



**Annexure**

**IspA Response to TRAI's Consultation Paper on Auctioning of spectrum in frequency bands identified for IMT/5G**

**Question 8**

**Whether entire available spectrum referred by DoT in each band should be put to auction in the forthcoming auction? Kindly justify your response.**

**Answer 8**

7. For the frequency range 27.5-28.5 GHz, we would propose TRAI to recommend the following

(a) The spectrum from 27.5-28.5 GHz should be excluded from the auction for IMT/5G.

(b) However, in the event in spite of all of the satellite industry expressing its concerns, if the Government decides to allocate the 1 GHz (27.5-28.5 GHz) for IMT, in line with the principles laid down by ITU to protect incumbent services (28 GHz band being presently allocated to Satellite), the least that has to be ensured is the following:-

(i) Adequate protection & exclusion zones are provided for existing or proposed gateway locations.

(ii) Maintain access to the band for FSS and especially gateway feeder links - Gateways need to be protected by an exclusion zone (of appropriate radius depending on the case) and with the conditions put on IMT base stations that they operate only below the horizon as any operation above the horizon can cause interference to the satellites that are orbiting.

(iii) The total radiated power of the IMT base stations if operated in this band, should not exceed 91 dBw/M2/MHz at 5 meters above the ground level in the band from 27.5-28.5 GHz.



(iv) Maintain access to ESIMs (In-flight and maritime terminals) in the band 27.5-28.5 GHz with appropriate sharing conditions.

(v) Maintain access to subscriber terminals in the band 27.5-28.5 GHz with appropriate coordination criteria (secondary basis).

8. We would like to present the following justification

(a) The policy reforms unleashed by the Hon' ble Prime Minister has given rise to a lot of enthusiasm. The circumstances are ripe for leveraging existing opportunities to capture a major market share in areas of design, development and manufacturing in areas such as Launch Vehicles, Satellites, Payloads, Ground Segment and applications. The technologies so developed would also be beneficial to other segments like PNT, Remote Sensing etc. A number of startups are already working in developing satellites in the 28GHz spectrum. Allocating the satellite 28 GHz spectrum to 5G would cause irreversible damage to this sector in terms of loss of business for industry as well as loss of mammoth manufacturing opportunity on account of reduced demand from India.

(b) A recent study by PLUM Consulting has stated that the economic value of satellite broadband in unserved and underserved areas is in the order of US\$184.6 billion in GDP growth by the year 2030 (and especially in the spectrum band of 27.5-30 GHz as it is a prime band for satellite broadband).

(c) The frequency range 27.5-28.5 GHz is already used in many of the satellites that are launched or are in the build stage. The allocation of this range to IMT/5G will severely impair the services planned by these satellites, curtail the capacity available from these satellites besides discouraging investments in the space sector

(d) Considering the propagation characteristics of the 27.5-28.5 GHz frequency range, it is best suited for capacity enhancement in urban areas. However, satellites use the 27.5-28.5 GHz for service coverage all across the country. Additionally this band is used by satellite for providing coverage to subscribers who live in unserved and underserved areas.



(e) The recent pandemic has demonstrated that while the urban population switched to an on-line mode of learning, the population living outside the urban areas struggled to receive education. The single biggest factor being lack of quality broadband in the areas that have been poorly served by terrestrial communications.

(f) The Indian Space Research Organization (ISRO) has already manufactured satellites that use this band for the rural connectivity projects of the Government that use this band. If this band is allocated for IMT/5G, some of these programs will be set back by several years and will severely impact the rural connectivity initiatives of the Government.

(g) In the year 2018, the Government announced the Flight & Maritime Connectivity rules based on recommendations put forth by TRAI. These rules allow the frequency band from 27.5-28.5GHz for use by these services. Service providers have made investments to launch services using this band. This sudden u-turn in the regulations will severely impact investor confidence and will set a wrong precedence.

(h) 4G/5G services need backhauled to reach the remote areas of the country. These backhauled are provided by satellites very effectively. The TRAI recognized this need and further simplified the regulations to provide backhauled via satellite. However, without access to the frequency band from 27.5-28.5 GHz, the capacity available to provide these backhauled will be severely reduced.

(j) Allocation of 1 GHz to IMT from the crucial satellite spectrum (27.5-28.5 GHz) will impair all of the present and future satellites over India at least by 50% in terms of capacity, or introduce coverage gap, depending on the satellite system design

(k) 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.

(l) The band plan n258 clearly identifies 24.25-27.5 GHz and is widely supported by all device manufacturers. Use of this band plan as opposed to 24.25-28.5 GHz will not require any change in the devices or affect the device ecosystem.

(m) In 3GPP's plenary meeting that took place between 6-17 December 2021, various enhancements were agreed for NTN 16 work for Release 18. Specifically, an NTN-NR Work Item was approved with one objective being to look at NR-NTN deployment in above 10 GHz bands - this will start with a study using harmonized Ka-band frequencies 17 (17.7-20.2 and 27.5-30.0 GHz) as the reference, providing important recognition of satellite services that will be provided in this the Ka-band. It is very significant that 3GPP recognizes satellite as a very viable NTN option and feels that 28 GHz is crucial for Satellite NTN deployment.

(n) Furthermore, the satellite community is very concerned by the reference to a possible auction mechanism for satellite spectrum (as in sections 1.51-1.53 of the consultation document). This would be unprecedented in mm-wave frequency bands.

(o) The parallel between "access spectrum" for satellite and terrestrial networks does not stand, as the spectrum sharing mechanism is completely different. Spectrum assignment for satellite services should be based on an administrative process, which is standard procedure elsewhere. This is because for satellite spectrum is shared between multiple satellite operators. (in C/Ku/Ka band). Such efficient sharing of spectrum is made possible also thanks to the directivity of antennas. Spectrum assignment by auction to satellite services in these bands would lead to unnecessary spectrum segmentation and, therefore, a terribly inefficient use of spectrum.



(p) It is a very different situation from spectrum assignment to terrestrial mobile operators where spectrum cannot be shared amongst the mobile operators and exclusive access is required by each operator.

(q) In summary, a spectrum auction for satellite spectrum would artificially limit the number of satellite operators sharing the spectrum and exclude them from the market, while satellite operators can (differently from terrestrial mobile operators) coexist in the same frequency range.

**(r) It is reiterated that 27.5 GHz and above should not be auctioned, at least not until the usage of other mmWave like 26 GHz has been substantiated and other IMT bands are exhausted.**

(s) Countries which have allocated the band from 27.5-28.5 GHz to IMT have a much smaller geographical area that has been adequately fiberized. However, this is not the case with India. More than 70% of the population lives outside the urban areas and do not have access to broadband. There is sufficient 26 GHz spectrum already available in India. The government should take a phased approach and consider only 24.5- 27.5 at this stage so that there is enough time to assess the appetite for mmWave by mobile in the 26 GHz auction result. This would also give time to observe the development of satellite in 28 GHz band. Allocation of spectrum beyond 27.5 GHz can be re-looked later once the above is taken into account.

(t) The case in the US is very different where the 28 GHz band was allocated to IMT for historic reasons as 26 GHz was not immediately available for release at national level. It is an opportunistic use of spectrum due to the inability to release mid-band and globally harmonised mmWave spectrum. India's case is very different. This band was allocated for point to multipoint (LMDS) as these services come under the umbrella of Fixed Services and they share a co-primary status as per the ITU RR Article 5. Service providers like Verizon who bought this spectrum through auction lobbied for use of this spectrum for mobile operations as well and that is how the FCC decided to allow IMT/5G use. It should be noted Verizon has sold some of their 28GHz after obtaining more C-band spectrum in the latest FCC auction.



(u) In the case of South Korea, the spectrum was auctioned in the year 2018 with a rollout obligation of deploying 45,000 sites. Till date only 161 sites have been rolled out by the Mobile Network Operators (MNO). MNOs have not found this spectrum viable for large scale deployment.

### **Question 21**

**What should be associated roll-out conditions for the allocation of spectrum in 24.25 to 28.5 GHz frequency range? Kindly justify your response?**

### **Answer 21**

8. The text in the consultation states in Sec. 2.67 that “24.25 – 28.5 GHz (mmWave) spectrum is likely to be used for provision of 5G use cases/ applications requiring very high data rates and ultra-low latency. Therefore, the TSPs would be deploying it selectively in the areas where the demand for such use cases/ applications exists.

*Further, the technical characteristics of high band are such that it cannot be used for meeting coverage requirements.”*

9. As such it is clear that, given the contention in the band and its high value for satellite services, nationwide allocation to 5G of the 27.5-28.5GHz band is not a sensible way forward, as it would unnecessarily sterilize valuable spectrum in areas where 5G will never be deployed using these frequencies. The potential use of this band by 5G is for providing higher capacity in the urban/semi-urban areas as it requires many more base stations. Satellite is already using this band for providing coverage in the rural/remote areas in addition to the urban/semi-urban areas.

### **Question 71**

**Whether some spectrum should be earmarked for localized private captive networks in India? Kindly justify your response.**

### **Answer 71**



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The association does not support any private/captive deployment that is difficult to regulate and that can potentially cause interference to an incumbent service (satellite)s. The receivers on the LEO/MEO/GEO High Throughput Satellites are extremely sensitive and can pick-up any transmission in this band by 5G if the stated conditions in the initial portion of this document are not adhered to. In any private/captive deployment, where there is very little accountability, it is difficult to ensure the adherence to these conditions.