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November 01, 2024

Reference No.: KUIPER/IND/TRAI/2

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**RE: Counter-Comments on the Consultation Paper on Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services**

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 Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services ("**Consultation Paper**").

At the outset, Amazon reiterates the submissions made in its comments dated October 25, 2024 ("**Comments**"). Amazon submits that to create a facilitative regulatory regime, there should be flexible spectrum assignment to satellite operators that allows for capacity expansion and the provisioning of reliable services. Further, there should be a consistent spectrum assignment and charging mechanism for *all* types of Fixed-Satellite Service (**FSS**) uses. Similarly, consistent with the TRAI's prior recommendation, there should be an Adjusted Gross Revenue (**AGR**) charging mechanism which is based on an administrative cost-based approach. Lastly, it would be prudent to follow a globally consistent regulatory regime and rely on the provisions of the ITU Radio Regulations (**ITU-RR**) to address interference concerns amongst satellite operators and terrestrial wireless service providers.

Amazon submits the following specific counter-comments for consideration by the TRAI.

**A. Spectrum should be assigned on a block basis.**

Amazon most respectfully submits that spectrum should be assigned as a block, instead of on a carrier-by-carrier basis. A carrier-by-carrier basis assignment is time consuming and administratively burdensome. For example, any change in carrier size or the number of carriers may necessitate changes in the assignment, which burdens the administrability of such a framework. Accordingly, a block spectrum assignment would improve ease of doing business and increase operational efficiency.

**B. Default protection distances to avoid interference are not required given the ITU-RR coordination provisions, available technological mitigation measures, and the scarcity of gateway station sites.**

Amazon reiterates its suggestions that the TRAI recommend relying on the ITU's proven coordination provisions and procedures for managing compatibility between GSO and NGSO operators / systems and the resolution of possible interference cases. Contrary to what some stakeholders have suggested, prescribing default protection distances or gateway station exclusion zones is not necessary and, in fact, is spectrally inefficient. Specifically, the provisions of the ITU-RR successfully facilitate coordination among operators and provide a framework to resolve possible cases of harmful interference. As highlighted in Amazon's Comments, applying the coordination provisions in the ITU-RR are sufficient for satellite operators to anticipate the magnitude and behavior of possible interference from other satellite operators to gateway stations.<sup>1</sup>

Modern FSS systems employ frequency sharing techniques that can avoid harmful interference to other systems, such as automatic power control, frequency shifting, angular avoidance, and satellite or gateway station diversity. Amazon reiterates that there is no need for default procedures or conditions to mitigate gateway station site scarcity. As mentioned above, NGSO and GSO earth stations can be collocated, provided the operators coordinate their operations and follow international provisions in the ITU-RR for sharing spectrum.

Regarding terrestrial wireless networks, the ITU-RR coordination provisions are sufficient for terrestrial wireless and gateway stations to anticipate the magnitude and behavior of possible interference from one another. The magnitude and likelihood of possible interference can be calculated between terrestrial wireless networks and gateway stations by adopting transparent spectrum assignment procedures and technical conditions following international standards.

For the single-entry equivalent power flux density (**epfd**) limits, Amazon can meet the single-entry limits in accordance with ITU procedures. On aggregate epfd, Amazon wishes to reiterate that the 2023 World Radiocommunication Conference (WRC-23) modified Resolution 76, which called for the development of procedures to accurately model NGSO systems and to develop procedures for engaging in consultation discussions. These discussions are on-going in ITU-R WP4A, and Amazon is intimately involved in producing and advancing the development of this methodology at the ITU-R. The work at the ITU-R will develop methodology on how to calculate aggregate epfd (none exist at the moment) and what to do if the limits are exceeded. Additionally, the methodology will ensure fair treatment for new comer NGSO systems.

Finally, the current ITU-RR provisions of Article 22 establishing epfd limits applicable to NGSO FSS systems significantly over protect GSO systems. These limits were developed over 25 years ago based on outdated technical assumptions about NGSO systems. This over-protection creates spectrum inefficiencies and impacts the ability of NGSO systems to provide the most efficient and affordable broadband service to unserved and underserved communities. Amazon submits that spectrum efficiencies can be increased by revising the existing epfd framework while still protecting GSO systems. Updating these limits to take account of major developments in satellite technology over the past 25 years will unleash new capacity from NGSO FSS systems to serve communities around the world. Amazon respectfully suggests that the TRAI consider revisiting the epfd limits applicable in its territories, with a goal to increase spectrum efficiencies with greater utilization by NGSO FSS systems while still ensuring protection of GSO systems.

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<sup>1</sup> Amazon, Comments on the Consultation Paper on Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services, at page 4.

**C. Consistent with the TRAI's prior recommendation spectrum charges for satellite-based communication services should be based on a percentage of AGR basis and aligned with an administrative cost-based charging approach.**

Amazon respectfully submits that an AGR-based charging mechanism is appropriate for satellite-based communication services. Amazon further submits that suggestions that spectrum charges should be benchmarked to a market discovered price for spectrum for terrestrial wireless networks are based on a false equivalence between terrestrial wireless service providers and satellite operators.

Arguments that an AGR-based charging mechanism would incentivise inefficient roll-out of services do not consider that spectrum scarcity is unlikely, since satellite operators share the spectrum they use to provide services. Sharing spectrum negates potential opportunity cost of underutilized spectrum. Further, frequency coordination is able to resolve potential conflicts in the use of the spectrum by operators of different satellite systems. The administrative assignment of spectrum for NGSO FSS systems is appropriate, as this spectrum is not exclusive and its assignment to one operator does not preclude the same spectrum from being assigned on an administrative basis to other satellite operators. As such, concerns that spectrum is "kept" or "hoarded" would not materialize in shared spectrum that is administratively assigned.

Some stakeholders have mischaracterized the 'processing rounds' the Federal Communications Commission in the United States (**FCC**) uses to address applications and petitions by satellite to operate to operate in certain frequency bands. These stakeholders argue that even the United States has created exclusivity in spectrum assignments. To clarify, the FCC's processing rounds is simply a mechanism through which the Commission considers the applications submitted during a specific period of time established to receive such applications. However, the FCC does not limit the number of applicants who can apply during a specific processing round, or the number of processing rounds the FCC may open for the same spectrum. Therefore, there is no FCC limit regarding the number of satellite operators who can share a given frequency subject to a processing round. Further, even the requirement on operators who participate in subsequent processing rounds to protect operators in earlier processing rounds from possible interference cases is not a limit on the number of NGSO operators that can co-exist. It is simply a mechanism to avoid possible harmful interference, which itself should be rare given the ability of NGSO operators to coordinate operations.

An AGR-based charging mechanism using an administrative cost-based approach would also be consistent with the TRAI's own recommendations in the past. The TRAI has previously recommended that spectrum charges for commercial VSAT CUG and GMPCS be 1% of AGR. The TRAI made the recommendation on the rationale that this fee would adequately cover the administrative expenses incurred for managing the spectrum, thus emphasizing cost recovery as a basis for charging for spectrum for satellite operators.

Arguments that spectrum charges for satellite operators should be on per MHz basis benchmarked to prices for terrestrial wireless networks draw a false equivalence between terrestrial wireless and satellite systems. Unlike terrestrial wireless networks, satellite operators only require regulators to recover their costs to administer the spectrum assignment. Satellite spectrum is shared among various operators and systems, allowing many co-frequency users in the same spectrum. Terrestrial wireless networks, on the other hand, exclude all other potential licensees from their assigned spectrum, and competitive auctions allow regulators to identify the greatest value achievable for that exclusive access. Additionally, in the context of satellite operators, it is impractical to charge spectrum on a per MHz basis at the Local Service Area (**LSA**) level as services are meant to be deployed on a country-wide basis. Further, as satellite

spectrum is shared and used amongst multiple operators providing different services (e.g., digital satellite news gathering, teleport, direct-to-home, etc.), it would not be practically possible to determine a per MHz price at the LSA level.

**D. Spectrum assignments that are co-terminus with the license and carry an assignment period of 20 years or until the expiry of the license will benefit customers and spur deployment of service.**

Amazon respectfully reiterates its support for spectrum assignments that are co-terminus with the license, with a spectrum assignment period of 20 years or till expiry of the license, whichever is earlier. This approach would allow greater regulatory certainty in light of the significant investment and resources required to plan a satellite network, and the many years required to deploy such systems. Such an approach would facilitate the timely deployment of satellite services.

**E. Satellite operators are not positioning satellite broadband as a viable alternative to traditional broadband access, especially in urban and suburban areas.**

Amazon respectfully submits that NGSO systems will be an augmentation to existing communications infrastructure, helping to extend broadband services into underserved geographies and communities. This will contribute to greater access parity without disrupting the existing competitive landscape. Amazon's services aim to support the expansion of connectivity, bringing more people online and bridging the digital divide.