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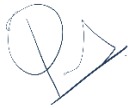
Subject: SpaceX and Starlink India's Counter-Comments on "Terms and Conditions for Assignment of Spectrum for Certain Satellite-Based Commercial Services"

Dear Sir,

Please find enclosed SpaceX and Starlink India's counter-comment submissions for the ongoing consultation on the crucial issue of assignment of satellite spectrum.

We thank the TRAI for the opportunity to participate in this consultation.

Sincerely,



Parnil Urdhwareshe
Director
Starlink Satellite Communications Private Limited

Visit us at www.starlink.com and www.spacex.com

SpaceX and Starlink India Counter-Comments – Terms and Conditions for the Assignment of Spectrum for Certain Satellite-Based Commercial Communication Services

SpaceX and Starlink India have great respect for the advances in affordable connectivity enabled by India's existing terrestrial operators. Unfortunately, some comments submitted during this consultation appear to be dedicated to increasing the price of affordable satellite broadband for those who need it the most. SpaceX and Starlink India assume that these comments stem from a fundamental misunderstanding of next-generation satellite operations. While the following items are clearly well-understood by the TRAI, SpaceX and Starlink India reiterate them here to clearly address these comments on the record -

- 1. Satellite systems share spectrum, while terrestrial mobile systems do not.** Some comments urge the TRAI to artificially increase the price of satellite broadband by increasing the costs of spectrum access for next-generation satellite systems. They argue that this is justified because mobile operators have been forced to “acquire” spectrum at auction, but importantly omit that the mobile industry has long advocated for exclusive assignments despite this cost simply because mobile operators' systems cannot share spectrum. This is why spectrum auctions are employed to determine the winners in these spectrum contests. The pricing of mobile spectrum must consider the opportunity cost imposed by exclusivity - to ensure that those with exclusive access to spectrum will use it efficiently. Moreover, mobile spectrum auctions fetch high prices because the spectrum has far more utility for the bidder - the exclusive use, coupled with the propagation and technical characteristics of terrestrial mobile spectrum allow operators to support a much larger number of users per unit area, as well as a variety of services (e.g. mobile and FWA).

Conversely, next-generation satellite systems must share the spectrum they use, and they use spectrum in much higher frequencies to serve users at a much greater distance (from satellites in orbit) all over the world. It is therefore impossible for any single satellite system to maximise economic utility by securing exclusive access to spectrum. Rather, economic utility is only maximised by having several systems share spectrum to serve any market. Happily, satellite operators can and must share access to the same spectrum - as Starlink does in over 113 markets around the world without any issues. All satellite operators (except perhaps one) appreciate that the process of managing access to this spectrum is not without administrative cost. It is why they have all recommended a reasonable percentage of 1% (or less) of adjusted gross revenue to cover these costs (and enable a level playing field by scaling providers' contributions with their performance).

Pricing access to critical spectrum resources beyond this will have absolutely no impact on the efficient use of satellite spectrum, but will have a very real negative impact on the affordability of satellite broadband.

- 2. Underserved users should not be punished for finally having connectivity via affordable satellite broadband.** SpaceX and Starlink India reiterate that Indian users who seek access to affordable next-generation satellite broadband will do so because their current options are too expensive, too unreliable, or non-existent. Comments that urge the TRAI to impose excessive costs for accessing satellite spectrum transparently seek to increase the prices for these users, and thus ensure that their choices *remain* too expensive, too unreliable, or non-existent.

Some comments even go so far as to suggest different prices for satellite spectrum access based on whether these systems target “traditional and conventional” use cases (versus those capable of serving underserved users across all of India). These operators are attempting to reframe their limited capabilities as a conscious system design and business choice; however it is difficult to see this as anything other than transparently self-serving at the cost of underserved users.

More importantly, these operators do not attempt to provide any explanation of how their satellite systems use spectrum differently from next-generation systems that can serve users all across India (because they do not). Instead, they try to thread the difficult needle of arguing for reasonable spectrum pricing for their own satellite systems, but artificially heightened and anti-competitive pricing for others. SpaceX and Starlink India strongly doubt that any underserved user anywhere in India would prefer having to pay higher prices (or prefer to remain unconnected) just so these satellite operators can serve their preferred “traditional and conventional” markets more cheaply instead.

- 3. Next-generation satellite broadband systems with high capacities are a good thing for India’s telecommunications ecosystem.** Starlink services are currently available in over 113 markets around the world. In every single one of these markets, users have greatly benefited from finally being able to cross the digital divide and having access to connectivity that those historically served by terrestrial services take for granted. SpaceX is proud of the efforts and investments it has made in growing Starlink’s capacity to serve all these users around the world.

Unfortunately, some comments attempt to mischaracterise the ability of next-generation satellite systems to provide high-quality services to users as a bad thing for those very users. Because this is a very difficult position to justify, these comments instead resort to misinformation about Starlink and other similar systems. They do so by submitting unsourced information about the total global capacity of these systems and then claiming that this poses an existential threat to the terrestrial telecom market. We remind these commentators that while India is an extremely important telecom market, it still only accounts for ~2.4% of the world’s land area (and ~0.6% of the surface area

of the Earth) - an important factor in understanding the capacity of satellite constellations for any individual market.¹

These same comments also elect to simply create false narratives, alleging that next-generation satellite systems will engage in “predatory pricing” against terrestrial services should the price for accessing satellite spectrum not be made exorbitant. Once again, they do so without attempting to provide a single real-world example of such an occurrence anywhere in the world. Thankfully, SpaceX provides Starlink around the world with extreme transparency - service and equipment prices around the world are easily available at www.starlink.com (which also has up-to-date information on Starlink’s performance across download speeds, upload speeds, and latency in every live market). As a result, it is extremely easy for any stakeholders to independently debunk the claims made in these comments.

With these three fundamental items understood, broader consensus on recommendations by the vast majority of commentators in this consultation become clear.

- 1. Satellite systems should be able to access all spectrum bands assigned to satellite services under India’s National Frequency Allocation Plan.** Practically every single commentator that has touched on FSS spectrum has recommended protecting shared access for satellite systems to the Ku, Ka and Q/V bands.² SpaceX and Starlink India submit that the TRAI should also recommend enabling access to even higher frequency satellite bands to keep pace with users’ growing needs.
- 2. Satellite spectrum should be predictably assigned (on a shared basis) for long time horizons.** Practically every single satellite operator, provider, and satellite association has submitted that the TRAI recommend spectrum assignment periods of 15 years or more.³ This is consistent with the TRAI’s own analysis of the need for long term predictability for satellite investments in India. It is also in line with SpaceX and Starlink India’s submissions that longer time horizons incentivize all satellite operators to focus on affordable pricing and long-term business plans, thus maximising the number of users who can affordably access the services they need.
- 3. The price of shared access to satellite spectrum should focus on administrative cost recovery via a spectrum access fee of less than 1% of AGR.** An overwhelming majority of the submissions from operators, applicants and industry associations (that

¹ To illustrate - these commentators’ arguments are analogous to suggesting that the majority of India’s terrestrial operators’ total capacity is focused on serving an area that is the approximate size of Nagaland.

² The exception is one terrestrial operator that has instead asked for the right to be able to exclusively acquire all satellite spectrum at auction, and then deploy it however it wants (including for its terrestrial network).

³ The exceptions are three non-satellite provider associations. Remarkably, they all use the exact same language to recommend less than three-year assignment periods with the stated goal of penalising investments in the improvement of satellite technology. Additionally, one terrestrial/satellite operator recommends a three-year assignment period *unless* it can obtain satellite spectrum exclusively at auction (in which case it recommends a twenty-year assignment period).

address this item) recommend satellite spectrum fees at 1% or less of adjusted gross revenue, consistent with the TRAI's previous recommendations.

Out of the rest –

- One mobile operator (and its related satellite licensee) continue to recommend auctions. This is despite the absolute clarity of the terms of this consultation, the Indian Telecommunications Act, and the nature of satellite spectrum.
- One mobile operator and one mobile operators' association recommend benchmarking prices for accessing satellite spectrum to the costs of exclusive terrestrial spectrum at auction. This is clearly a transparent attempt to increase end-prices for satellite users. SpaceX and Starlink India submit that such an approach is impossible to justify given the fundamental differences in the nature, characteristics, and use of satellite spectrum. It is also plainly incorrect to equate shareable spectrum for an infant Indian satellite market with the current pricing for exclusive terrestrial spectrum determined by 30 years of auctions and 1.17 Billion mobile users.
- One mobile operator recommends fees per User Terminal. This is unnecessary as an AGR-based satellite spectrum fee will scale directly with the number of users (i.e. user terminals). Moreover, specifying individual fees per user terminal is not recommended because it will directly penalise satellite systems that use spectrum more efficiently, as well as reduce affordability for those very users who need high quality next generation satellite service the most.

4. Separate ITU filings should have no bearing on spectrum assignment, and the provisions of the ITU-RR are sufficient to resolve potential interference issues. The vast majority of submissions from satellite operators, satellite industry associations, and non-satellite associations agree that satellite spectrum assignment should be on the basis of how satellite systems are licensed by the Ministry of Communications and IN-SPACe, and that the number of ITU filings is irrelevant to the assignment of spectrum. An overwhelming majority also agree that the ITU radio regulations ensure sufficient protections for resolving potential interference.⁴

5. The TRAI must not pre-judge the outcomes of ongoing work at the ITU. One commentator suggests the TRAI should unilaterally force far-reaching restrictions on NGSO systems even before the completion of on-going preliminary work at the ITU for assessing both single-entry and aggregate epfd limits (which the Indian administration is actively participating in).⁵ Studies on Article 22 are well underway with respect to

⁴ Indeed, some commentators correctly note that - if anything - the existing provisions overprotect GSO systems well beyond what is necessary at the cost of limiting the performance and efficiency of next-generation systems. The Indian administration is already involved in work currently ongoing at the ITU to study these and related items at a global level.

⁵ Resolution 76; in both cases it is expected that the ITU will approve new recommendations and provisions in 2027.

these limits (as well as how they were derived over 25 years ago). An ITU document summarizing these studies will be approved in 2027 and all these aspects are critically interlinked, currently on-going, and *not* final. The TRAI must not prematurely ignore this ongoing work in its recommendations for India's spectrum assignment rules today.⁶

Additionally, the same commentator has submitted claims (misrepresented as fact) questioning the appropriateness of currently-in-force coordination provisions for NGSO systems under Article 9 of the ITU radio regulations. This is even though these principles for NGSO systems are clearly working. This submission attempts to steer the TRAI towards adopting more rules that are not accepted at the ITU level, but *are* expressly designed to limit the benefits NGSO systems can deliver to Indian users. SpaceX has completed coordination with several NGSO operators and submits that the current Article 9 coordination principles have had absolutely no demonstrated issues or challenges.⁷

⁶ Similarly, the TRAI should not accept one commentator's submission on enforcing orbital tolerances that are much stricter than those already agreed to by consensus at the WRC-23 held in Dubai in December 2023.

⁷ The ITU is conducting new studies on NGSO-NGSO spectrum sharing aimed at facilitating administrations involved with multiple NGSO systems. As this work is also ongoing, no studies have yet been submitted or agreed upon with respect to any changes to the current Article 9 coordination provisions.