

Counter comments to the various comments filed by stakeholders on the Consultation Paper on Auction of Spectrum in frequency bands identified for IMT/5G

VSAT Services Association of India is pleased to offer its counter comments to the comments filed by the various stakeholders on the TRAI Consultation Paper on Auction of Spectrum in frequency bands identified for IMT/5G. The Government in the recent past has announced many telecom reforms. The new spacecom policy is on the anvil and is aimed to bring in greater private sector participation. Today more than 70% of the Indian population lives in areas where broadband penetration is still a big challenge. The Government has rightly recognized the need for complementing the terrestrial infrastructure with the satellite medium. The earlier Secretary Telecom Ms. Aruna Sundarajan highlighted the fact that there is over reliance on the mobile infrastructure and suitable complementing technologies and options need to be identified to mitigate this big risk.

The Government has embarked on a very ambitious PM-WANI program to deploy wifi hotspots all across the country. Recognizing the role that can be played by satellite, a number of reforms including allowing wireless backhauls by satellite, enabling low-bit rate applications such as IoT using satellite and other similar reforms are either announced or underway. A number of startups have begun work on building and launching satellites with the help of Indian Space Research Organization. A number of these initiatives require spectrum.

Satellite spectrum unlike terrestrial spectrum is shared by a wide range of users that include Government departments, defense entities, disaster relief and management agencies, many rural initiatives of the Government and last but not the least private entities who are licensed to provide satellite broadband services. Protection of satellite spectrum is very important for the growth of satellite broadband services in the country. The earlier Secretary DoS and Chairman ISRO Mr. Kirankumar had stated that India has only 50% of the capacity that it needs. The High Throughput Satellites both in the GSO and NGSO orbits are expected to bridge this gap and make satellite broadband affordable. Keep all this in mind and the analysis of the various comments, we feel that the responses broadly fall into the categories mentioned below. We are pleased to present our counter comments on the same.

1. The identification and auction of the mmWave band 24.25-28.5 GHz for IMT/5G.
2. Earmarking of spectrum either in the identified or non identified bands for private/localized 5G networks
3. Request for the authority to recommend fresh identification of bands not already identified for 5G
4. Auctioning of spectrum used for satellite services.

Identification and auction of mmWave band 24.25-28.5 GHz for IMT/5G

In the recent past, the identification of mmWave spectrum for 5G has gained a lot of traction. Different IMT players have argued that mmWave spectrum is very essential for the success of 5G rollouts. Additional arguments have been made that the device ecosystem exists today and is well positioned to leverage the mmWave bands. As a satellite association we would like to present the following facts:

1. The WRC 2019 identified 3.25 GHz in the 26GHz band for 5G/IMT (24.25-27.5 GHz). In addition the WRC 2019 also identified 14 GHz of additional spectrum in the mmWave bands. However, there was no spectrum identified in the 28 GHz band.

2. It is often quoted that some of the countries have identified spectrum in the 28 GHz bands on their own (without any such identification done by the ITU). These countries did such identification before the WRC 2019 got concluded. Many of these countries are either highly fiberised geographies or did so for certain legacy reasons.
3. In South Korea, in spite of a portion of the 28 GHz band being identified for IMT/5G and also allocated through auction with roll-out obligations to deploy 45,000 base stations (allocated in 2018), till date, only 161 base stations have been deployed in the 28 GHz band.
4. In the US, the FCC for legacy reasons, allocated 850 MHz of spectrum in the 28 GHz band - 27.5-28.35.
5. However, recently the FCC Chairwoman Jessica Rosenworcel went on record to say the following - ***“I think that the FCC made a mistake a few years ago when it focused all of its energies in the early 5G days on the spectrum called millimetre wave. Those are airwaves that are really high up there they have lots of capacity but their signals don’t travel very far. And so what that means is that you have to have lots of ground-based facilities to make those signals viable. And that’s a really costly thing to do. And so, if we just relied on millimeter wave spectrum we’d actually grow the digital divide with 5G.”***
6. One of the leading cellular operators of the country Reliance Jio has admitted in its submission (in response to Q.53) that 5G base stations are required every 50-100 meters if they are operated in the 28GHz band. It also goes to say that the deployment of such base stations in the 28 GHz band is going to be a lot more expensive (100s multiple of the deployments in the current bands).
7. It is evident from all these submissions, the 28GHz band if at all would be used only in pockets for enhancing capacity rather than achieving an uniform reach all across the country.
8. Taking away 1 GHz of the 28 GHz spectrum (27.5-28.5 GHz) from satellite services for which it was originally allocated by the ITU increase the digital divide rather than reducing it
 - a. Satellites today serve the rural and remote areas across multiple geographies
 - b. Only 50% of India’s satellite capacity needs are met by GSAT satellites. The remaining 50% are met by foreign satellites, which operate in the 28 GHz band.
 - c. If the crucial 1 GHz of spectrum (27.5-28.5 GHz) is taken away for IMT/5G, each satellite that has a potential of serving the rural and remote areas of India will have a capacity impairment of 50%
9. **Our methodology of auctioning and assigning spectrum circle/LSA wise will make the situation worse as this crucial spectrum will only be utilized in certain hotspots in the cities and will remain unutilized in areas outside the cities. This will result in a huge wastage of the country’s precious resources.**
10. Thereport referenced by the URL <http://www.strategies.nzl.com/industry-comment/dedicating-28ghz-spectrum-band-to-satellite-services/> clearly outlines the economic value that can be derived from dedicating the 28 GHz band for satellite.
11. **It is apparent that the usefulness of the mmWave spectrum in widespread rollout has not been proven anywhere across the world. So we urge the authority to recommend the use of the 26 GHz band initially for the IMT/5G rollout (24.25 - 27.5 GHz). Subsequently, this can be expanded to the freshly identified 14 GHz of spectrum in the mmWave band.**

Earmarking of spectrum either in the identified or non identified bands for private/localized 5G networks

Many respondents to the consultation paper also have asked for mmWave allocation for private 5G networks. ISpA requests the authority to proceed with caution while making recommendations on the use of mmWave spectrum for private 5G networks. The authority may kindly consider the following points:

1. Private 5G networks are not essentially indoor deployments. They can be outdoor deployments, but within a campus or a private area.
2. Any private 5G network that operates in the 28 GHz band will directly conflict and impair the usage of this band for the crucial satellite deployments in the country.
3. While, one might argue that the 28 GHz is a transmit band for satellites and if all satellites can potentially cause interference to 5G deployments, this is certainly not the complete picture. Modern satellites have highly sensitive receivers in order to support smaller terminals on the ground. These receivers could potentially pick-up transmissions from 5G base stations and the same could impair the capacity of the satellites.
4. Any uncontrolled and de-licensed deployments will make this situation worse if the base station operation is not kept below the horizon or within certain power levels.
5. Since any such deployment could impair the satellite coverage over a given geographic area, the association does not recommend any deployment of a private 5G network in the 28 GHz band.

Auctioning of spectrum used for satellite services

One of the respondents (Reliance Jio) has recommended that allocation of satellite spectrum should also be done through auctions. We are addressing the same in the section below.

Specific to submissions made on the above points by Reliance Jio, we are point by point responding to the same.

Point no 1

The consultation paper is w.r.t. consultation for spectrum in in the 500 MHz, 600 MHz, 700 MHz, 800 MHz, 900 MHz,1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3670 MHz and 24.25 to 28.5 GHz.

Reliance Jio in response to Q8 & preface point no 5, has submitted in its response that the entire C-band spectrum & mm wave band should be made available for IMT/5G services on exclusive basis.

Response:

We would like to put following points for TRAI consideration:

- i) The C-band, other than 3300-3670 MHz and 24.25GHz – 28.5GHz is outside the scope of discussion of this consultation paper and should not be discussed. As most of the respondents have responded w.r.t. scope of consultation paper and questions asked thus it will not be fair to consider anything beyond scope of this consultation paper.
- ii) As spectrum in C-Band 3.7GHz- 4.2 and 4.5GHz to 4.8 GHz; 5.925 GHz to 7.125 GHz is already ear-marked for Fixed satellite services and millions of user terminals are already operating in this band.
- iii) There are hardly any examples of C-band beyond 3.8GHz, being used for providing IMT/5G services.
- iv) The Satellite Industry has reiterated the fact that the parallel between “access spectrum” for terrestrial and satellite networks in microwave frequencies does not stand, as the spectrum sharing mechanism is completely different. For terrestrial mobile services spectrum has to be managed by a single operator in a given geographic area and, therefore, cannot be shared amongst the operators, while in the case of satellites, the same spectrum can be used by multiple operators to serve the same geographic area.
- v) In other words, assignment by auction for satellite spectrum that can be shared between operators, such as the C/Ku/Ka bands, would lead to unnecessary segmentation and a very inefficient use of spectrum. For this reason, **there are no precedents of spectrum assignment by auction to satellite services in these bands in any country.**
- vi) The ask & rationale of allocating all the spectrum for IMT/5G services is against the principle of co-existence of various services – TV broadcasting, Fixed and mobile satellite services etc. Every service has its purpose to serving the nations & its citizens and cannot be shut down just for the sake of giving all the spectrum for IMT/5G services.
- vii) In fact, Reliance Jio in its submission in response to Q24 has submitted that there is no scarcity of spectrum for IMT services. *“The Authority should go beyond the myopic concerns like monopolization of spectrum resources, which are relevant only in the spectrum scarcity scenarios and focus on the optimum deployment and in deriving strategic dividend of spectrum allocation in 5G bands of 3300-3670 MHz and 24.25-28.5 GHz”.*
- viii) Moreover, the frequency band from 24.25-27.5GHz has been allocated for IMT/5G use by the ITU. The ITU has (as of WRC 2015, 2019 and the agenda for 2023) not considered the 28 GHz band for IMT/5G. The allocation of 24.25-27.5 GHz for IMT/5G gives 3.25 GHz of total spectrum in this band. Considering that there are four operators, a 800 MHz assignment is possible to each operator for immediate deployments. The World Radio Congress that was held in 2019, additional allocations (37- 43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, 66-76 GHz, 81-86 GHz) amounting to a total of 14 GHz were identified for IMT/5G deployments. **With this there is adequate spectrum for the growth of IMT/5G services.**

Considering all above, we want to submit that Reliance Jio demand for additional spectrum for IMT other than Sub Ghz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3670 MHz and 24.25 to 28.5 GHz should not be considered.

Point no 2

Reliance Jio in its response to Q7 & its Preface Point no 5, has submitted that considering importance of mmWave band for true 5G experience entire band from 24.25 – 29.5 GHz should be reserved for IMT/5G service.

Response:

- ix) Reliance Jio in its response to Q7, point2 refers that *“Currently, more than 160 operators in 44 countries have invested in 5G networks across the 24.25 GHz – 29.5 GHz spectrum”*.
- x) We would like to point out that in its own submission in point against Q53 that *“this spectrum is useful majorly to provide high speed data capacities in dense locations and is unlikely to be used to provide uniform coverage owing to limited coverage by mmWave radio which is limited to 50-100 meters and requires lot many radios in a small cluster to provide hotspot coverage”*. *“Thus, even if we consider, hotspot deployment, the cost of laying such a network will be 100s multiple of current spectrum bands deployed in the country”*.

- It is quite evident that the use of mmWave for providing 5G services beyond such dense locations is going to be rare and limited. This will be most in-efficient way of using the spectrum. Whereas in case of satellite services, the spectrum is not location dependant and will be available across the country.
- xi) We would like to clarify that most of the counties have implemented in 26Ghz range rather than 28Ghz. The examples of countries presented by Reliance Jio, aside from being the absolute exception in the global context, do not, in any way, lead to the conclusions above.
- xii) As a start, the auctions mentioned in Mexico, Thailand and Brazil are not for “satellite spectrum”, but for domestic filing/GSO orbital slots to which, of course, some spectrum will be associated. However, other satellite operators are still allowed, pending the relevant license/ authorization and satellite network coordination, to use the spectrum, as the spectrum, as such, is not being auctioned.

Point no 3

1. Jio is mixing up auctions for orbital slots, auctions for landing rights, and spectrum auctions.

Geostationary satellites all occupy a single ring above the equator and need to be spaced apart to avoid interference, therefore orbital slots at the same longitude as any country are limited and these are coordinated through filings at the ITU. Some countries (notably Brazil) have indeed used a market-based approach (i.e., auctions) to support filings made by the administration but meant to be used by private satellite companies.

Spectrum is part of those ITU filings, meaning that satellites deployed at that particular orbital slot can only use the filed spectrum range, however it does not mean this spectrum range can only be used by the said satellite in that country (or neighbouring countries). As previously submitted, several fixed satellite systems can share the same spectrum bands through international coordination. Without understanding this, one might quickly jump to the conclusion that the spectrum is the main object of those auctions as in terrestrial mobile case, whereas in fact the main object of the auctions is the orbital slot, and spectrum is just a technical factor of this orbital slot as filed by the local government at the ITU.

Note too that non-geostationary satellites (NGSOs) do not have “orbital slots” nor any particular longitude, meaning that since most NGSO constellations are global, and cover every nation, there is no argument that orbital slots are a scarce resource, as in Brazil, and thus no need to auction for NGSO locations.

2. Spectrum for Satellites is used differently than spectrum for mobile

The fundamental principle of an auction of any sort is to provide exclusive access to a resource where demand exceeds supply. This is often the case for terrestrial mobile operators where spectrum cannot be shared amongst the MNOs and each operator needs exclusive access to a particular spectrum range.

However, the auction mechanism does not work on a resource where the demand and supply are unquantifiable, and is accessed on a non-exclusive basis, such as the spectrum shared between multiple Fixed Satellite Service (FSS) operators. It is even more the case when, instead of nationally, the said spectrum is only used at a spot location such as satellite earth stations. In this scenario, spectrum should only be assigned administratively, and on a case-by-case basis.

3. Misleading country examples quoted by Jio

Having the common understanding regarding the two points above, we can move to examine the various cases referenced in Jio’s submission.

Thailand operates on a concession model and the Thaicom concession come to an end after 20 years. The auction mentioned in Jio’s submission is regarding the operating right of the ITU filings for GEO satellites previously operated by Thaicom. These filling included spectrum such as Ku and Ka-band, however although included in the auction of the orbital slots, both bands are still available for other satellite operators. Incidentally, the proposed orbit slot auction was cancelled several times during 2021 as only one bidder (Thaicom) manifested interest¹.

¹ <https://www.bangkokpost.com/business/2207283/satellite-bid-in-limbo>

CITC public consultation: Spectrum outlook for commercial and innovative use 2021-2023
[https://www.citc.gov.sa/ar/new/publicConsultation/Documents/Spectrum%20Outlook%20for%20Commercial%20and%20Innovative%20\(2021-2023\).pdf](https://www.citc.gov.sa/ar/new/publicConsultation/Documents/Spectrum%20Outlook%20for%20Commercial%20and%20Innovative%20(2021-2023).pdf)

In **Latin America**, there is no such view from administrations that satellite spectrum should be auctioned; this is not even a debate in the region and has never been. The social value of satellite services, their democratizing role in reducing digital poverty, and the fact that satellite operators (as opposed to terrestrial ones) actively share the same spectrum has been long well-understood in Latam. Satellite spectrum is assigned via long established administrative procedures that favour the sharing of frequencies by satellite operators and there's no indication across the region that this will change. Administrations in the region have implemented rules to facilitate the use of spectrum for satellite services (and stayed away of any auctioning). Recent examples of this are the new satellite regulations approved in **Brazil** in November 2021 and the draft spectrum fees soon to be approved in **Colombia**. Again, the examples Jio provides relate to orbital slots, not frequencies/spectrum, and OneWeb is also building gateways using Ka-band in all those countries.

In **Saudi Arabia**, CITC consulted for S-band for Mobile Satellite Services (MSS), as referenced in Jio's submission, but it limited the discussion to 2GHz used for IMT and MSS only. The outcome of the consultation has not been made public, and no auction has been carried out yet. However, MSS is notably different than FSS in several aspects. MSS terminals are deployed ubiquitously and use omnidirectional antennas which make it difficult to share spectrum among the MSS operators or with other services, therefore an MSS operator usually needs exclusive access to their spectrum in order to ensure there is no interference to their operation. This is similar to the way terrestrial mobile operators use spectrum. Therefore, the auction could be justified in the particular case of MSS bands, but this is very different scenario than FSS where sharing is much easier due to coordination between satellite operators, especially for gateways.

In another much wider consultation last year², CITC made it very clear that satellite bands were out of the discussion for auction and are protected. "Continued guaranteed and protected access to all existing satellite bands for current and future uses."