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SIAINDIA
Satcom Industry Association

# SATELLITE SPECTRUM ALLOCATION

## International Best Practices and Learnings

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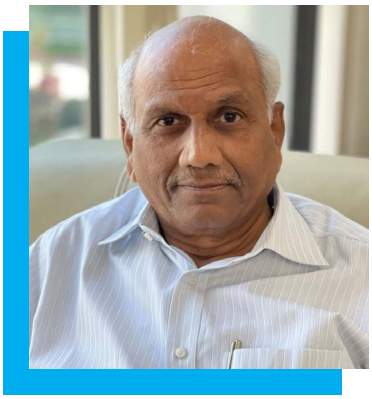
# Preface



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The space and satellite sector in India is undergoing liberalization that allows the private sector to take it to a new horizon. The sector is deemed a 'Sunrise Sector' with emphasis given for adopting supportive policies, we expect that these policies would give impetus to light-touch regulations, facilitative actions to build domestic capacities, and promotion of research & development in the recent budget announcements.

The move to transform the space sector from being government driven to opening the sector to commercial businesses, both Indian and international, in the country's space journey is a revolutionary move by the GOI. The Hon'ble Prime Minister Shri Narendra Modi has envisioned the Space sector to be a revolutionary medium of progress for 1.3 Billion Indians. The Finance Minister Ms. Nirmala Sitharaman has affirmed the key role of private sector participation in the Indian space sector expected to capture a larger share of the global space economy. The Indian space economy aspires for a massive target of cornering 10-15% of market share by 2030 which translates into the space sector becoming a $50 Billion market. Former ISRO Chief, Dr. K Sivan also had emphasized a 10 fold strengthening of DoS to be able to meet the rising demand.

These ambitious targets of DoS, ISRO and the vision of the GOI are driven by space based industrial capabilities, applications and services that are enabled by a balanced Spectrum Policy. Like any other wireless service, appropriate Spectrum is not just the fundamental prerequisite for the Space communication service providers but is also crucial for ISRO, R&D institutes, manufacturers, academia and startups to carry on their projects seamlessly. India's Space sector has a lot of potential, the space sector is an international phenomenon that needs policies which are well aligned with the International Telecommunication Union [ITU] that supports global harmonization of the spectrum for space activities.

Satellite spectrum-orbital resources, a globally shared public good managed by the ITU, are best suited for administrative licensing as a global best practice. There are no precedents of spectrum assignment by auction to satellite services in any coordinated frequency bands in any country. Out of the 193 ITU member countries, just a negligible number of countries have ever attempted to auction satellite spectrum but later abandoned the practice and replaced it with a globally adopted administrative process.

In the case of terrestrial mobile services, the spectrum is exclusive and is managed only by a single mobile operator in a given geographic area; therefore, this cannot be shared between or amongst operators. While in the case of satellites, the same spectrum is non-exclusive in nature and it can be used by multiple satellite operators to serve the same geographic area. There are hundreds of satellite systems in the geostationary (GSO) and NGSO arc, and several thousands are planned. All these systems will reuse and share the same spectrum.

Assignment of satellite spectrum by auction would lead to unnecessary segmentation and artificially limit the number of satellite operators sharing the spectrum and encounter technical, legal and economic flaws.

The fact that the satellite spectrum is utilized for the greater public good, in terms of use by govt and private sector such as disaster mitigation, metrology, agriculture, TV channels, public radio, defense and paramilitary forces, aviation, maritime communications, asset tracking, locomotive, ATMs, Gas Stations and list goes on, serving different needs of the society.

This paper brings up various international practices to highlight the best solution for satellite spectrum allocation in India. This whitepaper aims at disseminating the information and bringing rationale on why spectrum for satellite use be allocated administratively as followed in the majority of counties as global best practice. The regulators and policymakers must analyze and evaluate the international trends for an appropriate spectrum allocation mechanism.

Billions of dollars in investment decisions have been taken and several start-ups, MSMEs, and manufacturing industries, and Pvt Companies' business decisions depend on a stable and certain spectrum environment. This also ensures the benefits of satellite capacity from foreign satellite operators to the capacity starved needs of the country.

SatCom Industry Association (SIA-India) therefore brings out this timely whitepaper with the key objective to promote the adoption of a spectrum allocation policy under the administrative route. An Open Sky Policy will help the Satellite operators to have capacity over India and will allow flexibility to the Indian users.

# Executive Summary

Globally, satellite operators do not enjoy exclusive tenure of spectrum rights to deliver services and they are not looking for exclusive rights to spectrum in India either. Satellite spectrum-orbital resources are a globally shared public good managed by the ITU suited for administrative licensing as a global best practice.

For terrestrial mobile services, the spectrum is exclusive and is managed only by a single mobile operator in a given geographic area; therefore, this cannot be shared between or amongst operators. While in the case of satellites, the same spectrum is non-exclusive in nature and it can be used by multiple satellite operators to serve the same geographic area.

In other words, space-based communications use and reuse shared spectrum resources. Any assignment by auction for satellite spectrum that can be shared between operators, such as the C/Ku/Ka bands, would lead to unnecessary segmentation and very inefficient use of spectrum. It would artificially limit the number of satellite operators sharing the spectrum and exclude them from the market.

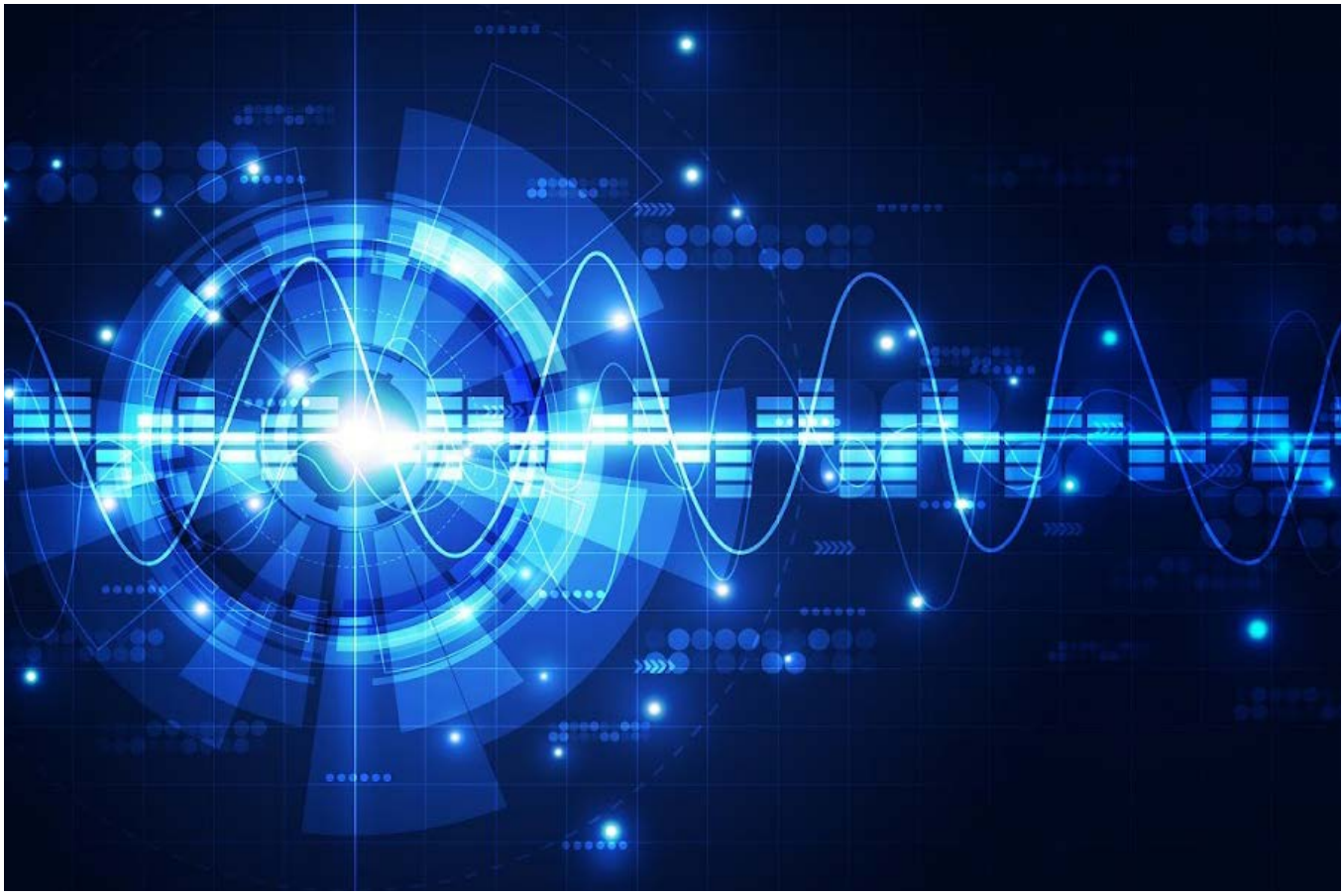
A review of a proposal to replace the administrative licensing regime for shared spectrum uses would encounter technical, legal and economic flaws. Such a proposition would likely be subject to review under the Competition Act 2002, and also lead to legal hurdles for applying auctions to shared-spectrum use.

One of the economic flaws that would arise from the fact that spectrum auctions are a mechanism to assign spectrum rights on exclusive basis to a limited number of users to resolve excess demand. The government would have to justify the economic benefits of closing its space economy or reducing it to a minimum participation. In addition, significant costs would be imposed on India from the loss of the shared satellite capacity that India requires in present and future terms; those costs would hugely surpass any fees collected through an auction.

Satellite based communication is very different from terrestrial communications, both are distinct technologies and governed by separate rules and regulations. A forward-looking approach by policymakers is needed to adopt the best practices based on technology and market dynamics in line with international best practices.

The international trend is clear, and it is against auctions. Out of the 193 ITU member countries, very few including the US, Mexico and Brazil, have ever attempted to auction satellite spectrum in the past. All such experiments have been abandoned and the practice of auctioning satellite spectrum has been replaced with a globally adopted administrative process.

The need of the hour is an Open Sky Policy wherein the Satellite operators having capacity over India are permitted to provide full spectrum bandwidth to the Indian users in a competitive manner so that satellite capacity pricing is made available at an affordable level to all.



## Why is Satellite Spectrum not auctioned internationally?

Globally, satellite operators do not request exclusive tenure of spectrum rights to deliver services and are not requesting exclusive spectrum rights in India either. Because satellite spectrum-orbital resources are a globally shared public good managed by the ITU, satellite operators' business models and service designs are different from terrestrial services. Instead, shared spectrum use is naturally suited for administrative licensing (the global practice).

Auctions have been used to manage excess-demand in the terrestrial wireless context for decades, particularly for the mobile industry. Although, the practice is well established, to date there is no consensus amongst mobile operators and their associations on the approach that governments should take to ensure a fair value for their exclusive spectrum use. Through auctions, mobile operators buy the rights for exclusivity of spectrum use for 20 or even 30 years, and by doing so, they exclude new entrants and new options for consumers. What price should they pay for such luxury? No single answer has been offered.

When engaging in spectrum auctions, mobile operators are naturally driven to seek the lowest cost possible in ensuring reduced competition and minimum risk of new entrants for 20 to 30 years. Many mobile operators' request lowering of base prices at auctions; this follows a carefully calculated bidder behaviour that strives to reduce costs, maximise revenue and eliminate competition as much as possible. Such calculating bidder behaviour may not necessarily be aligned with governments' public policy goals.

**To replace the administrative licensing regime for shared spectrum uses which is an international practice for satellite services would encounter technical, legal and economic flaws.**

There would be several legal hurdles for applying auctions to shared-spectrum use. The idea of auctioning shared goods is hard to grasp on its own, let alone devise a rational policy to implement it. First, such proposition would likely be subject to review under the Competition Act 2002. A review of a proposal to replace the administrative licensing regime for shared spectrum uses (an international practice that includes satellite services) would encounter technical and economic flaws.

One of the technical flaws, amongst other considerations, would be the issue that hundreds of satellite systems are visible from the geostationary arc (GSO); and NGSO satellite systems would add hundreds more. All these systems belong to different administrations and all reuse and share the same spectrum. One of the economic flaws that would arise from the fact that spectrum auctions are a mechanism to assign spectrum rights on exclusive basis to a limited number of users to resolve excess demand. The government would have to justify the economic benefits of closing its space economy or reducing it to a minimum participation.

In addition, significant costs would be imposed on India from the loss of the shared satellite capacity that India requires in present and future terms, and those costs would greatly surpass, any fees collected through an auction.

Therefore, it is unclear what problem a change in the administrative licensing regime would attempt to address. What are the additional complexities and costs from phasing-out administrative licensing of the shared spectrum resources? What are the costs to the Government and the wider economy?

The use of the "same service, same rules" narrative is a tool to buy the rights to close down new market actors. Expanding exclusive spectrum rights by encroaching into shared spectrum bands does not guarantee a better market structure. In fact, this results in the exact opposite. CCI has debunked the argument of "same service, same rules" and legal precedent exists that not all communication services in India are considered "same services". Space-based communication is very different from terrestrial communications, and hence, their business models are very different too.

**Satellite based communication is very different from terrestrial communications, both are distinct technologies and governed by separate rules and regulations. A forward-looking approach by policymakers is needed to adopt the best practices based on technology and market dynamics in line with international best practices.**

The Competition Commission of India (CCI) correctly states that "spectrum ownership creates a competitive advantage for operators providing wireless access services". Hence, CCI links exclusive spectrum ownership to market competition. Satellite operators are not, and will not, request the government to sell exclusive spectrum rights to them. Spectrum ownership, as a practice, concerns the exclusive tenure (spectrum rights) of spectrum by mobile operators within the jurisdiction of India. Contrary to the exclusive spectrum rights that are enjoyed by terrestrial cellular operators for decades, space-based communications reuse the same spectrum over and over again to service multiple countries from the same satellites (i.e., dozens of satellite operators can use the same spectrum on a non-exclusive basis with international ITU coordination and spectrum reuse requirements) from both the GEO arc and from non-GEO systems.

In conclusion, space-based communications use and reuse shared spectrum resources. Auction mechanisms for shared spectrum use would be impractical, hence such an approach has not become international practice. Such an approach would likely create unnecessary difficulties, both in technical and legal terms. It would also cast a shadow of doubt on the ability of the government to differentiate between the calculating bidding behaviour of the proponents of such an approach and real policy analysis: what is the problem that is being addressed by such an approach and why?

# Satellite Spectrum Licensing Regime - International Learnings

The discourse on identification and allocation of spectrum to IMT and Satellites, often touches upon the method of allocation. Some of the discussions hint at a method of Spectrum allocation for satellite operations to be via auction, as is the case of IMT Spectrum and a few examples are cited as international reference.

On the contrary, a deep dive into this issue with the referenced nations presents a totally different picture. The few countries that have attempted to auction the NATIONAL orbital resources, to which, of course, some spectrum will be associated, have failed and abandoned the practice of auctioning satellite spectrum and replaced it with an administrative allocation process. And this is for a good reason.

The reason for this is that exclusive terrestrial mobile services spectrum has to be managed only by a single mobile operator in a given geographic area and, therefore, cannot be shared amongst the operators, while in the case of satellites, the same spectrum is non-exclusive in nature as it can be used by multiple satellite operators to serve the same geographic area. In other words, assignment by auction for satellite spectrum, that can otherwise be shared between operators, such as the C/Ku/Ka bands, would lead to unnecessary segmentation and a very inefficient use of spectrum. For this reason, there are no precedents of spectrum assignment by auction to satellite services in these bands in any country.

**The few countries that have attempted to auction the NATIONAL orbital resources have failed and abandoned the practice of auctioning satellite spectrum and replaced it with an administrative allocation process.**

These statements on the auction of frequency slots for Satellite spectrum usage are explained on the basis of auction process that was experimented in some of the countries. What is masked in this explanation is that the auction being experimented is for the Orbital slots on geostationary arc along with the associated frequency spectrum. Even the very few examples of auctions for domestic filing/GSO orbital slots have revealed to be mostly unsuccessful.

**The auctions mentioned in Mexico, Thailand and Brazil are not for "satellite spectrum", but for domestic filing/GSO orbital slots. However, other satellite operators are still allowed, pending the relevant license/ authorization and satellite network coordination, to use the spectrum, as the spectrum, as such, is not being auctioned.**

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Contrary to claims, administrative allocation of satellite spectrum is the norm around the world and not a "relic". Out of the 193 ITU member countries, very few including the US, Mexico and Brazil etc., have ever attempted to auction satellite spectrum in the past. Brazil in 2020 amended its regulatory framework to replace satellite auctions with administrative licensing. Since 2004, the U.S. has replaced its auction rules with a streamlined administrative process for all satellite spectrum. Mexico is the only country with a satellite auction process still in its regulations, but the last time it attempted to conduct such an auction was in 2014 resulting in a failure. Virtually all such experiments in the world have been abandoned and the practice of auctioning satellite spectrum has been replaced back with a globally adopted administrative process.

Brazil abandoned satellite auctions completely in 2020 and replaced satellite auctions vide Law No. 9,472 of July 16, 1997, with administrative process that can be referred at § 172, as amended by Law No. 13,879 of October 3, 2019. The consultation of this amendment specifically mentions that "It is also important to highlight that an international benchmark study was carried out, seeking to assess how other administrations deal with the matter. Of the countries analyzed (8 in total), only Mexico adopts a bidding procedure for conferring rights, similar to the Brazilian case. Therefore, there is a mismatch between Brazilian procedures and those adopted by several countries with relevant satellite markets."

Thailand tried to auction orbital slots in 2021 for the first time, but it was cancelled (only one bidder). Instead, Thailand will be assigning the slots administratively. Being a recent developments, the details are available from multiple news sources across the internet.

As established, international experience shows that auctions has only ever been attempted in a small number of countries and only for domestic satellite orbitals slots, and that nearly all of those countries have abandoned the practice. Furthermore, even the very few examples of auctions for domestic filing/GSO orbital slots have been unsuccessful. Details for these countries are provided in the following table:

## Table Showing Countries with failed attempt at Satellite Spectrum [domestic filing/GSO orbital slots] Auctions

| COUNTRIES | SPECTRUM ALLOCATION ATTEMPTS |
|---|---|
| **United States** | The United States last conducted a satellite auction in 2004 for three domestic orbital slots for broadcasting services.[1] Since then, it has abandoned satellite auctions completely for legal and policy reasons. Both domestic and foreign satellites are authorized administratively.[2] |
| **Brazil** | Brazil abandoned satellite auctions for Brazilian orbital slots in 2020[3], noting its inefficiency and the fact that virtually no country in the world uses this method for assigning satellite spectrum.[4] Authorizations to use satellite capacity/ spectrum can now be applied and obtained administratively both for Brazilian and foreign satellites.[5] |
| **Thailand** | Thailand attempted to auction Thai orbital slots in 2021 for the first time, but it was cancelled twice[6]. The Government is now considering allocating the Thai orbital slots directly to National Telecom.[7] |
| **Mexico** | Mexico is one of the few countries that still has a requirement to auction domestic satellite slots.[8] However, the last time Mexico did an auction for orbital slots allotted to Mexico was in 2014 and it failed.[9] Moreover, in relation to foreign satellites, service providers can apply for administratively for authorization to provide service in Mexico.[10]<br><br>The list of authorized providers in the various frequency bands and for the various satellite systems is available online. |

1 See https://www.fcc.gov/auction/52

2 See 47 U.S. Code of Federal Regulations, Part 25

3 See Brazil, Law No. 9,472 of July 16, 1997, § 172, as amended by Law No. 13,879 of October 3, 2019 (in Portuguese) (replacing satellite auctions with administrative process), at https://informacoes.anatel.gov.br/legislacao/leis/2-lei-9472#livroIIItituloVcapIII

4 See, e.g.,ANATEL, Analysis No. 241/2020/MM, Public Consultation regarding the General Satellite Regulation - Item No. 37 of the Regulatory Agenda for the 2019-2020 biennium (17 Dec. 2020) (in Portuguese), at ¶¶ 4.70-4.81, available at https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?eEP-wqk1skrd8hSlk5Z3rN4EVg9uLJqrLYJw_9INcO6WoeHMBfhEpsGdV8m3dD4wT0pjDpc-gcaIS61R3UjJd_ZLKrutrh6DuXQLXjN9HUfMZ9RrUBhEkSkb_KXbDORK

5 Title II, Chapter I, Article 16 of Resolution 748/2021 (General Regulation of Satellite Exp

Art. 16. In order to obtain, amend or extend the Brazilian or Foreign Satellite Exploitation Rights, the Satellite Operator or its legal representative, in the case of Foreign Satellite, must formalize a request before the Agency, through its own electronic form, contained in the Agency's computerized system, and meet the following general conditions:

I - be a legal entity, under public or private law, incorporated under Brazilian law and with headquarters and administration in the country.

II - not being prohibited from bidding or contracting with the Government, not having been declared disreputable or having not been punished, in the previous 2 (two) years, with the decree of expiry of a concession, permission or authorization of telecommunications service, or of expiry of the right to use radio frequencies or Satellite Exploration.

III - have legal and technical qualifications for satellite exploration, economic and financial capacity and fiscal regularity with the Federal Treasury and be in good standing with the Guarantee Fund for Length of Service (FGTS);

IV - present a simplified technical design of the satellite communication system, keeping it up to date; and

V - submit a statement of compliance with the applicable regulations and of awareness of the grant conditions.

6 https://www.bangkokpost.com/business/2167347/auction-for-satellite-orbital-slot-cancelled-again
https://www.bangkokpost.com/business/2207283/satellite-bid-in-limbo

7 https://www.bangkokpost.com/business/2249691/talks-aim-for-solution-to-stalled-orbital-slots

8 *See* Reglamento de Comunicación Vía Satélite, Art. 4, *available at* http://www.ift.org.mx/transparencia/marco-normativo/reglamentos

9 https://www.elfinanciero.com.mx/empresas/ift-declara-desierto-proceso-de-licitacion-de-posiciones-orbitales/

10 https://rpc.ift.org.mx/vrpc/

The only other example cited is the case of Saudi Arabia,[11] which recently announced that it intended to auction domestic MSS spectrum in the 2GHz band. This is different, as MSS spectrum in the 2GHz band, similarly to spectrum allocated to mobile terrestrial operators, is not so easily shared amongst satellite operators in the same location. Even then, countries such as the United States have found ways to assign this spectrum by administrative process rather than auction.[12]

The international trend is clear, and it is against auctions. Very few countries have ever thought that auctions are an appropriate method even for assigning domestic satellite slots. The few who have, have either abandoned the practice (e.g. US, Brazil) or discovered the difficulties of such auctions (e.g. Thailand, Mexico).

In line with international best practices, auctioning of the Satellite spectrum may not be a feasible and desirable solution in the Indian context as well. An auction for satellite spectrum would artificially limit the number of satellite operators sharing the spectrum and exclude them from the market, as different from terrestrial mobile operators, multiple satellite operators can reuse the same frequency range. The need of the hour is an Open Sky Policy wherein the Satellite operators having capacity over India are permitted to provide full spectrum bandwidth to the Indian public in a competitive manner so that satellite capacity pricing is made available at an affordable level to all.

-END-

11 https://www.citc.gov.sa/ar/new/publicConsultation/Documents/PublicConsultationon_EN_144303.pdf

12 *See* FCC, *Establishment of Policies and Services Rules for the Mobile Satellite Service in the 2 GHz Band,* FCC 00-302, Report and Order (25 Aug. 2000)

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