise of satellite-based communication services and their competition with terrestrial services, **it is essential to maintain consistent and equitable spectrum assignment rules** for both. This involves avoiding preferential treatment based on network topology or architecture and establishing fair and uniform rules to ensure a level playing field for all stakeholders.
    - ii. **In the case of GSO (Geostationary Orbit) satellites, the demand-supply gap was not apparent due to the absence of an open sky policy.** The DoT assigned spectrum to service providers based on recommendations from ISRO. As a result, the demand-supply issues were resolved within ISRO, and DoT merely assigned spectrum to the party recommended by ISRO.

- iii. With the implementation of the open sky policy, the role of ISRO or INSPAC as gatekeepers to recommend specific satellite operators based on available spectrum is no longer applicable. **If they decide the entry of operator on the basis of spectrum, their decision inherently includes the bundling of spectrum. Hence, it is imperative for them to adhere to a transparent bidding process in creating any such bundled decision that involves spectrum assignment.** If the administrative decision is independent of the spectrum, it is crucial for the DoT to handle the spectrum assignment decision. Hence, a transparent process becomes imperative to ensure fairness and accountability in the assignment of spectrum.
- iv. For NGSO systems, the demand-supply gap is evident due to the high demand for spectrum resulting from the launch and planned deployment of numerous satellite operators' constellation networks. For instance, the same spectrum frequencies (i.e. Earth to space: 14-14.5 GHz & Space to Earth: 10.7-12.7 GHz) are utilized by SpaceX, OneWeb, Kuiper (Amazon) etc. To address this demand and mitigate frequent interference events between a large number of satellites and user terminals, it is crucial to assign exclusive spectrum through an auction process. Given that multiple NGSO operators would be vying for the same exclusive frequency bands, it becomes crucial to determine a market-driven price through the auction, ensuring a level playing field and efficient assignment of spectrum resources.
- v. As has been discussed earlier as well, it is important to note here that the FCC has also recognized the competition issues that have resulted from its existing assignment policy and has recently adopted revised spectrum sharing rules for NGSO FSS systems. Chairwomen Jessica Rosenworcel has stated that *"...when this first mover advantage continues in perpetuity it shuts out would-be competitors, prevents newer deployments, and discourages operators from transitioning to more efficient systems..."*. This statement alludes to the ill-effects of the adoption of an administrative assignment system that promotes priority vis-à-vis competition. This system has created an exclusive club of operators that have gained priority solely because of this first-cum-first serve basis system. While the new sharing rules have added a sunset clause to this priority in an attempt to restore competition, even these changes will do little to introduce competition in the market in the near future.
- vi. There are important lessons to draw from the US FCC's assignments. It showcases how administrative assignment (first cum first serve) has killed

the competition in the market. It is submitted that to avoid such a situation and to ensure competition, the introduction of auctions would prevent a US-like challenge from the very beginning. Auctions allow for true value discovery as opposed to an administrative assignment that creates barriers for new entrants and ensure competitiveness in the Indian market.

- vii. In summary, **it is essential that every operator have to get a chance to participate in a transparent bidding process at every stage of spectrum assignment by the government.** This ensures fairness and equal opportunities for all operators in acquiring spectrum rights.

**b. Legal Ground:**

- i. India maintains a stable and predictable legal stance on the assignment of scarce and important natural resources such as spectrum.
- ii. The assignment criteria for any spectrum usable for providing communication services in the country must comply with the Hon'ble Supreme Court Judgement on the assignment of spectrum in the landmark 2G case in CWP 423 of 2010 dated 2nd February 2012 which states the following:

*94. There is a fundamental flaw in the first-come-first-served policy inasmuch as it involves an element of pure chance or accident.*

*95. .... When it comes to alienation of scarce natural resources like spectrum etc., it is the burden of the State to ensure that a non-discriminatory method is adopted for distribution and alienation, which would necessarily result in protection of national/public interest.*

*96. In our view, **a duly publicised auction conducted fairly and impartially is perhaps the best method for discharging this burden ....***"

- iii. The position that auctions are the most suitable method for alienating natural resources like spectrum for commercial pursuits was further reaffirmed by the Hon'ble Supreme Court's opinion dated 27<sup>th</sup> September 2012, on presidential reference. Relevant excerpts have been extracted and reproduced below for reference.

*149. Regard being had to the aforesaid precepts, we have opined that auction as a mode cannot be conferred the status of a constitutional principle. Alienation of natural resources is a policy decision, and the means adopted for the same are thus, executive prerogatives. **However, when such***

*a policy decision is not backed by a social or welfare purpose, and precious and scarce natural resources are alienated for commercial pursuits of profit maximizing private entrepreneurs, adoption of means other than those that are competitive and maximize revenue may be arbitrary and face the wrath of Article 14 of the Constitution. Hence, rather than prescribing or proscribing a method, we believe, a judicial scrutiny of methods of disposal of natural resources should depend on the facts and circumstances of each case, in consonance with the principles which we have culled out above. Failing which, the Court, in exercise of power of judicial review, shall term the executive action as arbitrary, unfair, unreasonable and capricious due to its antimony with Article 14 of the Constitution.*

- iv. Hence, it is important to note that the **Hon'ble Supreme Court has unambiguously declared that the right to use spectrum can only be transferred through a transparent auction process.** This declaration emphasizes the significance of conducting auctions as the appropriate method for the transfer of spectrum rights. By employing transparent auction processes, the government ensures fairness, equal opportunity, and market-driven determination of prices. This approach aligns with the principles of transparency, efficiency, and non-arbitrariness in the assignment of spectrum rights, as mandated by the Supreme Court.

17. In summary, it is important to ensure that every service provider gets the chance to participate in a transparent bidding process at every stage of the assignment of spectrum rights by the government. This can be ensured through auction based assignment of spectrum rights, and which is the only legally tenable method of such assignment.

With this background, we take this opportunity to submit our detailed counter comments on each of the key views submitted by the stakeholders that go against the auction method (i.e. method prescribed by DoT in its reference to TRAI) of spectrum assignment for space based communication services.

Our response to the stakeholder comment(s) are as below:-

**Stakeholder Comment(s):**

**A. Satellite Spectrum is a globally shared resource and terrestrial concept of exclusivity does not apply, hence auctioning is not applicable. The same frequency ranges are being used over and over again by multiple satellite operators in geostationary and non-geostationary orbits.**

- B. Auctioning spectrum will lead to inefficient spectrum usage due to fragmentation.
- C. There is also no model suitable for auctioning the spectrum for user links (in bands such as C band, Ku band and Ka band) and for gateway links. As opposed to terrestrial networks, satellite operators require only a limited number of gateways, for a country as vast as India there is no scarcity of location. Hence administrative assignment method is more efficient and gateway spectrum should not be auctioned. Any segregation of spectrum for use of gateway station links and user station links should not be carried out. Regulators should consider adopting database assisted “light licensing” relies on a central, public database of fixed installations, and permits gateway earth stations to register new ground equipment on a self-coordinated, first-come, first-served basis without the need for auctions.
- D. The concepts such as block size, spectrum cap, intra-band share, which originate from terrestrial mobile spectrum management, are not applicable to satellite spectrum.
- E. Auction designs built on securing exclusive access are fundamentally incompatible with the essential requirements of NGSO systems (to access entire spectrum bands on a shared basis).
- F. Intra-band sharing rules among satellite systems do exist in the form of the ITU framework. This raises questions as to why the exclusive assignment is necessary at all (it is not) and why the same sharing rules could not be used to accommodate future entry (they can).
- G. The access to low-cost spectrum is a fundamental requirement for the burgeoning space industry and overall economy in long run. Administrative approach would ensure a level playing field for all stakeholders involved.
- H. The administrative method based on the ITU framework (i.e. shared spectrum use) would be better aligned with Government’s goals for the new Indian Space Policy 2023. Such shared model would involve requirement of satellite operators to coordinate in good faith.

**RJIL Response:**

1. As mentioned in the preface, we disagree with the views expressed by stakeholders that satellite spectrum is a shared resource and that exclusive assignment of the spectrum is not applicable to space based communication services.

2. From the response, it appears that stakeholders are not aware that the existing spectrum assignments for satellite services are also based on exclusive assignment of spectrum. Therefore, it is important to debunk this myth.
3. In our response to the consultation paper, we have submitted that an auction for user links in GSO can be conducted by creating angular sectors. We will be using the same concept here to understand whether the current assignment is shared or exclusive in nature for various satellite service providers i.e., VSAT, DTH & Teleports.
4. The suitable orbital slot range for India is from 45°E to 115°E, covering a total arc of 70°, and with an orbital gap of 3 degrees, the number of angular sectors that can be created would be 23 (i.e. A: 45°-48° till W: 111°-114°). The details of all angular sectors created with 3 degree orbital is presented as Annexure-1, and the same are used for understanding the current assignments in India under the administrative regime.
5. The spectrum assignments in the Ku band to various DTH service providers is enclosed as Annexure-2. The spectrum details of the same are presented below:-

| S.No. | Orbital Slot | Angular Sector | Spectrum used (GHz)  | Satellite Operator | Service Provider  |
|-------|--------------|----------------|--|--------------------|-------------------|
|       |              |                | Centre Fx & Polarization   |                    |                   |
| 1     | 108.2°       | V              | 11483 H, 11520 V, 11520 H, 11560 V, 11560 H, 11600 V, 11600 H, 11640 V, 11640 H, 11680 V, 11680 H          | SES-7              | Bharti Airtel Ltd |
|       |              |                | 12281 H, 12281 V, 12341 H, 12341 V, 12591 V, 12651 V, 12711 H, 12711 V                                     | SES-9              |                   |
| 2     | 83°          | M              | 10970 V, 11010 V, 11050 V, 11090 V, 11130 V, 11170 V, 11470 V, 11510 V, 11550 V, 11590 V, 11630 V, 11670 V | GSAT 10            | Tata Play         |
|       |              |                | 10970 H, 11010 H, 11050 H, 11090 H, 11130 H, 11170 H, 11470 H, 11510 H, 11550 H, 11590 H, 11630 H, 11670 H | GSAT 30            |                   |
| 3     | 93.5°        | Q              | 11510 H, 11590 H   | GSAT-15            | Dish TV           |
|       | 95°          | Q              | 12464 H, 12535 V, 12595 V, 12647 H, 12688 V, 12688 H, 12729 V  | SES-8              |                   |
| 4     | 91.5°        | P              | 12276 H, 12316 H, 12436 H, 12476 H, 12523 V, 12563 V, 12603 V, 12643 V, 12683 H                            | Measat 3b          | Sun Direct        |
| 5     | 93.5°        | Q              | 11090 V, 11170 V, 11470 V, 11510 V, 11550 V, 11630 V   | GSAT-15            | Prasar Bharti     |

6. The above details show that even though certain frequencies assigned are similar between two DTH service providers, **the exclusivity is created by the use of satellite systems placed in different angular sectors or by using different frequencies or polarizations when spectrum is assigned within the same angular sector.**
7. The exclusivity in spectrum assignment for teleports is also evident. The table below demonstrates how exclusivity is achieved in C-band assignments for teleports by utilizing different angular sectors or separate frequencies within a particular angular sector:-

| S.No. | Orbital slot | Angular Sector | Frequency (MHz)   | Satellite    | STV No  | Company                           |
|-------|--------------|----------------|-------------------|--------------|---|-----------------------------------|
| 1     | 76.5°        | K              | 6267.00 - NA      | APSTAR-7     | 6 - STV-118/1+1 S/B   | Indiasign Pvt. Ltd.               |
| 2     | 105.5°       | U              | 6132.00 - NA      | ASIASET-7    | STV-89/01   | Planetcast Media Services Limited |
| 3     | 83°          | M              | 6172.00 - 3947.00 | GSAT-10      | 3 - STV-126/01  | Tata Communications Limited       |
| 4     | 66           | G              | 6132.00 - NA      | IS-17        | 1 - STV-49/1+1, 2 - STV-50/1+1                                      | SUN TV Network Limited            |
| 5     | 83°          | M              | 6372.00 - NA      | INSAT-4A     | 1 - STV No 11/1, 2 - STV No 41/1, 3 - STV No 41/2, 4 - STV NO 121/1 | DISH TV India Limited             |
| 6     | 68.5°        | H              | 6005.43 - NA      | IS-20        | 1 - STV-78/01, 2 - STV-107/01                                       | Indo Teleports Limited            |
| 7     | 100.5°       | S              | 5987.00 - NA      | ASIASAT-5    | 1 - STV-103/01  | Silverstar Communications Limited |
| 8     | 51.5°        | C              | 6347.00 - NA      | CHAINASET-12 | 1 - STV-80/01   | Raj Television Network Limited    |

Even within the same teleport operator, whenever the same frequencies are assigned, they are done in different satellite systems in different angular sectors to maintain exclusivity:-

| S.No. | Orbital slot | Angular Sector | Frequency (MHz) | Satellite | STV No         | Company             |
|-------|--------------|----------------|-----------------|-----------|----------------|---------------------|
| 1     | 68.5°        | H              | 6092.00 - NA    | IS-20     | 7 - STV-100/01 | Indiasign Pvt. Ltd. |
|       | 66           | G              | 6092.00 - NA    | IS-17     | 5 - STV-70/02  |                     |

In case of use of the same satellite by multiple service providers, the exclusivity is maintained by allocating different spectrum frequencies to different teleports as shown below:-

| S.No. | Orbital slot | Angular Sector | Frequency (MHz)   | Satellite | STV No                              | Company                            |
|-------|--------------|----------------|-------------------|-----------|-------------------------------------|------------------------------------|
| 1     | 105.5°       | U              | 5945.00 – NA      | ASIASET-7 | 1 - STV - 45/1                      | ABP Network Pvt. Ltd.              |
| 2     | 105.5°       | U              | 6347.00 - 4122.00 | ASIASET-7 | 2 - STV-124/01                      | Tata Communications Ltd            |
| 3     | 105.5°       | U              | 6061.00 - NA      | ASIASET-7 | 1 - STV-63/01                       | Ortel Communications Ltd/.         |
| 4     | 105.5°       | U              | 6079.00 - NA      | ASIASET-7 | 1 - STV-40/01                       | Kasthuri Medias Private Limited    |
| 5     | 105.5°       | U              | 6110.00 - NA      | ASIASET-7 | 1 - STV - 54/01,<br>2 - STV - 54/02 | Rachana Television Private Limited |
| 6     | 105.5°       | U              | 6132.00 - NA      | ASIASET-7 | STV-89/01                           | Planetcast Media Services Limited  |

| S.No. | Orbital slot | Angular Sector | Frequency (MHz)   | Satellite | STV No          | Company                                   |
|-------|--------------|----------------|-------------------|-----------|-----------------|---|
| 1     | 83°          | M              | 6083.00 - NA      | GSAT-10   | 1 - STV - 64/01 | Eastern Media Limited                     |
| 2     | 83°          | M              | 6172.00 - 3947.00 | GSAT-10   | 3 - STV-126/01  | Tata Communications Ltd                   |
| 3     | 83°          | M              | 6236.00 - NA      | GSAT-10   | 1 - STV-68/01   | Pride East Entertainments Private Limited |

| S.No. | Orbital slot | Angular Sector | Frequency (MHz) | Satellite | STV No         | Company                              |
|-------|--------------|----------------|-----------------|-----------|----------------|--------------------------------------|
| 1     | 93.5°        | Q              | 5887.00 – NA    | GSAT-17   | 1 - STV-93/01  | Information TV Private Limited       |
| 2     | 93.5°        | Q              | 6196.00 – NA    | GSAT-17   | 1 - STV-69/01  | Broadcast Equipments India Pvt. Ltd. |
| 3     | 93.5°        | Q              | 6120.00 – NA    | GSAT-17   | 3 - STV-127/01 | Indiasign Pvt. Ltd.                  |

8. The complete details of existing frequency assignments to teleports is enclosed as Annexure-3 which clearly presents that no two teleports have been allocated the same frequencies on a shared basis from the same angular sector. Not only the capacity on foreign satellites, but also all spectrum assignments on the INSAT system are also exclusively assigned to multiple service providers. **The exclusivity is granted by way of band segmentation within each angular sector.** This exclusivity is similar to spectrum grant in terrestrial services where the same spectrum is assigned to service providers

across the circles. For e.g., the angular sectors can be viewed as a parallel to circles/LSAs in terrestrial networks.

9. **The notion of intra-band spectrum sharing for satellite communication, as propounded by some stakeholders, is not true, as exclusivity is maintained in the form of different frequencies to different users in different angular sectors.** Hence, the exclusive assignment of spectrum to service providers for space based communication services is already in practice through the administrative regime. Therefore, the comments made by several stakeholders that the satellite spectrum is always assigned in a non-exclusive and shared manner are incorrect.
10. The comments that the **same frequency ranges are being used over and over again by multiple satellite operators on a shared basis can be regarded as an oxymoronic assertion. If there is no exclusivity granted to the assignee, it implies that there is no assignment is taking place. The method of creating exclusivity may be different for each type of assignment, but that does not mean there is no exclusivity and all spectrum is assigned in a shared mode. In fact, any assignment without exclusivity is equivalent to delicensing of spectrum which can be used by any number of persons freely without the need of assignment.**
11. The assignment of satellite spectrum to a group of more than one operator simultaneously would also mean exclusivity for that group. For example, FCC in their rule making for NGSO-FSS system (FCC 23-29) have introduced exclusivity in the form of priority in processing rounds where the NGSO FSS systems approved in later processing round must coordinate with and protect the communication systems assigned rights during the earlier-round of assignment. This resulted in formation of exclusive club comprising of a restricted number of operators who are granted permission to utilize the same frequencies through self-coordination i.e. the division/use of the entire spectrum in the particular band between this exclusive club. This approach establishes exclusivity by allowing entry into the exclusive club for the utilization of specific frequency sets. The club has a limited membership, therefore, it is essential that the entry to this club is through a transparent auction process which is similar to one of the auction methods proposed by authority in the consultation paper.
12. Further, there is also exclusivity created within members of the club, where FCC rules indicate that if two or more NGSO FSS satellite systems which are approved in the same processing round fail to complete coordination, a default spectrum-splitting procedure would apply. This splitting process is also a way of creating the exclusivity to each satellite service provider. We have to understand that if the spectrum can be used in a shared basis by all the operators, then why would there be a necessity to create priorities and establish a club of limited number of operators and also introduce frequency split within

the club of members. This indicates that **FCC also recognize that spectrum cannot be used by all existing and future satellite operators on shareable basis and hence resulted in creation of a limited number of club of operators who can utilize same frequencies through self-coordination. The membership to this club grants exclusive access to a specific set of frequencies, thereby creating exclusivity in their utilization.**

13. It is crucial to understand that both in satellite and terrestrial networks, **"protection" implies exclusivity and "assignment" refers to exclusive right to use particular set of frequencies at any place such as (i) circle in case of terrestrial networks, (ii) all India level for NGSO user links, (iii) angular sector in space at all India level for GSO, (iv) exclusion zone for gateways/feeder link, (v) link by link between any two points etc. Such assignment can be done individually to one operator or to a set of operator under special circumstances.** The exclusivity of frequencies at the level of angular sector or exclusivity of frequencies to a small group of operator by some countries cannot be termed as assignment of non-exclusive/shared spectrum by any stretch of imagination.
14. As far as protection from harmful interference is concerned, it is just not a phenomenon for spectrum used in satellite networks, but is also required for the terrestrial networks. The government assignment of spectrum right comes with a built-in rights of protection from harmful interference. Any assignment without the protection is meaningless. Therefore, **when a satellite operator or service provider rightfully seeks protection from the harmful interference, either in terrestrial network or satellite based network, under the provisions of ITU or otherwise, would mean it has exclusive rights on that part of the spectrum.**
15. **If it was possible to use spectrum on a shared basis by large number of operators, then what is the need for the service providers to approach to Government and seek assignment?**
16. **Further, if Government has to assign the right of same frequencies at same to a large number of operator on a non-discriminatory basis then what is sanctity of such assignment? rather that tantamount to a delicensed operator.**
17. **To summarize, the spectrum for the space based services is assigned on an exclusive basis in India as well as in the other countries. Therefore, the only surviving question is the methodology for such assignment. Should such assignment be done on administrative basis or through open and transparent auction?**
18. Hon'ble Supreme Court has already laid law in the country to assign spectrum through open auction only. While some respondent to the consultation paper have contended

that the judgement of Hon'ble Supreme Court is restricted to the assignment of terrestrial networks, but they have not shown how it is restricted.

19. **Probably they have mixed their constrained understanding of exclusive assignment and their vested interest to obtain the spectrum without paying the market determined price in an open and transparent manner while interpreting the judgment of Hon'ble court. As per our understanding from the media report that Ld Attorney General in it opinion has also suggested the auction to the only route for assignment of the spectrum where there is a demand for the limited resource.**
  
20. **As far as the impossibility of the design of auction of spectrum for space based communication as contented by many stakeholder is concerned, many countries including Thailand, Saudi Arabia, Brazil, USA etc have designed such auction. Since those auction, except Saudi Arab where it was for Non-Terrestrial Network(NTN), were designed for GSO system for which the auction has to be done for each angular sector and the entity need to bid for the angular sector where the orbital slot lies, irrespective of where the satellite is already placed or is likely to be placed in future. As far as spectrum for NGSO is concerned, except for few countries including the home countries the currently leading NGSO constellation, not may countries have assigned the spectrum or market access rights. So it would be premature to say that the assignment of spectrum for NGSO has been done across the globe administratively on the basis of priority set by ITU on first cum first serve basis.**
  
21. **It is possible to devise a model to auction spectrum in various bands for satellite services.** We have provided a thorough explanation in our response to the consultation paper regarding the necessity of allocating spectrum solely through auctions. We have also suggested the block size & spectrum cap requirement for both GSO & NGSO User Links and Gateway locations, without any compromise on the availability of spectrum or fair market access. We are further elucidating our contentions to assuage any possible concerns with the proposed methodology.
  
22. There are two types of usage of spectrum in satellite networks – a) User Links and b) Gateway Links. **Both of these require exclusive assignment of spectrum, as explained below:**
  - a. **User Links:** Given the extensive geographic distribution of user terminals, it would be impractical for terminals deployed by different service providers to operate on the same frequency, specifically for Non-Geo-stationary Orbit (NGSO) satellite based services. Even if some service providers attempt coordination and utilize the same frequencies, effectively coordinating millions of user terminals, thousands of satellites, and numerous satellite operators would be a humungous and

impossible challenge. **Hence, the exclusive assignment of spectrum becomes indispensable for user links, ensuring uninterrupted operation of each satellite constellation and user terminal by minimizing interference.**

Moreover, if two or more service providers intend to share their spectrum, they can do so through mutual coordination. This approach would not impose any liability on the Government or create administrative priorities based on a "first come, first serve" process.

In the case of Geo Stationary Orbit (GSO) operators, user devices are directed towards a fixed angular slot in space over the equator. As a result, the space can be divided into angular sectors based on circles, allowing for spectrum reuse. However, within a specific angular sector, typically spanning 4 to 5 degrees or values as decided by WPC, spectrum cannot be reused. Hence, it becomes necessary to **assign exclusive frequencies to avoid interference within these sectors.**

For NGSO operators, user terminal antennas do not point towards a fixed angle but instead track the satellite as it moves. As a result, it is not feasible to create angular sectors for spectrum assignment. Therefore, **exclusive assignment of spectrum on a full sky basis becomes imperative for NGSO operators to ensure interference-free operations.**

- b. Gateway Links:** Considering the limited number of gateways and their requirement for the entire spectrum band to support aggregated traffic, **it is necessary to carry out exclusive assignment for specific geographical areas/zones in which the assignee can use the specified frequencies.** Within these designated zones, the gateway operator would have full access to the specified spectrum band, while ensuring that IMT (International Mobile Telecommunications)/backhaul activities are excluded from those areas. Auction of such exclusion zone will ensure the assignment of spectrum through a transparent auction process. **By following such a process, the assignment of spectrum can be effectively managed, enabling efficient utilization and minimizing interference between different services and operators, curtail any hoarding of the gateway locations, provide any opportunity for the bidder to select their most preferred location by bidding higher as compared to being settled at the location available through first cum first route.**

- c.** As explained in our response, spectrum for space based communication services needs to be auctioned as follows:

i. **User Link:**

- NGSO- exclusive on pan India basis.
- GSO- exclusive frequencies on pan-India basis but repeated in each angular sector (similar to the local states in case of terrestrial auction)

ii. **Gateway Link:**

Both GSO/NGSO: Auction of geographic exclusion zone in which there will not be any terrestrial network and the successful bidder can use the full set of frequencies in that band.

23. From the above submission it is clear that the it is possible to design an auction methodology. The notion of shared use of spectrum and impossibility of auction is being deliberately promoted by some incumbent operators in satellite communication domain, just to evade the auction process and pay market determined price and to retain exclusive rights to spectrum usage obtained or to be obtained on the basis of "first come, first served". This approach unfairly provide competitive advantages to these entities over terrestrial to provide the broadband services to the consumer while not paying the market price of the spectrum.

24. The assignment of spectrum through a fair and transparent auction has been the pillar for achieving the Government's goals of digital inclusion in India and would also support the Government goals for the new Indian Space Policy 2023. Without a fair, transparent and competitive assignment mechanism, and by relying solely on good faith without a structured process, there is a greater potential of creating imbalances and challenges in achieving fair competition and optimal spectrum utilization. Further, there is high possibilities that the assignment of spectrum on an administrative basis to a few selected entities on first cum first basis would also lead to the risk of such entities engaging in profiteering by reselling their rights, anti-competitive practices etc.

25. **It is crucial to acknowledge the fact that spectrum assignments for satellite services are inherently exclusive in nature. The only viable option for assigning spectrum to space based communication services is through the auction process, which is a transparent method of assignment.**

Stakeholder Comment(s):

- I. **There are no global examples for auction of satellite spectrum on exclusive basis (Saudi Arabia's recent auction of certain S-band spectrum is an outlier). Also, Satellite operators who operate satellites in orbital slots filed by other Administrations (other than the local Administration) have not been subject to spectrum auctions.**

- J. Instead of exclusive auction, India should adopt regulatory practices of other countries such as non-exclusive assignment (subject to a requirement to protect with previous assignments), blanket licenses or license-exempt (based on defined technical parameters) for user terminals. If India were to auction its satellite spectrum, other countries would likely reciprocate by imposing similar measures on Indian service providers.
- K. The auction of orbital slots done in a few countries should not be confused with the auction of spectrum for satellite services. No country has auctioned the spectrum for satellite services in isolation without the corresponding orbital resources it requires.
- L. Half of the S band spectrum auctioned in Saudi Arabia was sold specifically for terrestrial use (i.e., 3GPP carriers), and the other half was sold as MSS. However, the MSS blocks were sold with a path to convert their usage to terrestrial.

**RJIL Response:**

1. Several countries have embraced transparent and competitive auction methodology to assign satellite spectrum for market access. **Successful examples include countries like Saudi Arabia and Thailand, where spectrum for satellite services has been auctioned.** The details given below clearly demonstrate the success of auction method for assigning spectrum for satellite based communication services.
2. **Thailand Satellite Auction<sup>1 2</sup>:**
  - a. On January 15, 2023 the satellite auction was conducted by Thailand for GSO orbital slots with a license period is for 20 years.
  - b. A total of 5 packages i.e. satellite network sets, were included with the award of rights for operations in the orbital slots associated with various frequencies such as C, Ku, Ka, L, S, X, Q, V.
  - c. The auction concluded with the total auction winning price of **3 satellite network packages** equal to **806,502,650 baht** (eight hundred six million five hundred and two thousand six hundred and fifty baht only), with the winning bidder for each network package.

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<sup>1</sup> <https://satelliteauction.nbtc.go.th/Download/Document/172.aspx>

<sup>2</sup> <https://satelliteauction.nbtc.go.th/Download/Document/54.aspx>

d. The table below presents the auction results:-

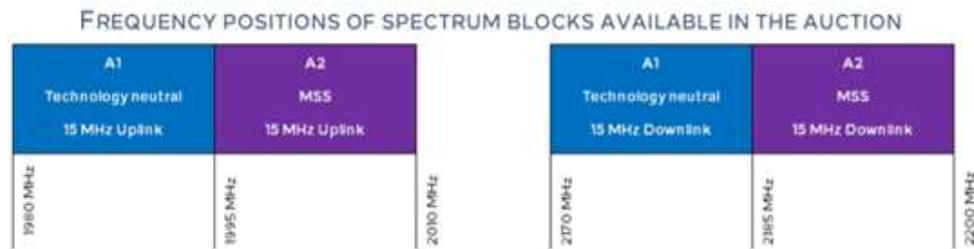
| Batch No. | Slot details & Starting price                              | Satellite Network | frequency bands to use   | Result (Winner& Final Price)  |
|-----------|--|-------------------|--------------------------|---|
| Package-1 | 50.5° East and 51° E<br><br>374 million baht (374,156,000) | THAICOM-C1        | C, Ku                    | No one submits demand   |
|           |  | THAICOM-N1        |                          |   |
|           |  | THAICOM-51        | C, Ku, Ka,L, S, X        |   |
| Package-2 | 78.5° E<br><br>360 million baht (360,017,000)              | THAICOM-A2B       | C, Ku                    | Space Tech Innovation Co., Ltd. (Affiliated to Thaicom)<br><br>380,017,850 baht |
|           |  | THAISAT-78.5E     | C, Ku, Ka, L, S, X, Q, V |   |
| Package-3 | 119.5° E and 120° E<br><br>397 million baht (397,532,000)  | THAICOM-IP1       | Ku, Ka                   | Space Tech Innovation Co., Ltd. (Affiliated to Thaicom)<br><br>417,408,600 baht |
|           |  | THAICOM-P3        |                          |   |
|           |  | THAISAT-119.5E    | Ku, Ka                   |   |
|           |  | THAISAT-120E      | C, Ku, Ka, L, S, X, Q, V |   |
| Package-4 | 126° E<br><br>8 million baht (8,644,000)                   | THAISAT-126E      | C, Ku, Ka, L, S, X       | National Telecommunication Public Company Limited<br><br>9,076,200 baht         |
| Package-5 | 142° E<br><br>189 million baht (189,385,000)               | THAICOM-G3K       | C, Ku, Ka L, S, X, Q, V  | No one submits demand   |
|           |  | THAISAT-142E      |                          |   |

e. It can be seen that three packages (2,3,4) have received bids in excess of the reserve price. These packages have the market access/ right to use frequency in C, Ku, Ka, L, S, X, Q, V at various orbital slots, as outlined in the table above. Hence, the argument that the auction of orbital slots done in a few countries should not be confused with the auction of spectrum for satellite services is completely false since the spectrum auction was not just for the orbital slots, but also includes the right to use frequency within the orbital slot and exclusive market access from these orbital slots for the winning bidder. The auction of only the orbital slot without spectrum is meaningless. It was actually the auction of spectrum in those angular sectors in which the orbital slot lies. Therefore, we should not confuse such spectrum auction with an auction of only an orbital slot.

- f. NBTC has the selected participants for granting market access by “sequential ascending clock auction” for various packages, which clearly demonstrates a case for auctioning satellite spectrum in other geographies as well. The packages unsold in the auction can be kept in the subsequent auctions as well.
- g. **The model of the successful auction of spectrum for the GSO satellites in Thailand can be a good reference for India. There is no need to wait for a majority of the countries to adopt the auction methodology.**

3. **Saudi Arabia Spectrum Auction for Non-Terrestrial Services (NTN)**<sup>3</sup>:

- a. The Communications, Space and Technology Commission (CST) announces the final results of its Spectrum Auction in the 2100 MHz band for Non-Terrestrial Networks.
- b. The spectrum for award is put into two 2x15 MHz blocks – A1 (Technology Neutral) and A2 (limited to Mobile Satellite Services)



- c. The Communications, Space and Technology Commission (CST) announced 4 qualified bidders: Saudi Telecom Company (STC), Echostar, Omnispace, Salam in cooperation with Iridium, AST Space Mobile and Airbus.
- d. The qualified bidders participated in the spectrum auction to acquire a total of (2x30) MHz bandwidth in the 2100 MHz band for the provision of Non-Terrestrial Network services, including Mobile Satellite Services (MSS), wireless connectivity on aircrafts (A2G), Internet of **Things through satellites (Sat-IoT) and hybrid 5G connectivity (5G CGC)**.
- e. **The auction started on 30 November 2022 and lasted for (3) days. The 4 qualified bidders in the auction competed for the two available spectrum blocks over the course of 32 bidding rounds.**
- f. The auction ended with STC winning both spectrum blocks. Those blocks will require the license holder to build an Air to Ground (A2G) network covering the

<sup>3</sup> <https://www.cst.gov.sa/en/mediacenter/pressreleases/Pages/202212061.aspx>

air routes in the Kingdom with internet services, as well as to provide mobile satellite services (MSS) across the Kingdom.

- g. We do not agree with the comment that Saudi Arabia's satellite spectrum auction is an outlier, since the spectrum is assigned for satellite services through a transparent process where four qualified bidders in the auction competed for the two available spectrum blocks over the course of 32 bidding rounds.
- h. Moreover, **the auction encouraged flexible use by permitting one block in the auction to be technology neutral**. This establishes a precedent and supports our submission that spectrum awarded in the auction should be permitted for flexible use by the service providers for both terrestrial and satellite based communication services wherever technical feasible. **Some of the arguments that entire spectrum blocks have been acquired by only one entity i.e. STC would not be the case as auctions planned in India would generally include spectrum cap requirements.**

#### 4. Brazil Satellite Auctions<sup>4</sup>:

- a. Anatel, the Brazil telecommunication regulator, has conducted the auction for awarding the **orbital slot and associated spectrum frequencies** through multiple round sealed bid auction process.
- b. The auction conducted in the year 2015 resulted in a cash harvest of 183.7 million Brazilian reals, which was nearly **70 percent more than the minimum bidding floor set** for each slot.
- c. On 26<sup>th</sup> May, 2015, the auction witnessed Telesat of Canada, Hispasat of Spain and YahSat of the United Arab Emirates to be the high bidders winning four spectrum licenses at three orbital slots. The auction was Brazil's second, where in 2014, Hispasat, SES of Luxembourg and Paris-based Eutelsat won frequencies in different orbital slots/angular sectors.
- d. In this 2015 auction, Telesat paid about 90 million reals for its two licenses (Ka band & Appendix 30B – FSS services). YahSat, which bid through its Star Satellite Communications Co. subsidiary, paid 44.1 million reals (Ka band, slot at 20 degree west). Hispasat's Hispamar paid 50.3 million reals for its slot at 74 degrees west (Ka & Ku band)
- e. The spectrum licenses were for 15 years, renewable for a second 15 year period.

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<sup>4</sup> <https://spacenews.com/telesat-hispasat-and-yahsat-prevail-in-brazilian-slot-auction/>

5. We do not agree with the arguments that the auction of orbital slots conducted in certain countries should not be confused with the auction of spectrum for satellite services. Since, **when an auction is conducted for an orbital slot, it is inherently bundled with assignment of a right to use specified frequencies in that specified orbital slot/angular sector. Without the assignment right of frequencies, the assignment/auction of any orbital slot is meaningless. Hence, the auction conducted in Thailand & Brazil, are essentially the auction of the spectrum associated with that particular orbital slot/angular sector,** and not just for the right of placing the satellite at some orbital slot.
6. Further, in a competitive market, the assignment of spectrum for satellite services should be exclusively done through the auction only. We strongly reject the views expressed by certain stakeholders for non-exclusive assignment, blanket license, or license-exempt assignment of spectrum for satellite services.
7. **Additionally, India has emerged as a global leader in spectrum auctions for terrestrial services since 2010. The policy framework and auction methodology implemented by India have been widely adopted by numerous countries worldwide, highlighting its effectiveness and influence in shaping international practices. In fact, the transparent and progressive regulatory policies of India have been well recognised across the world.**
8. Furthermore, we would like to clarify that auctions are not intended to create entry barriers for the satellite providers of other countries, and the requirement to participate in an auction is common to all; irrespective of the origin of the service providers/ satellite operators. Rather the auction based spectrum assignments will offer equal opportunity to all operators to enter the market at any point in time with certainty. Hence, the comment of a stakeholder that Indian service providers would face reciprocal treatment in the other countries is factually incorrect.

**Stakeholder Comment(s):**

**M. Any auction process of this shared spectrum would Inhibit the spectrum sharing among service providers:**

**RJIL Response:**

1. We do not agree with the views expressed that the auction of spectrum would inhibit sharing of spectrum between satellite operators. We have addressed the issue of spectrum sharing in our response and are reiterating the facts to allay any apprehensions to the contrary.

2. The spectrum sharing between the service providers is a complex process due to the dynamic nature of wireless networks and requires close coordination between the service providers entering into such an arrangement.
3. This principle applies to both terrestrial and space-based networks due to the **fundamental similarities between the two, as both are wireless networks**. Both undergo continuous planning and reconfiguration to optimize their performance according to traffic patterns and user requirements. Terrestrial mobile networks achieve this by adjusting network parameters, deploying additional sites, and relocating existing sites. Similarly, space-based communication networks, also involve the similar optimization but instead of terrestrial infrastructure, these involve the reconfiguration of satellites. Thus, such reconfiguration/continuous changes in the networks require close coordination between the two service providers sharing the networks, as the changes in one network may have a significant impact on the other.
4. Considering the above, if **operators find it possible to share their spectrum to optimize spectrum usage, they may be allowed to do so by entering into an agreement with each other. In this regard, DoT's guidelines allow operators to share the terrestrial spectrum, awarded to them through auctions. Given the similarity between terrestrial mobile and satellite networks, the same framework needs to be applied to satellite networks. This framework allows service providers to engage directly without any involvement of governmental entities.**
5. Direct coordination, governed through the private contract, will prove to be a more efficient approach, as service providers possess the necessary expertise to effectively coordinate and share spectrum resources while addressing any interference issues among themselves. This method avoids unnecessary government intervention in a dynamic and rapidly evolving sector, especially considering the exponential growth of satellite constellations consisting of hundreds of thousands of fast-moving satellites.
6. Therefore, contrary to the contentions of certain stakeholders, auction based regime complemented with the voluntary sharing between service providers, based on market forces, ensures the most efficient use of spectrum.

**Stakeholder Comment(s):**

**N. Auction of spectrum for exclusive assignment will Distort utility & lead to coverage gaps as operators (e.g., a typical LEO system) cannot operate with different/ partial spectrum.**

**&**

**O. Next-generation systems cannot operate on narrower slivers of spectrum sliced along smaller geographic boundaries (even with exclusive access).**

**RJIL Response:**

1. It is incorrect to say that exclusive assignment of spectrum may lead to coverage gaps or impair performance of satellite systems. Please refer to the detailed explanation provided in response to **stakeholders' comments (A, B and C)**, which effectively demonstrates that exclusive assignment of spectrum serves as a facilitator for satellite networks rather than being misrepresented as a hindrance to their operation. A thoroughly designed auction with carefully decided block sizes can provide an operator unhindered opportunity to acquire the necessary amount of spectrum to meet its requirements.
2. Moreover, under exclusive assignment, operators can share the spectrum through direct coordination in case they need additional spectrum. This is a more efficient way of sharing, as it ensures the inference free and efficient use of the spectrum. Under the direct coordination approach, operators can resolve the spectrum sharing issues in close coordination with each other. This approach is more agile and is market driven which is in fact, required given the dynamic nature of the wireless networks. Hence, if technically feasible and mutually beneficial, service providers can share the spectrum exclusively assigned to them through auctions, and any operator in need of spectrum can fulfil its requirements.

**Stakeholder Comment(s):**

**P. Auctioning will result will**

- **Lead to no investments and uncertainty.**
- **Higher prices for consumers & impact economies of scale**
- **Inhibit the growth of satellite networks to cover the uncovered areas**
- **Impact wider-economic social welfare**

**Q. Auction outcomes are driven by market forces, and there is no inherent requirement for operators to prioritize specific social or economic objectives focusing on connecting underserved areas of the country.**

**RJIL Response:**

1. Auctions ensure a fair, transparent assignment process and promote efficient use of a precious resource. Competitive bidding fosters innovative business models and improved services, ultimately benefiting end users. Auctions have been able to provide a stable

regime to mobile services in the country, that has led to massive investments in infrastructure. We are nearing a Pan India 5G rollout in just 1.5 years.

2. The auction-based regime has proven to foster healthy competition, resulting in some of the most affordable tariffs worldwide, benefiting consumers. Similar success can be replicated in satellite services under an auction-based regime. This success can be replicated in the satellite services sector by implementing an auction-based approach. In contrast, administrative assignment is susceptible to legal challenges due to its lack of transparency and potential bias, making it unable to establish a stable environment that enables the free play of market forces and the provision of services at affordable rates.
3. Hence, auctions play a vital role in encouraging investments by instilling **certainty regarding long-term spectrum assignments**. They serve as a catalyst for service providers to allocate resources for service deployment, leading to the rollout of new services. Additionally, due to the long-term prospects offered by auctioned spectrum, they contribute to the establishment of affordable tariffs in line with market forces.

**Stakeholder Comment(s):**

**R. Auctions result in blocking/hoarding of spectrum resulting in artificial scarcity.**

**RJIL Response:**

1. It is a completely incorrect assertion that Auctions lead to the hoarding of spectrum due to the following reasons:
  - Anyone who has paid market determined price will want to use the spectrum efficiently to earn returns on investment.
  - Generally, enforcing the rollout obligations on spectrum assignees ensures that they deploy and utilize the spectrum within reasonable timeframes.
  - Further, Spectrum Caps prevent the concentration/ blocking of the spectrum with one bidder.
2. Conversely, the "first come, first served" approach allows entities to claim the right to use the spectrum even before they are fully prepared to utilize it effectively. This practice often leads to the hoarding of spectrum by entities that may not be immediately ready to put it to use. Further, it may exclude the most efficient person and include the inefficient entity to get the resource just because they applied earlier- be it to the Government of India or to ITU for co-ordination.

**Stakeholder Comment(s):**

**S. Auctions will result in:**

- **Creating a middle entry (an intermediary) between licensor and satellite operator**
- **Lead to risks by creating gatekeepers or “super providers/spectrum holders”**

**RJIL Response:**

1. The notion of creating an **intermediary relies on flawed imaginary grounds by assuming that entities will acquire spectrum solely for the purpose of sharing it with others.** In reality, no one bids for spectrum by relying purely on sharing arrangements, as the availability of sharing partners is too unpredictable against the investments required for acquiring spectrum. The sharing of spectrum is just an additional means employed by service providers to make the best use of spectrum at the places where they are not able to use and thereby increase the efficiency without getting the Government involved in day-to-day coordination between various entities and network elements.
2. Furthermore, a well-planned and designed auction always has a provision of spectrum caps that prevents the concentration of spectrum in the hands of one entity. Therefore, **arguments suggesting the emergence of gatekeepers or ‘super providers/spectrum holders’ seem to be nothing but attempts to misguide the policy makers.**
3. In fact, the argument suggesting the emergence of gatekeeper work the other way. In the case of administrative assignment, the entity may obtain the spectrum on first cum first serve basis with the aid of extraneous factors and then become the gatekeeper to share with the entities who actually need the spectrum. **Indian telecommunication sector has already witnessed the ill effect of the administrative assignment of spectrum during the year 2008-2012 which created huge uncertainty on investments.** It took many years for the Industry to stabilize and grow by adopting a stable and transparent regime of spectrum assignment through auction.

**Stakeholder Comment(s):**

**T. Auctions will prevent Entry of new entrants & exclude some players due to high spectrum costs**

**RJIL Response:**

1. It is completely incorrect to say that Auctions prevent the entry of new players. Auctions are the most transparent, fair, and unbiased way of assigning spectrum, making them the

simplest means for a prospective new entrant to gain market access. Anyone who meets the eligibility criteria can participate in the auctions. It is important to note that the eligibility criteria set for auction participation are not intended to exclude any entity from participating. Rather, they are reasonably established to ensure that only committed and serious players take part in the auctions, guaranteeing that the assigned spectrum is utilized effectively. In contrast, administrative assignment based on a "first come, first served" approach lacks transparency and can give rise to concerns regarding potential biases in the process and hoarding of spectrum, as was seen in the case of 2G Case.

2. Kindly refer to our response wherein we have recommended that **spectrum acquired through auctions should be permitted to be shared/leased/traded with any entity that does not currently hold spectrum or was not successful in the auction for the particular band**. This approach allows for the entry of any entity interested in providing satellite-based services to participate in the market. Additionally, auctions can be conducted on an annual basis, bringing certainty and predictability and enabling new entrants to acquire spectrum or existing service providers to obtain additional spectrum according to their requirements.
3. In contrast, administrative assignment poses barriers to the entry of new players, as incumbent operators holding the rights to spectrum will often try to impede the entry of new competitors by citing increased interference in the shared spectrum. It is worth mentioning that such administrative assignments to incumbents will consistently raise concerns due to the lack of transparency in the assignment process.
4. Further, it is also incorrect to state that auction will lead to a high cost of spectrum. A well designed auction process, along with spectrum valuation done on sound economic principles, will rather enable in establishing optimal price for the spectrum. Further, it will take away the uncertainty associated with administrative pricing.

**Stakeholder Comment(s):**

- U. Auctions will create artificial scarcity of an abundant sharable resource**
- V. Spectrum capacity for satellite services can be considered almost limitless. Hence, the demand for it can never be more than the supply.**

**RJIL Response:**

1. We disagree with the notion that auctions create artificial scarcity of any resource, it is an accepted fact that a fair and transparent auction of all available spectrum gives the best opportunity to all interested parties to acquire spectrum.

2. Spectrum, by its nature, is a limited and scarce resource that is sought after by multiple stakeholders, including both terrestrial and satellite operators. Furthermore, as explained before, exclusive assignment of spectrum is equally necessary for both space-based and terrestrial networks. Recognizing the spectrum as a scarce resource that requires exclusive assignment, auctions are the only transparent and equitable method that aligns with the legal position in the country.
3. Nevertheless, it is essential to ensure that the entire available spectrum is auctioned. This approach guarantees that service providers do not encounter any constraints during the auctions and that the entire spectrum can be effectively utilized for the benefit of the public.

**Stakeholder Comment(s):**

**W. Auction will:**

- **Be a big setback for the 200+ startups which are registered with ISRO & IN-SPaCe**
- **Put Indian start-ups at a competitive disadvantage versus global countries**

**RJIL Response:**

1. We strongly refute the claims that spectrum auctions are detrimental to the interests of startups. We have already addressed these concerns in our response and emphasized that implementing a spectrum sharing/leasing policy will allow service providers who acquire spectrum in user and gateway links through auction to fulfill the requirements of smaller players and start-ups in the evolving space sector in India.
2. Thus, contrary to the administrative approach, which runs into the risk of spectrum being hoarded by a few big companies, auctions allow a more equitable and fair assignment method wherein even small startups can lease/share spectrum from successful bidders to rollout their services. The VNO regime is a testimony to the successful proliferation of small service providers wherein even VNO ISP-C category service providers are permitted to acquire resources from larger service providers to rollout their services.
3. As explained earlier, the spectrum assignment to satellite services has always been exclusive in nature, and auction is the only suitable method of assignment.

**Stakeholder Comment(s):**

**X. The assignment of satellite spectrum for gateway links should be by the administrative process. In the United States, for example, administratively issued**

earth station licenses routinely authorise the use of given frequencies with multiple satellites so that the service provider holding the license can easily switch between different satellite operators. India's licensing system is less flexible today due to the need to procure satellite capacity through NewSpace India Limited ("NSIL"), but exclusive licensing of satellite spectrum threatens to stifle competition by making switch providers (and frequencies) even more difficult. This problem is best avoided by not requiring auctions of satellite spectrum.

**RJIL Response:**

1. The finalization of a location of a Gateway Earth Station is a well-considered decision by a service provider and is based on its preference. A service provider can bid for a spectrum assignment zone for the gateway earth station.
2. Moreover, in India, the current regime allows only a service provider with a relevant service authorization to set-up a gateway. Hence, the question of a service provider switching between the gateway earth station providers does not arise. Even if a provision is made in the future to allow separate gateway earth station providers, then a service provider can easily make such switchovers between gateway earth station providers by surrendering its current spectrum assignment and acquiring the spectrum at the location of the new gateway earth station provider by participating in annual auction cycle or using the spectrum trading/sharing/leasing opportunities.

**Stakeholder Comment(s):**

- Y. The assignment of spectrum for satellite services and the associated orbital resources is governed by international treaties and agreements established by ITU. Satellite communications have a special global status as a part of the ITU constitution which is a legal treaty signed by the administration of India.
  - Z. The framework for coordination already exists at ITU level, and not at national level to ensure interference free operations. Satellite systems file their frequency with ITU & register them in MFIR, so cannot be subsequently pick and choose depending on the outcome of the spectrum assignment of a market.
- AA. Frequency bands for space-based communications services should continue to be governed based on ITU Radio Regulations & National Frequency Allocation Plan ("NFAP").

**RJIL Response:**

1. The ITU Constitution and Radio Regulations neither explicitly recognize nor regulate the process adopted by administrations for spectrum assignment/ grant of market access in their respective geographies. The assignment of spectrum within a nation's jurisdiction is an inherent sovereign right. The primary role of the ITU is focused on the allocation of orbital slots and ensuring equitable access to these slots by all member states, global harmonization of frequency bands and establishing rules for management of interference. **It does not establish rules or guidelines regarding the methodology for spectrum assignment or the pricing decisions that are to be followed by their member states.**
2. Furthermore, it has been provided in the ITU Regulations that the assignment of the spectrum is the right of administration. Thus, the decision about whom to assign is to be decided by the administration, provided that such an assignment does not cause interference with other systems. Since auctions lead to exclusive assignments, no question arises about the priorities filed at ITU.
3. Regarding the NFAP (National Frequency Allocation Plan), its primary objective is to identify the specific spectrum bands designated for various services. However, it does not govern the mechanism by which these spectrum bands are assigned to service providers. The NFAP's role is limited to spectrum band identification for various services and does not extend to the assignment process for individual service providers.

**Stakeholder Comment(s):**

**BB. An alternative auction design exercise could involve an auction where bidders commit a percentage of annual revenue as a “spectrum value fee” in lieu of upfront currency bids. The winners receive the right to use the entire spectrum bands (shared amongst themselves) without any new market entrants being allowed to use this spectrum for a limited initial time-period (e.g. five years).**

**RJIL Response:**

1. We could not understand how a percentage of AGR based on the final rate committed by the bidders would be applicable when the spectrum quantum requirements itself will be different for all the bidders in both uplink and downlink frequencies for both gateway and user terminals. If the bidders are permitted to have the entire spectrum on a shared basis even after the auction process, then the question of auction itself doesn't arise since there will be no exclusivity granted. Any attempts to provide the right to use the entire spectrum band by successful bidders in an auction without any new market entrants to use the spectrum, even for a limited period, is nothing but an attempt to reduce competition and

restrict the number of players in the market which will discourage or prevent new players from participating in subsequent auctions. Such practice is against the principles of fairness, and inclusiveness.

2. We also see that such practice of adopting the spectrum value fee in auction based on the percentage of revenue would also not aid in arriving at the market determined price for the spectrum resource, thereby creating uncertainty for the players in current and future spectrum assignments. Also by adopting such a method, the proceeds of the auction would be dependent on the operators with no clarity on revenue to exchequer post auction. Further, it will lead to inequality in payment among operators and will be against the principle of efficient use of scarce natural resources. Such a process of percentage of AGR for the spectrum resource was adopted during the administrative regime and there is no need to reinvent the wheel when the legal position of the country is to conduct the auction, which will aid in market determined price for the spectrum.
3. The service providers already pay license fees as a percentage of their AGR, and the government has already abolished the spectrum usage charge (SUC) which was based on the AGR of the successful bidder for the spectrum assigned through auction. Having the auction design itself on the basis of the percentage of AGR committed by the highest bidder would be counter-productive to the policy stand taken by the government w.r.t. auction assigned spectrum resource.
4. The auction should specify the reserve price for each band where interested entities can compete for the spectrum resource based on the reserve price, which will aid in true price discovery for the spectrum put to auction. The possible concerns relating to the upfront payment of the bid amount have already been addressed with the availability of various options of payments permitting deferred payments with the option of moratorium period.

**Stakeholder Comment(s):**

**CC. Satellite networks play a complementary role and does not compete directly with terrestrial services. Satellite networks have limited use cases in regions that lacks terrestrial connectivity (rural population) whereas MNO would only cover highly concentrated urban area. Terrestrial spectrum & satellite spectrum are two unequals with significant revenue disparity (mobile services at Rs. 2,50,000/- crore vs satellite service at Rs 1,000/- crore). Any method of using auction prices of terrestrial spectrum cannot be applied in case of satellite spectrum**

**RJIL Response:**

1. The limited use case argument is factually incorrect and cannot be a reason for not conducting the auction. It is important to understand that licenses such as GMPCS never

put a condition that satellite can only service with limited use cases where the limited population in uncovered/ underserved areas, disaster management, or maritime can only be within the scope of the license. There is no specific clause in the license that mandates service providers to limit their operations only to specific uncovered regions where terrestrial networks are not present in India. Therefore, once spectrum is assigned to a service provider having a valid unified license for satellite services, the argument of limited use case becomes irrelevant. Since, neither the policy nor the license imposes any restrictions on satellite based service providers from providing services in areas already covered by terrestrial networks, the satellite based service provider has the flexibility to offer services according to their business model and market demands where they would operate freely and compete with the terrestrial providers in same regions.

2. Further, in our response to consultation paper, where we have elaborated on the technological advancements that have empowered satellites to offer retail access services to customers, similar to terrestrial mobile networks. Consequently, creating a situation where **one entity is required to pay a market-determined price for spectrum through auctions, while the other party (satellite service provider) providing the same service is exempted from such payments, would result in an unfair and non-level playing field.**
3. We have also elaborated in our response that a majority of NGSO players have presented business cases and strategic roadmaps that clearly demonstrate the competitive nature of the services both in urban and rural/remote areas. One may also refer to the responses of some of the satellite operators, which also suggest that they intend to compete with terrestrial services.
4. Furthermore, this concern is more associated with establishing the right valuation of the spectrum and has nothing to do with the auction based assignment methodology.

**Stakeholder Comment(s):**

**DD. Auctioning spectrum and then creating a sharing mechanism is self-defeating. Mandating spectrum sharing after assigning exclusive rights to such spectrum is inefficient & the very logic of auctioning it would be questionable.**

**RJIL Response:**

The sharing of auctioned spectrum between service providers should be as per their mutual agreement and driven by market forces. Such sharing of auctioned spectrum between operators, based on their mutual agreement, is a proven practice in terrestrial spectrum assignment and the same can be applied to Satellite spectrum as well. Also given

the provisions relating to the adequate supply of spectrum, spectrum cap, periodic auctions, spectrum valuation etc. would address all the possible concerns relating to the equal access to the desired spectrum bands for any service provider.

**It is learnt that such sharing agreement also exists amongst the satellite operators while arriving at the coordination agreement either on the basis of some fee or as quid pro quo. Therefore, sharing of spectrum on a paid basis is not new to the satellite industry. The auction will only bring transparency in such sharing/coordination agreements and bring more revenue to the Government as well.**

**Stakeholder Comment(s):**

**EE. Spectrum should be assigned in a bundled manner for gateway link and user link, however bundling of the four types of frequencies (uplink and downlink each for gateway and user link) is not possible in auction due to the different requirements of each operator.**

**FF. The need to ensure combined User Terminal and Gateway spectrum will dramatically increase the complexity of any auction process, and the potential for unintended consequences.**

**RJIL Response:**

1. The auction for various frequency bands for gateway and user links needs to be conducted independently, and there cannot be any bundling of spectrum as different service providers may have different plans. Therefore, no common bundling scheme is possible.
2. It will be the responsibility of a service provider to ensure that it bids for the required frequencies for user links and gateways to ensure that it can operate its networks. If it fails to win a certain frequency, it will still have the option to acquire the requisite spectrum from the successful bidder through trading/sharing/ leasing.
3. The above approach is not different from auctions conducted for terrestrial services, where a service provider may require a combination of frequency bands (e.g., sub-GHz, mid band, and high band) for successful operation. In such cases, an operator carefully plans its bids, and no bundling is required.

**Stakeholder Comment(s):**

**GG. Satellite spectrum auctions are not required as a matter of constitutional law. Space-based communication is non-exclusive by its very nature and hence the**

Supreme Court order cannot be extrapolated to the satellite spectrum. the Presidential Reference also confirms that the findings of the 2G Judgment regarding auctions should not apply to the allocation of satellite spectrum. In the case of shared access by all satellite providers, spectrum is neither “transferred” nor “alienated” -its use by one operator does not prevent use by another. it is extremely ill-advised to force-fit auctions tailored for terrestrial mobile spectrum use onto satellite services.

**RJIL Response:**

As explained in the previous section of this response, such understanding regarding exclusivity by the stakeholders is incorrect. It is coloured by the strong wish to get the scarce natural resource at the charges which are nearly free and also get it on first cum first serve basis on the basis of priority set at ITU. Since the priority at ITU does not follow any transparent bidding process, that cannot be the basis of the assignment of spectrum in a free and democratic country.

The presidential reference was regarding the methods to be used for alienation / allotment of natural resources other than spectrum. No reference has been made to the satellite spectrum. Therefore, the Supreme Court Judgement in the 2G case applies to the spectrum for satellite services as well, and the spectrum for space based communication services needs to be exclusively assigned to service providers to enable interference free operations.

**Stakeholder Comment(s):**

**HH. Auction will result in building and launching of satellites only after an auctioning process**

**RJIL Response:**

1. Several satellite operators are either in the process of launching or have already launched their satellites. None of these service providers has linked their rollout plans to the spectrum assignment in any of the countries. Therefore, going forward, the process for launching the satellites will be as per the current processes only. It is only at the time of seeking market access i.e., spectrum assignment in the country, a service provider will have to participate in an auction. The service provider can also use such spectrum through other market mechanisms, such as sharing/leasing/trading for the provision of services.

**Stakeholder Comment(s):**

**II. Regarding satellite spectrum licenses for earth stations, no roll-out requirements are necessary. For satellite spectrum licenses for space stations, the ITU establishes regulatory deadlines for bringing GSO and NGSO satellite filings into use.**

**RJIL Response:**

The regulatory deadlines set by ITU for satellite deployment pertain to the satellite system as a whole and do not guarantee the launch or service rollout in any particular country. To ensure optimal utilization of scarce spectrum resources, it is essential to assign them through auctions with prescribed roll-out obligations. Hence, the ITU deadlines and the Minimum Roll-Out (MRO) requirements in auctions are separate requirements and serve different purposes.

**Stakeholder Comment(s):**

**JJ. For co-frequency, co-directional GSO and NGSO earth stations operating in bands subject to ITU-R EPFD limits (see ITU-R Radio Regulations, Art. 22), no protection distance on the ground are necessary to avoid interference. The User links can also operate in the Gateway Location. Instead of a coordination threshold distance, a power flux-density (PFD) threshold or another technical threshold for such coordination be adopted.**

**KK. TRAI should adopt sharing rules between satellite systems that encourage cooperation, competition, and efficient use of spectrum. For example, the TRAI could consider a spectrum splitting last resort where satellite operators would have to evenly split available spectrum only during in-line events if they have not completed private coordination before they both commence service. To create further incentives to build efficient systems, Regulators could also consider awarding first choice in the split to the more efficient, flexible, and robust system.**

**LL. There is need to implement rules that determine a coordination distance threshold in the order of 100 km, requiring new NGSO gateway to seek coordination with existing gateway licensees**

**RJIL Response:**

1. In flexible use, the SESG and Terrestrial may experience interference issues when using the same spectrum. Hence, a coordination threshold limits in terms of coordination

distance and/or Power Flux Density (PFD), as determined by WPC should be prescribed for various satellite gateway locations.

2. The use of spectrum splitting, as a means to tackle in-line events in NGSO systems can be avoided by assigning exclusive frequencies to each service provider through auction. Such recommendations for spectrum splitting by stakeholders in a nascent satellite market in India suggest that interference coordination would be highly difficult and will become a bottleneck for the growth of satellite services when many players use the same shared spectrum under an administrative regime.
3. Also, the adoption of choice based mechanism to assign the first choice in the split to a more efficient, flexible, and robust NGSO system would ensure unfair assignment and result in a non-level playing field to other NGSO systems. Hence, the exclusive assignment of spectrum through an auction for NGSO systems, as outlined in this response, should be adopted.
4. The suggestion of having a coordination distance threshold in the order of 100 km is not recommended as it will greatly limit/ reduce the number of gateway locations in the country. The minimum coordination distance threshold shall be decided by WPC by conducting an analysis at each gateway location at the time of assignment.

**Stakeholder Comment(s):**

**MM. By utilizing the Unified License as the basis for assigning spectrum, regulatory authorities can ensure that the assignment process is transparent, consistent, and aligned with existing regulatory frameworks.**

**RJIL Response:**

Combining spectrum assignment with a Unified License equates to administrative assignment that was the norm prior to 2G case judgement. In our response, we have extensively outlined the reasons why administrative assignment lacks transparency and contravenes the legal validity in the assignment. Further, the unified license is not provided through auction or bidding process, therefore, no scarce resource like spectrum can be bundled with the license.

**Stakeholder Comment(s):**

**NN. The same spectrum is shared across many services like satellite-broadband, DTH, VSAT (CUG) and governmental users like Defence, maritime, etc. Grant of exclusive**

rights in such a scenario would affect a wide range of services. Also exclusive satellite spectrum assignment would be disruptive to existing users (ISRO satellites and foreign satellites using C, Ku and Ka bands), especially if it result to someone other than the existing spectrum users gaining exclusive rights to that spectrum.

**RJIL Response:**

1. Grant of exclusive spectrum would aid in the proliferation of services without interference issues. Such grant of the exclusive spectrum is currently practiced in the Indian telecom sector for all the space based services (satellite-broadband, DTH, VSAT (CUG) etc.) under the administrative regime. Hence, is it incorrect to assume that an exclusive satellite spectrum would be disruptive to existing users since all the existing users in India are granted spectrum on an exclusive basis, either in terms of different frequencies or in terms of the same frequencies in different angular sectors.
2. Hence. the spectrum for all the services such as satellite-broadband, DTH, VSAT (CUG) etc. should be assigned through an auction on flexible use basis. These services are primarily served through GSO satellites in India, for which we have already stated that the auction would be done on an angular sector basis, where the spectrum reuse is facilitated between each of the angular sectors. Hence, in our view, there will be no dearth of spectrum blocks for allocating to the existing and new entrants for these services through auction.
3. In the case of NGSO, due to the very nature of these constellations, the concept of angular sector is not present, and hence the spectrum for user links should be assigned exclusively to each service provider through band segmentation. The user who could not get the spectrum through auction may use other means such as sharing/leasing/trading of spectrum from the successful bidder.
4. This situation is similar to an entity that has built towers before the assignment of spectrum, the options with such an entity are to either win spectrum in the auction or use the other methods like sharing/leasing.

**Stakeholder Comment(s):**

**OO. Satellite has international encumbrances and auctioning would render the satellite constellation operator at the mercy of a service provider for spectrum sharing in a specific market. Swapping/ harmonizing of spectrum is not possible as same frequencies are configured across the globe and required in each country by satellite operator for both user links and ground stations.**

### **RJIL Response:**

1. As detailed earlier, the assignment of spectrum within a nation's jurisdiction is an inherent sovereign right, and ITU has no role in guaranteeing specific spectrum assignments in every country worldwide. This is true for any country, and it has nothing to do with whether such spectrum assignment is being done on an administrative basis or auction basis. **Therefore, the contention about the possibility of restricted market access due to auction based assignment is inherently flawed. Infact the purpose of sovereign licensing is to provide the market access, and auction is to provide the right to sovereign resources like spectrum. Therefore, any entity seeking market access in the country is obliged to follow the law of the land and cannot demand resources without following the law.**
2. Further, as detailed in our response to the consultation paper, the spectrum assignment for ground stations i.e., satellite earth station gateway (SESG) would be based on location where the service provider will have exclusive use to the complete spectrum band. Since, the user terminals are ubiquitous in nature, the service provider should be assigned spectrum on an exclusive basis to ensure interference operations.
3. The sharing regime should be devised so that the players are encouraged to share their auction assigned spectrum. The satellite constellation operator shall not be at the mercy of the service provider because the rules of the sharing are equally applicable across all service providers. The satellite operator cannot provide the services without becoming a service provider by taking appropriate UL authorization for space based communication services.

### **Stakeholder Comment(s):**

**PP. The band 27.5-29.5 GHz should be completely assigned to satellite services due to following reasons:-**

- **This band was not identified for IMT at WRC-19. This band is protected by the ITU-R for satellite broadband services incl. earth stations in motion (ESIM) and is under study for expanded satellite use in WRC-23 Agenda Items 1.16 (non-geostationary ESIM) and 1.17 (satellite-to-satellite links).**
- **The demand can be adequately met using the 3.25 GHz of spectrum in the n258 band (24.25-27.5 GHz). This n258 band was auctioned in India remained unsold as the operators decided not to purchase the entire band. Also, “flexible use” or IMT (South Korea, the U.S. and Japan) have seen limited terrestrial deployments in 28 GHz band.**
- **The Parliamentary Standing Committee on Information Technology (2020-21) of the Seventeenth Lok Sabha presented a report on "India's Preparedness for 5G" to the Indian Parliament on 8th February 2021. The report highlighted that the**

spectrum for 5G IMT should only be utilized up to 27.5 GHz and not extended to 28.5 GHz.

- Losing the band for “flexible use” or IMT allocation would seriously impair preclude India from benefits of the many new Ka-band GSO and NGSO HTS systems (including ISRO satellites) that make use of this band.
- The only possible arrangement would be for IMT to be allowed as a secondary use, on a non-interference/non-protection basis.
- Flexible use of spectrum not feasible, mainly for broadcast services like DTH, where user terminals are deployed everywhere.

**RJIL Response:-**

1. Any assignment of an IMT band for other services and restricting IMT usage will seriously deprive the mobile operators with such valuable spectrum resource and lead to inefficient utilization of spectrum.
2. 3GPP N257 Band covers 26.5 to 29.5 GHz band remains the world's most tested 5G band. Following WRC-15, the manufacturers and mobile operators that are interested in deploying mobile in the 28 GHz have established what is called '5G 28 GHz Frontiers' that conduct their meetings in association with the ITU-RWP 5D meetings which is concerned with IMT. These countries include Canada, India, Japan, Korea, New Zealand and Singapore, and they aim to progress the global 5G market in support of the frequency 26.5-29.5 GHz band.
3. Given the need for greater bandwidth required by India, as India's telecommunication penetration is primarily driven by wireless networks, the mmWave has great potential to meet spectrum requirements for high bandwidth 5G & 6G use cases. Given the assignment period of spectrum via auctions for 20 years, a long-term perspective should be considered in making this band available for both **IMT & Satellite on flexible use basis for the service providers through auction.**
4. The concept of flexible use of spectrum extends this principle by allowing a service provider to utilize the same spectrum for multiple technologies concurrently or otherwise. However, such flexible use of spectrum is subject to the technical feasibility of using a certain frequency band for certain services. If technically feasible, a service provider can use the spectrum for multiple technologies by itself or through sharing arrangements with another service provider.
5. Therefore, such flexible use of spectrum must be enabled in the spectrum assignment conditions, and there should not be any artificial inhibitions. Needless to mention, such right to make flexible use will be exercised by the service provider only when it is technically feasible to do so.

**Details on Angular Sectors with 3 degree orbital gap**

| <b>Angular Sector (AS)</b> | <b>From Degree</b> | <b>To Degree</b> |
|----------------------------|--------------------|------------------|
| A                          | 45                 | 48               |
| B                          | 48                 | 51               |
| C                          | 51                 | 54               |
| D                          | 54                 | 57               |
| E                          | 57                 | 60               |
| F                          | 60                 | 63               |
| G                          | 63                 | 66               |
| H                          | 66                 | 69               |
| I                          | 69                 | 72               |
| J                          | 72                 | 75               |
| K                          | 75                 | 78               |
| L                          | 78                 | 81               |
| M                          | 81                 | 84               |
| N                          | 84                 | 87               |
| O                          | 87                 | 90               |
| P                          | 90                 | 93               |
| Q                          | 93                 | 96               |
| R                          | 96                 | 99               |
| S                          | 99                 | 102              |
| T                          | 102                | 105              |
| U                          | 105                | 108              |
| V                          | 108                | 111              |
| W                          | 111                | 114              |

**Spectrum assignment details for DTH***(Source: <https://www.lyngsat.com/>)*

| S.No. | Orbital Slot | Angular Sector | Spectrum (GHz)<br>(Centre fx) | Transponder | Satellite | Service Provider  |
|-------|--------------|----------------|-------------------------------|-------------|-----------|-------------------|
| 1     | 108.2°       | V              | 11483 H                       | SAH21       | SES 7     | Bharti Airtel Ltd |
| 2     | 108.2°       | V              | 11520 V                       | SAV12       | SES 7     | Bharti Airtel Ltd |
| 3     | 108.2°       | V              | 11520 H                       | SAH22       | SES 7     | Bharti Airtel Ltd |
| 4     | 108.2°       | V              | 11560 V                       | SAV13       | SES 7     | Bharti Airtel Ltd |
| 5     | 108.2°       | V              | 11560 H                       | SAH23       | SES 7     | Bharti Airtel Ltd |
| 6     | 108.2°       | V              | 11600 V                       | SAV14       | SES 7     | Bharti Airtel Ltd |
| 7     | 108.2°       | V              | 11600 H                       | SAH24       | SES 7     | Bharti Airtel Ltd |
| 8     | 108.2°       | V              | 11640 V                       | SAV15       | SES 7     | Bharti Airtel Ltd |
| 9     | 108.2°       | V              | 11640 H                       | SAH25       | SES 7     | Bharti Airtel Ltd |
| 10    | 108.2°       | V              | 11680 V                       | SAV16       | SES 7     | Bharti Airtel Ltd |
| 11    | 108.2°       | V              | 11680 H                       | -           | SES 7     | Bharti Airtel Ltd |
| 12    | 108.2°       | V              | 12281 H                       | SAH17       | SES 9     | Bharti Airtel Ltd |
| 13    | 108.2°       | V              | 12281 V                       | SAV17       | SES 9     | Bharti Airtel Ltd |
| 14    | 108.2°       | V              | 12341 H                       | SAH18       | SES 9     | Bharti Airtel Ltd |
| 15    | 108.2°       | V              | 12341 V                       | SAV18       | SES 9     | Bharti Airtel Ltd |
| 16    | 108.2°       | V              | 12591 V                       | SAV22       | SES 9     | Bharti Airtel Ltd |
| 17    | 108.2°       | V              | 12651 V                       | SAV23       | SES 9     | Bharti Airtel Ltd |
| 18    | 108.2°       | V              | 12711 H                       | SAH24       | SES 9     | Bharti Airtel Ltd |
| 19    | 108.2°       | V              | 12711 V                       | SAV24       | SES 9     | Bharti Airtel Ltd |
| 20    | 83.0°        | M              | 10970 V                       | -           | G-Sat 10  | Tata Play         |
| 21    | 83.0°        | M              | 10970 H                       | -           | G-Sat 30  | Tata Play         |
| 22    | 83.0°        | M              | 11010 V                       | -           | G-Sat 10  | Tata Play         |
| 23    | 83.0°        | M              | 11010 H                       | -           | G-Sat 30  | Tata Play         |
| 24    | 83.0°        | M              | 11050 V                       | -           | G-Sat 10  | Tata Play         |
| 25    | 83.0°        | M              | 11050 H                       | -           | G-Sat 30  | Tata Play         |
| 26    | 83.0°        | M              | 11090 V                       | -           | G-Sat 10  | Tata Play         |
| 27    | 83.0°        | M              | 11090 H                       | -           | G-Sat 30  | Tata Play         |
| 28    | 83.0°        | M              | 11130 V                       | -           | G-Sat 10  | Tata Play         |
| 29    | 83.0°        | M              | 11130 H                       | -           | G-Sat 30  | Tata Play         |
| 30    | 83.0°        | M              | 11170 V                       | -           | G-Sat 10  | Tata Play         |
| 31    | 83.0°        | M              | 11170 H                       | -           | G-Sat 30  | Tata Play         |
| 32    | 83.0°        | M              | 11470 V                       | -           | G-Sat 10  | Tata Play         |
| 33    | 83.0°        | M              | 11470 H                       | -           | G-Sat 30  | Tata Play         |
| 34    | 83.0°        | M              | 11510 V                       | -           | G-Sat 10  | Tata Play         |
| 35    | 83.0°        | M              | 11510 H                       | -           | G-Sat 30  | Tata Play         |
| 36    | 83.0°        | M              | 11550 V                       | -           | G-Sat 10  | Tata Play         |

|    |       |   |         |        |           |                |
|----|-------|---|---------|--------|-----------|----------------|
| 37 | 83.0° | M | 11550 H | -      | G-Sat 30  | Tata Play      |
| 38 | 83.0° | M | 11590 V | -      | G-Sat 10  | Tata Play      |
| 39 | 83.0° | M | 11590 H | -      | G-Sat 30  | Tata Play      |
| 40 | 83.0° | M | 11630 V | -      | G-Sat 10  | Tata Play      |
| 41 | 83.0° | M | 11630 H | -      | G-Sat 30  | Tata Play      |
| 42 | 83.0° | M | 11670 V | -      | G-Sat 10  | Tata Play      |
| 43 | 83.0° | M | 11670 H | -      | G-Sat 30  | Tata Play      |
| 44 | 93.5° | Q | 11510 H | 8      | G-Sat 15  | Dish TV        |
| 45 | 93.5° | Q | 11590 H | 10     | G-Sat 15  | Dish TV        |
| 46 | 95.0° | Q | 12464 H | SAHF10 | SES 8     | Dish TV        |
| 47 | 95.0° | Q | 12535 V | SEVC1  | SES 8     | Dish TV        |
| 48 | 95.0° | Q | 12595 V | SEVC3  | SES 8     | Dish TV        |
| 49 | 95.0° | Q | 12647 H | SEHC6  | SES 8     | Dish TV        |
| 50 | 95.0° | Q | 12688 V | SEVC7  | SES 8     | Dish TV        |
| 51 | 95.0° | Q | 12688 H | SEHC8  | SES 8     | Dish TV        |
| 52 | 95.0° | Q | 12729 V | SEVC9  | SES 8     | Dish TV        |
| 53 | 88.0° | O | 11050 H | -      | ST 2      | D2H (Videocon) |
| 54 | 88.0° | O | 11164 V | -      | ST 2      | D2H (Videocon) |
| 55 | 88.0° | O | 11164 H | -      | ST 2      | D2H (Videocon) |
| 56 | 88.0° | O | 11483 V | K1A    | ST 2      | D2H (Videocon) |
| 57 | 88.0° | O | 11483 H | K1B    | ST 2      | D2H (Videocon) |
| 58 | 88.0° | O | 11546 V | K2A    | ST 2      | D2H (Videocon) |
| 59 | 88.0° | O | 11546 H | K2B    | ST 2      | D2H (Videocon) |
| 60 | 88.0° | O | 11609 V | K3A    | ST 2      | D2H (Videocon) |
| 61 | 88.0° | O | 11609 H | K3B    | ST 2      | D2H (Videocon) |
| 62 | 88.0° | O | 11672 V | K4A    | ST 2      | D2H (Videocon) |
| 63 | 88.0° | O | 11672 H | K4B    | ST 2      | D2H (Videocon) |
| 64 | 91.5° | P | 12276 H | 13KH   | Measat 3b | Sun Direct     |
| 65 | 91.5° | P | 12316 H | 14KH   | Measat 3b | Sun Direct     |
| 66 | 91.5° | P | 12436 H | 17KH   | Measat 3b | Sun Direct     |
| 67 | 91.5° | P | 12476 H | 18KH   | Measat 3b | Sun Direct     |
| 68 | 91.5° | P | 12523 V | 7KV    | Measat 3b | Sun Direct     |
| 69 | 91.5° | P | 12563 V | 8KV    | Measat 3b | Sun Direct     |
| 70 | 91.5° | P | 12603 V | 9KV    | Measat 3b | Sun Direct     |
| 71 | 91.5° | P | 12643 V | 10KV   | Measat 3b | Sun Direct     |
| 72 | 91.5° | P | 12683 H | 23KH   | Measat 3b | Sun Direct     |
| 73 | 93.5° | Q | 11090 V | 16     | G-Sat 15  | Free Dish      |
| 74 | 93.5° | Q | 11170 V | 18     | G-Sat 15  | Free Dish      |
| 75 | 93.5° | Q | 11470 V | 19     | G-Sat 15  | Free Dish      |
| 76 | 93.5° | Q | 11510 V | 20     | G-Sat 15  | Free Dish      |
| 77 | 93.5° | Q | 11550 V | 21     | G-Sat 15  | Free Dish      |
| 78 | 93.5° | Q | 11630 V | 23     | G-Sat 15  | Free Dish      |

### **Spectrum assignment details for Teleports**

*(Source: <https://new.broadcastseva.gov.in/>)*

| S.No. | Orbital slot | Angular Sector | Frequency (MHz.)  | Satellite    | STV No              | Company   |
|-------|--------------|----------------|-------------------|--------------|---------------------|---|
| 1     | 83°          | M              | 6065.50 - 3840.50 | GSAT-30      | NA                  | N.K. Power and Infrastructure Pvt. Ltd.         |
| 2     | 68.5°        | H              | 6092.00 - NA      | IS-20        | 7 - STV-100/01      | Indiasign Pvt. Ltd.                             |
| 3     | 76.5°        | K              | 6267.00 - NA      | APSTAR-7     | 6 - STV-118/1+1 S/B | Indiasign Pvt. Ltd.                             |
| 4     | 66           | G              | 6092.00 - NA      | IS-17        | 5 - STV-70/02       | Indiasign Pvt. Ltd.                             |
| 5     | 68.5°        | H              | 5941.00 - NA      | IS-20        | 4 - STV-92/01       | Indiasign Pvt. Ltd.                             |
| 6     | 93.5°        | Q              | 6120.00 - NA      | GSAT-17      | 3 - STV-127/01      | Indiasign Pvt. Ltd.                             |
| 7     | 68.5°        | H              | 6335.50 - NA      | IS-20        | 2 - STV-96/01       | Indiasign Pvt. Ltd.                             |
| 8     | 83°          | M              | 6172.00 - 3947.00 | GSAT-10      | 3 - STV-126/01      | Tata Communications Ltd                         |
| 9     | 105.5°       | U              | 6347.00 - 4122.00 | ASIASET-7    | 2 - STV-124/01      | Tata Communications Ltd                         |
| 10    | 105.5°       | U              | NA - NA           | ASIASET-7    | STV-119/1+1 S/B     | PLANETCAST MEDIA SERVICES LIMITED               |
| 11    | 105.5°       | U              | 6230.00 - NA      | ASIASET-7    | 1 - STV - 39/01     | Sahara Sanchar Limited                          |
| 12    | 51.5°        | C              | 6347.00 - NA      | CHAINASET-12 | 1 - STV-80/01       | RAJ TELEVISION NETWORK LIMITED                  |
| 13    | 100.5°       | S              | 5987.00 - NA      | ASIASAT-5    | 1 - STV-103/01      | SILVERSTAR COMMUNICATIONS LIMITED               |
| 14    | 105.5°       | U              | 6350.00 - NA      | ASIASET-7    | 1 - STV-72/01       | Skyline Tele Media Srvce Ltd.                   |
| 15    | 105.5°       | U              | 5990.00 - NA      | ASIASET-7    | 1 - STV-91/01       | SRI VENKATESWARA BHAKTI CHANNEL PRIVATE LIMITED |
| 16    | 105.5°       | U              | 6403.50 - NA      | ASIASET-7    | 1 - STV-7/01        | RP TECHVISION INDIA PRIVATE LIMITED             |
| 17    | 105.5°       | U              | 6258.00 - NA      | ASIASET-7    | 1 - STV-113/1+1     | Surya Processed Food Pvt. Ltd.                  |
| 18    | 66           | G              | 6052.00 - NA      | IS-17        | 1 - STV-60/1        | Tata Communications Ltd                         |
| 19    | 68.5°        | H              | 6395.50 - NA      | IS-20        | 1 - STV-101/01      | TV TODAY NETWORK LIMITED                        |
| 20    | 105.5°       | U              | NA - NA           | ASIASET-7    | 1 - STV-120/01      | SUMMA REAL MEDIA PRIVATE LIMITED                |

|    |        |   |              |           |   |   |
|----|--------|---|--------------|-----------|---|---|
| 21 | 66     | G | 6132.00 - NA | IS-17     | 1 - STV-49/1+1, 2 - STV-50/1+1  | SUN TV NETWORK LIMITED                    |
| 22 | 105.5° | U | 6224.10 - NA | ASIASET-7 | 1 - STV 32/01, 2 - STV 62/01, 3 - STV 62/02, 4 - STV 104/01, 5 - STV 06/01, 6 - STV 06/02   | TV 18 BROADCAST LTD.                      |
| 23 | 105.5° | U | 6136.00 - NA | ASIASET-7 | STV-12/01, STV-12/01, STV-12/09, STV-125/01, STV-12/10, STV-82/03, STV-82/02, STV-82/08, STV-82/10, STV-110/1+1 S/B, STV-110/02, STV-82/09, STV-87/04, STV-87/10, STV-2019/TEMP-01/1+1 S/B, STV-94/01 | PLANETCAST MEDIA SERVICES LIMITED         |
| 24 | 105.5° | U | 6132.00 - NA | ASIASET-7 | STV-89/01   | PLANETCAST MEDIA SERVICES LIMITED         |
| 25 | 105.5° | U | 6110.00 - NA | ASIASET-7 | 1 - STV - 54/01, 2 - STV - 54/02  | RACHANA TELEVISION PRIVATE LIMITED        |
| 26 | 83°    | M | 6236.00 - NA | GSAT-10   | 1 - STV-68/01   | PRIDE EAST ENTERTAINMENTS PRIVATE LIMITED |
| 27 | 66     | G | 6132.00 - NA | IS-17     | 1 - STV No 42/03  | NEW DELHI TELEVISION LIMITED              |
| 28 | 105.5° | U | 6061.00 - NA | ASIASET-7 | 1 - STV-63/01   | ORTEL COMMUNICATIONS LTD./.               |
| 29 | 83°    | M | 5972.00 - NA | GSAT-30   | 1 - STV-28/01   | Indiasign Pvt. Ltd.                       |
| 30 | 105.5° | U | 6270.00 - NA | ASIASET-7 | 1 - STV-01/01, 2 - STV-102/01, 3 - STV-122/01   | LAMHAS SATELLITE SERVICES LIMITED         |
| 31 | 68.5°  | H | 6143.00 - NA | IS-20     | 1 - STV-81/01   | INDEPENDENT NEWS SERVICE PVT. LTD         |
| 32 | 105.5° | U | 6079.00 - NA | ASIASET-7 | 1 - STV-40/01   | KASTHURI MEDIAS PRIVATE LIMITED           |
| 33 | 93.5°  | Q | 5887.00 - NA | GSAT-17   | 1 - STV-93/01   | INFORMATION TV PRIVATE LIMITED            |
| 34 | 68.5°  | H | 6346.50 - NA | IS-20     | 1 - STV-10/1+1  | MAVIS SATCOM LIMITED                      |
| 35 | 105.5° | U | 6202.00 - NA | ASIASET-7 | 1 - STV - 37/1  | M.H. ONE TV NETWORK LIMITED               |
| 36 | 105.5° | U | 6172.00 - NA | ASIASET-7 | 1 - STV- 58/01  | BRAHMAPUTRA TELE-PRODUCTIONS PVT. LTD.    |

|    |        |   |              |           |   |   |
|----|--------|---|--------------|-----------|---|---|
| 37 | 68.5°  | H | 5996.00 - NA | IS-20     | 1 - STV-108/1   | Aastha Broadcasting Network Ltd             |
| 38 | 105.5° | U | 5945.00 - NA | ASIASET-7 | 1 - STV - 45/1  | M/s. ABP Network Pvt. Ltd.                  |
| 39 | 93.5°  | Q | 6196.00 - NA | GSAT-17   | 1 - STV-69/01   | BROADCAST EQUIPMENTS INDIA PVT. LTD.        |
| 40 | 105.5° | U | 6319.00 - NA | ASIASET-7 | 1 - STV-24/01   | CALCUTTA TELEVISION NETWORK PRIVATE LIMITED |
| 41 | 68.5°  | H | 6017.00 - NA | IS-20     | 1 - STV-97/01   | COMSAT SYSTEM PVT. LTD.                     |
| 42 | 68.5°  | H | 6020.25 - NA | IS-20     | 1 - STV-4/03, 2 - STV-4/04, 3 - STV-4/05                            | BENNETT COLEMAN AND COMPANY LIMITED         |
| 43 | 83°    | M | 6083.00 - NA | GSAT-10   | 1 - STV - 64/01   | EASTERN MEDIA LIMITED                       |
| 44 | 105.5° | U | 6367.00 - NA | ASIASET-7 | NA  | AM Television Pvt. Ltd                      |
| 45 | 83°    | M | 6372.00 - NA | INSAT-4A  | 1 - STV No 11/1, 2 - STV No 41/1, 3 - STV No 41/2, 4 - STV NO 121/1 | DISH TV INDIA LIMITED                       |
| 46 | 105.5° | U | 6212.00 - NA | ASIASET-7 | 1 - STV-105/01, 2 - STV-106/1                                       | EENADU TELEVISION PVT. LTD.                 |
| 47 | 68.5°  | H | 6005.43 - NA | IS-20     | 1 - STV-78/01, 2 - STV-107/01                                       | Indo Teleports Limited                      |
| 48 | 83°    | M | 6107.00 - NA | GSAT-30   | 1 - STV-65/01   | INDIRA TELEVISION LIMITED                   |