

## AMAZON'S COUNTER COMMENTS ON CONSULTATION PAPER ON ASSIGNMENT OF SPECTRUM FOR SPACE-BASED COMMUNICATION SERVICES

**Subject: Counter Comments on Consultation Paper on Assignment of Spectrum for Space-based Communication Services**

Respected Sir,

Kuiper Systems LLC (**Kuiper**), a wholly owned subsidiary of Amazon.com Services LLC (together, **Amazon**), has had the opportunity to review the comments submitted by various stakeholders on the Consultation Paper on Assignment of Spectrum for Space-based Communication Services (**Consultation Paper**).

At the outset, Amazon reiterates the submissions made in its comments to the Consultation Paper dated June 1, 2023. TRAI should recommend assigning spectrum for use by satellite operators via administrative assignment, rather than auction. Auctioning spectrum for satellite-based services would impose artificial restrictions and hamper effective spectrum sharing between satellite operators. Non-exclusive assignment of spectrum through administrative assignment will promote spectral efficiency and the availability of satellite services. India is a leader in satellite communication services, and it would be prudent to recommend a regime that is consistent with international practices.

In addition, Amazon submits the below counter-comments.

### **A. The Principle of "Same Service, Same Rules" Is Not Applicable**

There is a fundamental difference in how fixed-satellite service (**FSS**) systems function, and how terrestrial mobile service (**MS**) systems function. Satellite operators share spectrum, and multiple operators can share and operate without interfering with each other. It is therefore more efficient and beneficial to customers if spectrum for satellite-based services is administratively assigned. This is significantly different from assignments of spectrum for MS systems, for which auction is better suited as it necessarily requires use of exclusive spectrum by terrestrial mobile operators.

FSS systems are designed to operate at peak efficiency by sharing the entire spectrum available for satellite communication services. In fact, utilizing and sharing the same spectrum globally is a core part of how such satellite systems provide services. The ITU Radio Regulations (**RR**) provide a framework that ensures satellite operators efficiently provide services without causing harmful interference to others, including through frequency coordination requirements and other operational constraints.

Given that FSS and MS systems are so fundamentally different in their use of spectrum, and that the services provided through these different systems are also not similar, applying the "same rules" to both will result in unfair and unequal treatment.

Further, as noted in Amazon's submissions, administrative assignment of spectrum for satellite-based services allows better competition, more efficient utilization of spectrum, and is not contrary to the Supreme Court's decision in 2G spectrum for MS systems.

### **B. Not Mandating Exclusive Use for Specific Satellite Frequencies Has Several Advantages**

There are advantages to not mandating exclusive use for specific frequencies. The Ka-band frequencies are already globally allocated by the ITU to the Fixed Service (**FS**), FSS, and MS. Sharing rules are in place that allow all of these services to operate. There is no need to limit this growth by preventing shared access to spectrum.

In any case, benefits of satellite communication services in specific frequencies will not be limited to just enterprises or individuals; the Government can benefit from these services because they enable connection of remote areas and real time monitoring of transportation, among other uses.

**C. The 27.5-28.5 GHz Frequency Band Should Not Be Identified for IMT Use as There Are Adequate Alternative Bands for Identification**

Some stakeholders have recommended that a portion of the 28 GHz band be identified for use by both IMT and satellite services. Amazon reiterates that TRAI should not recommend this frequency band for any service other than satellite services.

Not only would such allocation to IMT and FSS constrain availability of spectrum for both services, there is no demonstrable need for such allocation either. In line with Resolution 242 of WRC-19 (see [here](#)) and Europe's 5G Roadmap (see [here](#)), the 24.25 - 27.5 GHz band (**26 GHz band**) may be used by IMT without impacting existing satellite operations in the 28 GHz band. Additionally, WRC-19 Resolutions have also identified several alternative bands capable of supporting emerging IMT applications, such as the 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, and 66-71 GHz bands (see [here](#), [here](#), and [here](#)). Taken together, these bands would provide more than adequate spectrum for the deployment and growth of IMT.

Further, a significant amount of spectrum in the 26 GHz band was unsold in the recent 2022 5G auctions. Despite this, India has seen a robust 5G service roll-out (see [here](#)). This demonstrates that there is not a significant need for use of the 28 GHz band by IMT / 5G, and allocation of a portion of the 28 GHz band is unnecessary.

Moreover, WRC-15 reviewed and rejected the consideration of the 28 GHz band for use by IMT. Some countries, nonetheless, proceeded to auction portions of the 28 GHz band for IMT use, only to find later that the use of the spectrum by these services was not successful. South Korea is a good example of an APT administration which assigned portions of the 28 GHz band to IMT, only to find that MS operators did not deploy services in the band ([see here](#)). Consequently, the agenda for WRC-23 will consider possible identification of low and mid-band frequencies for IMT use given their superior physical properties suitable for IMT use (see [here](#)).

**D. Exclusive Grant of Spectrum through Auction Will Prevent Satellite Earth Station Gateways from Accessing the Entire Band**

As stated in our initial submission, exclusive assignment of spectrum will result in fragmentation and, thus, will prevent the use of the complete spectrum by gateways and/or user terminals. This would not maximize the deployment of high quality, affordable satellite connectivity to customers in India.

In addition, satellite services using microwave and millimeter wave spectrum can effectively share spectrum across geostationary satellite orbit (**GSO**) and non-GSO (**NGSO**) systems without the need to segment different frequencies to each service provider to mitigate interference concerns. Indeed, the RR ensure this is possible by providing several regulatory frameworks designed to protect satellite operators from harmful interference. This includes the sharing conditions and frequency coordination requirements specified in Article 9 of the RR as well as operational restraints set forth in Articles 21 and 22.

**E. Auctions of Spectrum for Satellite Communications Are Not a Standard Practice Anywhere in the World**

Some of the submissions to the Consultation Paper argue that countries like Saudi Arabia and Thailand have auctioned spectrum for satellite-based communications. This assertion is incorrect., Saudi Arabia only auctioned spectrum in the S-band, which warranted exclusive assignment given the omni-directional antennas employed by the mobile-satellite service (**MSS**) user equipment envisioned to communicate with S-band satellite systems. Moreover, the MSS spectrum that was auctioned in Saudi Arabia came with a path to provide terrestrial mobile services as well with these assignments. On the other hand, FSS systems in the

Ku-band, Ka-band and other frequency bands, employ highly directional antennas that enable shared reuse of the same spectrum. In addition, the auction in Thailand comprised rights for operators to access specific orbital slot assignments in the GSO arc, and not for spectrum per se (see [here](#)).

**F. Low Earth Orbit (LEO) Systems Do Not Cause Harmful Interference/Disruptions to GSO Networks Providing Broadcast and/or DTH Services**

Some broadcast companies have argued that LEO systems can cause interference/disruptions to GSO networks providing broadcast and/or DTH services, which will impair the quality of service to their customers. This point cannot be substantiated. Broadcast networks in India operate in C-band frequencies. Current and planned LEO systems that seek to serve India do not operate in C-band frequencies. In India, DTH systems operate in Ku-band frequencies. Many LEO systems rely on Ka-band frequencies for their gateway operations and customer links, which have no overlap with DTH systems. In the case of NGSO systems with operations that overlap with DTH networks in the Ku-band, the interference can be effectively mitigated by adhering to the limits specified in Article 22 of the RR and by effective frequency coordination between satellite operators wherever necessary.

In conclusion, access to spectrum for satellite-based communications is essential for narrowing the “Digital Divide” in India and ensuring connectivity during natural disasters or other emergencies. If satellite operators are not able to use large, contiguous blocks of spectrum, this will result in reduced incentive to invest in new satellite technologies and, consequently, limit innovation. Auctioning spectrum for satellite-based services will impose an artificial restriction on existing and effective spectrum sharing mechanisms, result in an avoidable fragmentation of the available spectrum, and limit the number of operators. This would limit the number of customers that can be connected by these systems.