

## **SpaceX Counter Comments on submissions to TRAI Consultation Paper on Assignment of Spectrum for Space-based Communications Services**

SpaceX and its local subsidiary, Starlink India, thank the TRAI for the opportunity to provide counter-comments on the stakeholder submissions for assigning spectrum for space-based communications services in India. This proceeding represents a unique opportunity for TRAI to ensure that all Indian citizens, no matter where they are, can get connected and have choices. SpaceX respects the Government of India's sovereign authority to determine spectrum assignment within its territory, and we appreciate the TRAI's consultative approach towards ensuring a mechanism that maximises the public good for Indians.

The importance of using this spectrum to connect Indian citizens is underscored by the extraordinary level of engagement in response to TRAI's inquiry. And while the consultation received 61 submissions from a range of stakeholders, the arguments can be boiled down to two overarching positions. On one side, those with actual experience in or an understanding of space-based communications (a sizeable majority of all responses) support a regime of shared access based on international best practices without caveat.

On the other side, those without such experience or with incentives to prevent an Indian space communications ecosystem advocated for the TRAI to ignore technical/operational realities (and global best practices). These parties insist on a model of fragmented exclusive licensing that splits up access to spectrum that would effectively prevent India from benefiting from the next-generation satellite technology that is connecting otherwise unserved people around the world. The TRAI should see through these ploys designed to benefit a select few, while denying India a thriving space industry.

SpaceX urges TRAI to follow the path that will lead to a robust, competitive space economy and enable new critical services (such as high-speed low-latency satellite broadband) to all Indians.

### **The record contains several key themes –**

- A. All stakeholders with the ability to contribute to India's space communications ecosystem have emphatically agreed with the need to ensure the fundamental operating conditions SpaceX outlined in its initial submission.** These are –
- a. Predictable and guaranteed access across the entire critical bands allocated to FSS (for both user terminals and gateways) on a shared basis.
  - b. Access to critical spectrum across wide and contiguous channels on a national level without geographical restrictions.
  - c. Ensuring shared access to the entire critical bands on similar terms for all satellite operators that provide similar services in a harmonized manner.

These positions were not just held by certain operators or even those with systems like SpaceX. Instead, they include every Fixed Satellite Service operator, every Indian space start-up, the only mobile operator with a stake in an NGSO LEO constellation, four satellite Direct to Home providers, and the vast majority of credible industry associations.

This broad agreement across the space-communications ecosystem (including among operators that otherwise compete for customers) is fundamentally due to the globally accepted technical operating requirements of satellite system design. These are not points about economics or market competition, but are rather core technical requirements that are the bedrock for enabling any private space-communications ecosystem in India. These commenters agree that TRAI must ensure that these essential and fundamental technical requirements are guaranteed under any assignment mechanism.

- B. The responses are sharply divided between **those who support the stated goal of the 2023 Indian Space Policy “to provide regulatory certainty to space activities by various stakeholders, in order to create a thriving space ecosystem”**, and those who do not.

**Not a single stakeholder that supports forcing terrestrial auction designs onto space-communications systems has even attempted to analyse how such an approach would actually be workable.** They do not address any of the implementation concerns raised in the consultation paper, provide no productive discussion of the operating and design characteristics of satellite systems, and analyse none of the policy priorities we identify as guiding public good criteria (except for selective readings of the Hon'ble Supreme Court's judgment).

- C. **SpaceX is the only stakeholder to have made any attempt at all towards identifying a productive auction-based mechanism in good faith.** While SpaceX continues to oppose an exclusionary auction design (especially one designed for terrestrial assignment), SpaceX stands alone in its drive to find a resolution that helps expedite the rollout of space-based communications for Indians. To recap our good faith solution, SpaceX suggested **an auction where bidders commit a percentage of annual revenue as a “spectrum value fee” in lieu of upfront currency bids.**

The specifics of the mechanism are outlined under Section E of SpaceX's original submission, but we reiterate that unlike every other auction design discussed during this consultation, SpaceX's suggestions maintained the fundamental operating requirements of satellite systems. At the same time, SpaceX's suggested mechanism also helped achieve far more accurate value discovery of the spectrum over time, incentivize rapid rollouts and efficient spectrum use, provide a clear and transparent process, minimize barriers to current and future shared-use of critical satellite spectrum, and optimize revenue-generation from the SATCOM industry as a function of the auction-described percentage contributions.

In this counter-comment submission, SpaceX provides an analysis aggregated by stakeholder type across four categories – **(1) Satellite Operators / Space Companies, (2) Industry Associations, (3) Terrestrial Mobile Service Providers, (4) Broadcasting/Cable Providers, and (5) Other Third-Party Organisations.**

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## 1. Satellite Operators / Space Companies

Every single stakeholder invested in furthering space-based technologies emphasized that shared spectrum is fundamental to satellite systems. These stakeholders therefore all support an operating environment built upon the principles of co-existence.

SATELLITE OPERATORS / SPACE COMPANIES	
Against Forcing Terrestrial Auction Design	Support Forcing Terrestrial Auction Design
ABS Global	<i>- NONE -</i>
Amazon Kuiper	
Asiasat	
Dhruva Space	
Globalstar	
Hughes Communication	
Inmarsat	
Intelsat	
Kawa Space	
Mangata	
Nelco	
OneWeb	
Planetcast	
Sateliot	
SpaceX	
Suhora Technologies	
Tata Communications	
Telesat	
Thaicom	
Viasat	
Vihaan Spacetech	

As those that support leveraging next-generation satellite system to connect Indians all recognize, establishing rules that allow operators to share valuable spectrum is necessary to both enable private space-based communications networks as well as achieve national policy priorities. A proper framework to encourage sharing will enable India to rapidly and affordably bridge the digital divide; ensure healthy competition, consumer choice and sustained innovation; maximise efficient spectrum use; and stimulate the future of the Indian space industry (including the promotion of sustained investments into Indian space start-ups).

This unanimous agreement across the space industry also validates that the *ability* of multiple operators to co-exist is the result of (and also depends on) numerous technical innovations. Hence, TRAI should also adopt policies that create incentives for investing in efficient system design and spectrum sharing. For example, policies should reward operators that have the ability to use narrow, steerable beams, engage in good-faith inter-operator coordination, and leverage multiple other innovations.

Perhaps most importantly, the variety of competitors that align on these fundamental principles underscores that TRAI must avoid imposing unnecessary and arbitrary limitations on potential participants within the Indian space-ecosystem.

## 2. Industry Associations

Perhaps unsurprisingly, every single industry association connected to stakeholders invested in the Indian space-communications industry agrees that an exclusionary terrestrial auction design would harm Indians.

INDUSTRY ASSOCIATIONS	
Against Forcing Terrestrial Auction Design	Support Forcing Terrestrial Auction Design
Asia Video Industry Association	PHD Chambers of Commerce and Industry
Broadband India Forum	
Indian Broadcasting & Digital Foundation	
Indian Cellular & Electronics Association	
Indian Space Association	
ITU APT Foundation of India	
Manufacturers Association for IT	
NASSCOM	
News Broadcasters & Digital Association	
Satcom Industry Association of India	
US-India Business Council	

Notably, the one industry association that argues in favour of an exclusionary auction design relies on the demonstrably incorrect claim that *“while some stakeholders may argue for spectrum sharing in space-based communication services, the reality is that these services require the same level of exclusive spectrum assignment as terrestrial services.”* This statement is simply false.

As the TRAI correctly explains –

*“The same frequency spectrum in C-band, Ku-band and Ka-band has been assigned to several service providers in the country on non-interference, non-protection basis. Within the ITU framework, multiple service providers have*

*been using the same frequency spectrum without harmful interference. [...] the frequency spectrum in the higher spectrum bands such as C band, Ku-band and Ka-band can be used by multiple service providers using GSO/ NGSO satellites networks in the same geographical area."*

[TRAI Consultation paper, Paragraph 3.39 & 3.42]

Tellingly, this outlier fails to identify any members with experience of or a stake in leveraging next-generation satellite technology to connect Indians.

### 3. Terrestrial Mobile Service Providers

The one terrestrial mobile operator with experience with a global NGSO LEO constellation supports a spectrum-sharing framework that allows all satellite systems to co-exist to best serve Indian users.

Terrestrial Mobile Service Providers	
Against Forcing Terrestrial Auction Design	Support Forcing Terrestrial Auction Design
Bharti	Reliance Jio
	Vodafone Idea

The submissions from mobile service providers that support terrestrially-biased auctions pointedly avoid any discussion of the fundamental technical operating requirements of satellite systems. Instead, these submissions devote most of their arguments to building a case for regulatory protection against competition. Indeed, one of these responses goes so far as to cherry-pick and misrepresent financial information about next-generation operators to argue that this financial information somehow justifies *denying* India a vibrant space industry and broadband competition.

One terrestrial operator's response seeks to prevent competition by using a transparent myth-versus-truth response structure to create strawman arguments disconnected from the purpose of this consultation – that of enabling a private space-communications ecosystem in India. For example, many of these "myths" entirely avoid discussion of user terminals at all. Elsewhere, the fact and myth labels seem to be reversed. For instance, the submission labels as "fact" the demonstrably untrue statement that other countries auction "satellite spectrum." One of the examples this "fact" cites is Thailand, but in that case the country auctioned orbital slots for geosynchronous satellites and *not* access to shared spectrum for NGSOs. Similarly, as the TRAI consultation paper already notes, Saudi Arabia auctioned spectrum for Mobile Satellite Spectrum but that was only because the country assumed these specific satellite systems were unable to share spectrum. Even if that assumption were correct (which it may not be), that technology is distinct from the *FSS systems* being discussed in the vast majority of submissions.

These responses falsely label other myths as fact, and even try to twist the popularity of satellite systems as a reason not to allocate spectrum properly for them. They somehow claim that satellite systems cannot share because they deploy user terminals ubiquitously, even

though this is precisely what happens in countries around the world. Every single satellite operator, Indian space start-up, one major telecom operator, and the TRAI's consultation paper itself explained in detail these fundamental differences in terrestrial and satellite network design approaches to spectrum sharing.

These responses thus require the TRAI to wilfully ignore the fact that satellite operators have and continue to co-exist around the planet. Just because terrestrial operators refuse to deploy technology capable of sharing spectrum with competitors, does not mean that TRAI should ignore the reality of a satellite ecosystem that allows all systems to simultaneously share spectrum.

The arguments on "same service same rules" are also similarly misleading and disingenuous. Indeed, one operator submits that *"the arrangement should be such that giving someone the right to use the spectrum does not deny someone else the right to use it"*. Yet, this approach is precisely how satellite operators use spectrum. This commenter fails to reconcile this very principle with the demand that crucial satellite spectrum be assigned to IMT systems instead.

Indeed, these operators claim to believe that *"spectrum should be treated as truly technology neutral,"* while simultaneously suggesting that the spectrum be assigned in a way that makes it incompatible with satellite systems. One mobile operator even submits that the space-communications industry should be denied shared access to critical spectrum *because it is currently a nascent industry in India*. In effect, this is arguing that the driving purpose behind this consultation – the creation of a dynamic space-communications ecosystem in India – is the very reason *not* to follow through on the goal. TRAI cannot succumb to this circular logic put forward essentially due to fears of competition and consumer choice.

The terrestrial-biased approach favoured by these two mobile operators will decimate every single one of the advantages these operators claim to value in India's potential space ecosystem – including competition, consumer choice, industry growth, innovation, and investments – all to ensure regulatory protection for their own businesses.

#### 4. Broadcasting / Cable Providers

The majority of Broadcasters / Cable Providers (i.e. every single one with any stake in India's space-communications ecosystem) oppose an exclusionary terrestrial auction design framework for satellite systems.

BROADCASTERS / CABLE PROVIDERS	
Against Forcing Terrestrial Auction Design	Support Forcing Terrestrial Auction Design
Dish TV	Asianet
NXT Digital	Den Networks
Tata Play	Hathaway Cable
Times Network	

All three cable operators who do support a terrestrial-biased auction design are united in positing an identical approach they falsely describe as “technology-neutral”, and that (by no coincidence) protects them from any competition while requiring no potential stake in the Indian space-communications industry.

Meanwhile, none even attempt to address the fundamental spectrum operating requirements that all FSS systems depend on, and that their submissions would deny for all satellite systems. All three do however support the trading and leasing of spectrum acquired under an exclusive auction mechanism that would enable incumbents to prevent competition, prohibit market entry, and gatekeep India's space-communications industry.

Unsurprisingly, these providers support the auctioning of all spectrum *“except spectrum within C-Band that serves the current teleport/broadcasting”* i.e. the spectrum that supports their own markets. This defence of their own systems betrays their other advocacy, revealing that these companies are fully aware the terrestrial-biased auction does not work for satellite systems.

## 5. Other Third-Party Organisations

Finally, the remaining third-party comments maintain a similar pattern. In general, few of these stakeholders provided any discussion on the technical operating requirements of satellite systems, or of how an auction-based assignment mechanism would accommodate these fundamental conditions. Nevertheless, every single third-party commenter with *any* demonstrable experience in the satellite and space industries provided clear recommendations against instituting an exclusionary assignment mechanism that splits up access to satellite spectrum bands.

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India's leadership in space exploration and harnessing space technology for development has had enormous impacts on the development of the global space ecosystem as a whole. SpaceX thus strongly urges the TRAI to ensure that its recommendations help shepherd India's leadership into the private sector space economy as well.

This consultation process has been extremely helpful in recognizing and re-emphasizing both essential satellite system spectrum operating requirements as well as the significant interest in and potential of a vibrant Indian space sector. There is clear agreement across legitimate stakeholders on the need as well as the ability of satellite systems to share spectrum while co-existing, and the importance of ensuring that the assignment mechanism does not raise artificial barriers to participation.

SpaceX and Starlink India remain available at any time to provide additional comments, data, or feedback - including on the suggestions made in our previous submission.