Response to TRAI Consultation Paper No 6/2023 on Assignment of Spectrum for Space-based Communication Services dated 6th April 2023.

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We welcome the efforts of TRAI to understand the subject matter which has wide reaching impact on Satellite Industry, Telecom Industry, Broadcasting Sector, DTH operators, VSAT operators, Education and Tele services such as banking , medicine, governance and areas of national importance such as defence and security services, disaster management service and much more. In today's context, there is hardly any sector which is being untouched by the satellite sector.

This is a very timely move by TRAI to take a holistic view on the subject matter and to bring a logical conclusion to the different viewpoints on the satellite spectrum. Over the years the satellite services have been expanding its footprint and from a B2B segment to B2C segment . DTH has been catering to millions of direct consumers, LEO and MEO service likely to commence soon , another consumer touch points will come in play. The Satellite sector has been contributing to the social causes as distant education and we all the saw the importance of it during the pandemic.

TRAI also needs to look at the past experiences where the spectrum has been auctioned and how much it has been used effectively. We had lot of euphoria on the 5G spectrum and services, the experience of the auction from there is learning and also the roll out of services, By allocating the spectrum from C band , the broadcasting sector and cable sector has been facing interferences on the ground with no availability of band pass filters (which band to filter as auction was to be till 3670 Mhz and now talk is to give up to 4000Mhz to IMT) means there will have to be reinvestment on the filters and this is within a gap of less than a year. IMT may be blue eyed industry today but there are satellite based businesses which have invested considerably and continue to invest they need to continue in the business. Today even 5G services are not fully rolled out , consumer face toggling between 5G and 4G and even 3G and no coverage which results into disruption of services, call drops and battery consumption of devices. Please let us take a stock of situation holistically.

The satellite sectors role an be very well understood in the growth in other sectors like connecting the unconnected , Inflight Connectivity, maritime usages etc

The logic being given for auction is that this route is being taken as per the Hon'able Supreme Court judgment on the 2 G spectrum case and all the proponents of the auction take refuge behind this, they conveniently forget to mention that Supreme court in a reference on the matter mentioned " Auction , as a method of disposal of natural resources , cannot be declared to be a constitutional mandate under Article 14 of the Constitution of India." Supreme Court further stated that " Auction may not be the best way of maximizing revenue, but revenue maximization may not be always be

the best way to serve public interest." If the revenue maximization is the spirit behind the auctions then perhaps it is a myopic view.

Questions for the response of stakeholders

Q1. For space-based communication services, what are the appropriate frequency bands for (a) gateway links and (b) user links, that should be considered under this consultation process for different types of licensed telecommunications and broadcasting services? Kindly justify your response with relevant details.

Response : Though DOT has given a list of frequencies it wanted the recommendation on and later on expanded to be very generic position that TRAI may its recommendation on all the bands it deems fit. This is a very wide statement. There should have been specific bands with their usage indicated as just merely indicating band for consideration will not suffice, the value is in its usage, for example a Ku band capacity over a country is of no value if there is no service on it and has maximum if it has video neighbourhood of a DTH operator on it.

Thus though tone of the consultation paper is unidirectional that how the auction can be done , we need to understand the intricacies involved , technical, legal and international obligations, financial and economical.

The value of the spectrum is not just spectrum but its orbital slot , and its use. And thanks to the International Telecommunication Union (ITU) the spectrum has been made a shared resource and the ecosystem has been working flawlessly for decades. The simple example is that in Ku band spectrum there are four pay DTH operators , DD free dish , number of VSAT terminals, many other two way applications running , and there is not even a single instance of conflict, same spectrum is being used and even can accommodate more players . Even the concerns of interference are sorted out amicably between the parties and rarely are escalated.

From an Indian point of view Satellite links are a vital element in the country's telecommunication growth as it provides connectivity to telecom players for backhauls and redundancy, speed of roll out of services, it provides the much essential connectivity during disaster times , back bone to our defence and security services, thus associating Satellite spectrum with just telecom services is a misnomer, During pandemic times we all have seen the important role satellite services played to ensure that education reaches the farthest village. With the LEO constellation ready to serve it will be much easier for the homes to be connected. The prices will drop as the operators increase and the users come on board.

We have seen for decades that telecom companies have not been able to still connect the farthest regions of the country and recent recommendations of the Authority on the Recommendations on Improving Telecom Coverage and Backhaul Infrastructure in far-flung areas of Ladakh has once again emphasised the need of

connected the regions not served by fiber or traditional 4G/5G links. There are many such regions not only in North East even in the down South India there are vast areas where in even a mere 2G signal is not there as no infrastructure has been created by telecom players. Satellite is the only hope to connect such areas as it may not be making economical or profitable venture for IMT players to lay their network in those regions.

We reproduce a table below , which is indicative of the bands and its applications .

Frequency Range (GHz)	Region 1 Current Use	Region 2 Current Use	Region 3 Current Use	Future Trends
7.25-7.75	Government / military satellite networks as well as commercial use. Weather monitoring. Space Research. Radar applications. Maritime satellite terminals.		Military satellite networks.	Militaries around the world continue to rely on and operate in this band.
7.75-7.9				
7.9-8.025	Government / military and commercial use.			Militaries around the world continue to rely on and operate in this band.
8.025-8.400	Government / military and commercial use. Gateway downlinks for NGSO Earth Exploration satellites. Small sats, including nano and pico sats.			Militaries around the world continue to rely on and operate in this band. In Region 3, current use is increasing.
8.4-10.0	Weather monitoring, air traffic control, maritime vessel traffic control, defense tracking and vehicle speed detection for law enforcement. Space Research and active radars on			

	board NGSO in the Earth Exploration Satellite Service.			
10-10.5	Weather monitoring, air traffic control, maritime vessel traffic control and active radars on board NGSO in the Earth Exploration Satellite Service.			
10.7-10.95	Globally harmonized for FSS. Heavy usage by government and commercial operators by GSO networks and non-GSO systems. All ITU Member States given guaranteed access to their own orbital slots through ITU Appendix 30B Plan. These are permanently reserved for these member states to be used at any time they desire. Domestic satellite networks (VSAT, SNG, CBH, HEST, LEST, DTH, DTT, TVRO).		Globally harmonized for FSS All ITU Member States given guaranteed access to their own orbital slots through ITU Appendix 30B Plan. These are permanently reserved for these member states to be used at any time they desire. Government and commercial use. Domestic GSO satellite networks (VSAT, SNG, CBH).	Use of this band is intensifying with more Video via FSS to remain strong in many regions. Land, aero and maritime ESIMs to deploy. Expansion into High Throughput Satellites, incl. Software Defined Satellites (SDS). LEO systems to deploy.
10.95-11.2	Globally harmonized for FSS. This band is heavily used by GSO and NGSO satellites for all type of satellite services. Domestic and international satellite networks, including High Throughput Satellites (VSAT, SNG, video distribution (incl. cable TV feeds and direct to home reception), mobile terminals (incl. aeronautical and maritime), CBH, emergency communications/ disaster relief).			The current use is expected to continue and grow and more focus on High Throughput Satellites, with increasing throughput, are expected.

			Video via FSS to remain strong, VSAT and other data networks important. Use of aeronautical and maritime mobile terminals well established over many years and use increasing with ESIMs. LEO systems to deploy (NGSO satellite networks to co-exist with GSO through epfd limits)
11.2-11.45	Globally harmonized for FSS. All ITU Member States given guaranteed access to its own satellite capacity through ITU Appendix 30B Plan to be available to be used at any time they so desire. Government and commercial use by GSO networks and non-GSO systems. Domestic satellite networks (VSAT, HEST, LEST, SNG, CBH, DTH, DTT, TVRO).	Globally harmonized for FSS All ITU Member States given guaranteed access to its own GSO satellite capacity through ITU Appendix 30B Plan to be available to be used at any time they so desire. Government and commercial use. Domestic GSO satellite networks (VSAT, SNG, CBH). NGSO satellite networks co-existing with GSO through epfd limits.	Video via FSS to remain strong in many regions. Land, maritime, aero ESIMs to deploy. LEO systems to further deploy. Expansion into High Throughput Satellites, incl. Software Defined Satellites (SDS). Market for current applications

				expected to grow.
11.45-11.7	Globally harmonized FSS. This band is heavily used by GSO and NGSO satellites for all type of satellite services. Domestic and international satellite networks, including High Throughput Satellites for VSAT, HEST, LEST, SNG, video distribution (incl. cable TV feeds and direct to home reception), mobile terminals (incl. aeronautical and maritime terminals), CBH, emergency communications/ disaster relief).			The current use is expected to continue and grow and more focus on High Throughput Satellites, with increasing throughput, are expected. Video via FSS to remain strong in many regions, VSAT and other data networks important in some regions, Use of aeronautical and maritime mobile terminals well established over many years and use increasing with ESIMs. LEO systems to deploy (NGSO satellite networks to co-exist with GSO through epfd limits).
11.7-12.2	Globally harmonized for satellites use. Heavily used for DTT, DTH, NGSO FSS and FSS-like	Globally harmonized for satellites use. Heavily used as primary FSS band for GSO and	Globally harmonized for satellites use. All ITU Member States given guaranteed	BSS Video to remain strong in many regions. Land, aero, maritime

	services, including aero mobility, maritime, network services, broadband, enterprise, trunking, VSAT and CBH. AP30/30A downlink – equitable access planned band (BSS).	NGSO in the Americas including DTT, DTH, blanket licensing for aero mobility, maritime connectivity, broadband, enterprise, trunking, VSAT, CBH.	access to its own satellite capacity through ITU Appendix 30 Plan to be available to be used at any time they so desire. Predominantly domestic government and commercial use (depending on country). TV and radio broadcast (cable TV feeds and direct to hope reception) and associated feederlinks. Heavily NGOS FSS and FSS-like services, including aero mobility, maritime, network services, broadband, enterprise, trunking, VSAT and Backhaul.	ESIMs to deploy using LEO systems. Software Defined Satellites (SDS). Market for current applications expected to grow. Further expansion of HTS in Region 2.
12.2-12.5		Used for DTH, GSO and NGSO FSS and FSS-like services, including blanket licensing for aero mobility, maritime, network services and CBH. AP30/30A downlink – equitable access planned band (BSS).	Heavily used by GSO and NGSO satellites for all type of satellite services. NGSO satellite networks co-existing with GSO through epfd limits.	BSS Video to remain strong in many regions, Aero ESIMs to deploy, LEO systems to deploy. Use of High Throughput Satellites, incl. Software Defined Satellites (SDS).
12.5-12.75	Globally harmonized for satellites use. Primary Ku downlink band heavily used by			For FSS, current use is expected to continue and grow and more focus on

	GSO and NGSO satellites for all type of satellite services, incl. for VSAT, HEST, LEST, SNG, video distribution (cable TV feeds and direct to home reception), mobile terminals (incl. aeronautical and maritime terminals), CBH, emergency comms/ disaster relief).			High Throughput Satellites, with increasing throughput, are expected. Video via FSS to remain strong in many regions, VSAT and other data networks important in some regions, Use of aeronautical and maritime mobile terminals well established over many years and use increasing. Use of High Throughput Satellites, incl. Software Defined Satellites (SDS).
12.75-13.25	Globally harmonized for FSS. All ITU Member States given guaranteed access to its own satellite capacity through ITU Appendix 30B Plan to be available to be used at any time they so desire. Government and commercial use by GSO networks and non-GSO systems. Domestic satellite networks (VSAT, HEST, LEST, SNG, CBH).		Globally harmonized for FSS. All ITU Member States given guaranteed access to its own GSO satellite capacity through ITU Appendix 30B Plan to be available to be used at any time they so desire. Government and commercial use. Domestic GSO satellite networks	Planned use for IFC and maritime. Video via FSS to remain strong in many regions, Land, aero and maritime ESIM to deploy. Expansion into High Throughput Satellites, mobile terminals

			(VSAT, SNG, CBH).	(incl. aeronautical and maritime). Software Defined Satellites (SDS) and LEO systems to further deploy – noting that NGSO satellite networks to co-exist with GSO through epfd limits.
13.25-13.4				
13.4-13.65	FSS downlink only.			New FSS band since 2015 – new satellites designed with this band.
13.65-13.75				
13.75-14.0	Globally harmonized for FSS. Military/NATO use in the 13.75-14 GHz band for radar applications. Global uplink band for GSO/NGSO use. FSS government and commercial use for feeder links, Gateways, backhaul, VSATS.			Revise current ITU radio regulation to alleviate operational limitations. Extend mobility applications.
14.0-14.5	Globally harmonized for FSS. Primary Ku uplink band globally – used heavily by thousands of GSO and NGSO satellites for all types of services.			Heavy use by all FSS/MSS applications. Use of mobile terminals, including aeronautical and maritime mobile terminals, well established

				over many years and use is increasing. Increased use of High Throughput Satellites, incl. Software Defined Satellites (SDS).
14.5-14.8	Feeder links for BSS AP30/30A uplink – equitable access planned band (feeder link BSS).	FSS use with limitation on antenna size in a number of countries.	Some countries including in high rain-rate areas are given guaranteed access to BSS feederlinks through ITU Appendix 30A Plan. In other countries, ITU Radio Regulations also open up for FSS uplinks other than BSS feeder links. Predominantly domestic government and commercial use (depending on country) for BSS feederlinks.	Opened up for new FSS applications since 2015 – new satellites designed with this band .
14.8-15.35				
15.35-17.3				
17.3-17.7	BSS feederlinks & FSS downlinks. AP30/30A uplink – equitable access planned band (BSS).	BSS feederlinks & DTH downlinks. AP30/30A uplink – equitable access planned band.	BSS feederlinks (ITU Appendix 30A Plan) in 17.3-18.1 GHz range.	New FSS downlink allocation in Region 2 to be decided at WRC-23. Use increasing and more NGSO systems using the band. Expected heavy use for

				HTS and broadband. BSS video and associated feederlinks to remain strong.
17.7-17.8	High Throughput Satellites, GSO and NGSO co-existing through coordination procedures (broadband connections, VSATs, land, maritime and aeronautical ESIMs. Feeder (Gateway) downlinks. Government and commercial use. AP30/30A uplink – equitable access planned band (BSS).		BSS feederlinks (ITU Appendix 30A Plan) in 17.3-18.1 GHz range. High Throughput Satellites, GSO and NGSO co-existing through epfd limits. (broadband connections, VSATs, land, maritime and aeronautical ESIMs). Government and commercial use.	Further development of current use, including GSO High Throughput Satellites with increasing capacity, ESIMs (land, maritime and aeronautical), and more NGSO systems using the band with increasing number of satellites in constellations. BSS video and associated feederlinks also to remain strong.
17.8-18.1	High Throughput Satellites, GSO and NGSO co-existing through coordination procedures (broadband connections, VSATs, land, maritime and aeronautical ESIMs). Government and commercial use.	High Throughput Satellites, GSO and NGSO co-existing through epfd limits (broadband connections, VSATs, land, maritime and aeronautical ESIMs). Government and commercial use.	BSS feederlinks (ITU Appendix 30A Plan) in 17.3-18.1 GHz range. High Throughput Satellites, GSO and NGSO co-existing through epfd limits. (broadband connections, VSATs, land, maritime and aeronautical ESIMs).	Further development of current use, incl. GSO High Throughput Satellites with increasing capacity, ESIMs (land, maritime and aeronautical), and more NGSO systems using the band with

	AP30/30A uplink – equitable access planned band.		Government and commercial use.	increasing number of satellites in constellations. BSS video and associated feederlinks also to remain strong.
18.1-18.8	High Throughput Satellites, GSO and NGSO co-existing through epfd limits (broadband connections, VSATs, land, maritime and aeronautical ESIMs. Feeder (Gateway) downlinks. Government and commercial use.			Further development of current use, incl. GSO High Throughput Satellites with increasing capacity, ESIMs (land, maritime and aeronautical), and more NGSO systems using the band with increasing number of satellites in constellations.
18.8-19.3	High Throughput Satellites, GSO and NGSO co-existing through coordination procedures (broadband connections, VSATs, land, maritime and aeronautical ESIMs. Feeder (Gateway) downlinks. Government and commercial use.			Further development of current use, incl. GSO High Throughput Satellites with increasing capacity, ESIMs (land, maritime and aeronautical), and more NGSO systems using the band with increasing number of satellites in constellations.

19.3-19.7	High Throughput Satellites, GSO and NGSO co-existing through coordination procedures (broadband connections, VSATs, land, maritime and aeronautical ESIMs. Feeder (Gateway) downlinks. Government and commercial use.			Further development of current use, incl. GSO High Throughput Satellites with increasing capacity, ESIMs (land, maritime and aeronautical), and more NGSO systems using the band with increasing number of satellites in constellations.
19.7-20.2	High Throughput Satellites, GSO and NGSO co-existing through epfd limits (broadband connections, VSATs, land, maritime and aeronautical ESIM. Feeder (Gateway) downlinks. Government and commercial use.			Further development of current use, incl. GSO High Throughput Satellites with increasing capacity, ESIMs (land, maritime and aeronautical), and more NGSO systems using the band with increasing number of satellites in constellations.
20.2-21.2	Government/military satellite networks. Fixed and mobile terminals: in all 3 regions.			
21.2-21.4				
21.4-22	BSS downlinks.		BSS downlinks.	Definitive regulatory provisions for BSS in this band was not established

				until at WRC-12. Few satellites still to use this band.
22.55-23.55	Allocation for Inter-satellite links.			Links between LEO satellites and between LEO satellites and GSO satellites.
22-23.6				
23.6-24				

The satellite based applications are growing and will add more and more to the things.

We have been using C band services for decades where it provided all sort of services, and with advent of the technology Ku, Ka , Q/V bands have come to the fore .

Thus in our view point the administrative way of allocation of the satellite has withstood the test of the time nationally and internationally. There is no adverse implication of the administrative allocations. It has propelled growth in the industries which use Satellite Spectrum. It has allowed the players to co exist and over the years this has made increasing availability of the spectrum which has made costs reasonable. The Sector has been able to generate significant employment opportunities.

Satellite industry has a long lead time in terms of planning and execution of the launch of the satellite and it's operationalisation. Similarly the users of the satellite spectrum also have a long planning process as the infrastructure on the uplink and downlink sides have to be planned to ensure coexistence with other players and sharing of the spectrum.

The table above gives a detailed representations of the usage of the frequency bands and it is growing . Satellite industry thus needs a long term clear picture of the spectrum allocated as per the ITU regulations and process. Satellite industry has been using these spectrums and services are on thus it needs to be ensured that those services are not impacted and going forward there are opportunities for others to launch those service and also newer services and there is no gatekeeper which will increase the cost to the consumers , deter effective and productive competition.

Q2. What quantum of spectrum for (a) gateway links and (b) user links in the appropriate frequency bands is required to meet the demand of space-based communication services? Information on present demand and likely demand after about five years may kindly be provided in two separate tables as per the proforma given below:

Response : The term quantum of spectrum is not the right way to look at the usage of the satellite capacity, it is the number of transponders required. As satellite industry reuses the spectrum and also shares the spectrum with others till it does not causes interference's to the other. It we understand the industry today then we can see that there will be around 110 transponders of Ku band being used by DTH and equal numbers by other users as VSAT, Defence etc. 200 transponders of C band and around 50 Transponders on other services. The use of efficacy of the spectrum is dependent on the factors like modulation, Compression etc . With India, opening up to the services like IFC, maritime etc the requirement of the capacity in terms of the Gb's or number of the transponders will grow. And as this grows the reuse will also grow. The demand in India is going to grow as we see the efforts to increase penetration of the broadband using Satellite under BBNL scheme. It is an economy of scale business, the more the usage the downward prices will be going down.

We attach herewith the Annexure 1, which shows the number of Ku band and Ka Band Satellite operational worldwide and a significant number of these are over the Asia region and all of these satellites use spectrum in a shared manner. Thus it reinforces the argument that Satellite Spectrum is shared resource and all the operator use the same.

Q3. Whether there is any practical limit on the number of Non-Geo Stationary Orbit (NGSO) satellite systems in Low Earth Orbit (LEO) and Medium Earth Orbit (MEO), which can work in a coordinated manner on an equitable basis using the same frequency range? Kindly justify your response.

Response: The satellite systems work under close coordination with each other and they ensure that they remain non interfering with the other operator in the regions. ITU also ensures those. The ITU regulations and the coordination ensures that there is ease of reuse of the frequencies and risk of the orbital issues and interferences are not there. Thus in the current scenario it does not looks that there is a limitations on the NGSO systems.

Q4. For space-based communication services, whether frequency spectrum in higher bands such as C band, Ku band and Ka band, should be assigned to licensees on an exclusive basis? Kindly justify your response. Do you foresee any challenges due to exclusive assignment? If yes, in what manner can the challenges be overcome? Kindly elaborate the challenges and the ways to overcome them.

Response : A resource which has been used by multiple players generating employment, revenue , development, helping in national security , public broadcaster, banking and connectivity to the remote areas not served by any other means , would never merit a suggestion that it should be assigned to a licensee on exclusive basis. The very essence of the resource which is shared and yields maximum efficiency in shared mode , will be defeated here. Question here is, does authority wishes to create

gatekeepers or monolithic entities , who may not be interested in providing the service but may make it expensive for others for its own interests. For example if the Ku band spectrum is assigned to a particular company , then all the DTH players will have to take the spectrum from him , which will increase their cost and thus impact the consumer price. We have seen the issues in interconnections where in regulator and licensors had to intervene to ensure seamless connectivity for the consumers. The only to avoid the conflict that each licensee of the service should be allowed to choose its spectrum band and be assigned administratively and this has worked and has brought in revenue for the government , employment, has added social economic value to the nation. Thus in our opinion the spectrum should be assigned administratively as being done and has worked out with great success helping the industry, nation and consumers.

TRAI in the consultation paper itself has alluded to the shortcomings of the process in Paras 3.47 -3.50 of Chapter 3. There is no need to go on an exclusive basis on the spectrum auction. International experiments and experience in trying allocate spectrum on auction basis or exclusive basis has not worked out and where ever tried had to revert back and this has been mentioned in the consultation paper. Thus in our opinion the spectrum should be assigned on administrative basis and satellite spectrum be clearly earmarked for the both the Satellite Service provider (including ISRO) and Service providers using satellite spectrum can plan long term.

With the recently announced Space Policy ,Government on one hand is encouraging Non Government Enterprises to come forward in space segment and with this sort of ambiguity, the whole efforts will be defeated as who will invest when there is no clarity on the business side.

Q5. In case it is decided to assign spectrum in higher frequency bands such as C band, Ku band and Ka band for space-based communication services to licensees on an exclusive basis,

(a) What should be the block size, minimum number of blocks for bidding and spectrum cap per bidder? Response may be provided separately for each spectrum band.

Response : As we have mentioned in the response to the Q4 that spectrum in all bands should be assigned on administrative basis and not by auction.

(b) Whether intra-band sharing of frequency spectrum with other satellite communication service providers holding spectrum up to the prescribed spectrum cap, needs to be mandated?

Response : Internationally under the aegis of ITU an Intraband sharing is well defined and well accepted practice in GSO and NGSO systems and this has worked well over the decades. Nationally that can be adopted , why to reinvent the wheel and experiment, which may put significant investments at stake , may

shy away future investments over the country and potentially be disastrous for the consumers.

In case Authority feels it is not right then Authority should come out with its thoughts and share with the industry to consider the pros and cons. Authority needs to keep in mind that India is member of ITU and its obligations towards the same and also has to follow International practices and protocols.

(c) Whether a framework for mandatory spectrum sharing needs to be prescribed? If yes, kindly suggest a broad framework and the elements to be included in the guidelines.

Response : It is surprising that we are trying to do the things which have been working perfectly in unison for years and there is continuous process of refining the same and India is a part of the process, In our view the process as defined should be followed such as the EPFD limits, in ITU RR Article 22, requirement to protect the satellite networks from interferences etc.

(d) ***Any other suggestions to ensure that that the satellite communication ecosystem is not adversely impacted due to exclusive spectrum assignment, may kindly be made with detailed justification***.

Response : It is not a good thought to assign satellite spectrum on exclusive basis, currently the satellite operators coordinate with operators of different countries and ensure that there is no adverse impact on any operations of any satellite operator., With this concept of exclusivity which has never worked and is not in public interest as it may create giant monopoly over a band or set of frequencies or spectrum and which may not be put to use at all but may be used as blocker to advance the owners own agenda , we will suggest that the concept of exclusivity considering the short comings it has may kindly be dropped. As earlier stated that TRAI has mentioned in the consultation paper that efforts to allocate spectrum on exclusive basis on auction basis has not worked and even few countries have passed legislations that satellite spectrum will not be auctioned, thus trying to chart a path which has already been known not be successful, is going to take the industry and nation back by many steps. Our own national programme of INSAT satellite uses all the bands in a shared manner , will it not disrupt their operations ?, What will be the impact of the process of exclusivity on the subscribers or end users, has it been studied or not? . The whole of the consultation paper is concentrated only on the singular thought of auction , we need to have thought about the growth of the industry and best services at most affordable cost to the consumers.

Q6. What provisions should be made applicable on any new entrant or any entity who could not acquire spectrum in the auction process/assignment cycle?
(a) Whether such entity should take part in the next auction/assignment cycle after expiry of the validity period of the assigned spectrum? If yes, what should be the validity period of the auctioned/assigned spectrum?
(b) Whether spectrum acquired through auction be permitted to be shared with any entity which does not hold spectrum/ or has not been successful in auction in the said band? If yes, what measures should be taken to ensure rationale of spectrum auction and to avoid adverse impact on the dynamics of the spectrum auction?

(c) In case an auction based on exclusive assignment is held in a spectrum band, whether the same spectrum may again be put to auction after certain number of years to any new entrant including the entities which could not acquire spectrum in the previous auction? If yes,
(i) After how many years the same spectrum band should be put to auction for the potential bidders?
(ii) What should be the validity of spectrum for the first conducted auction in a band? Whether the validity period for the subsequent auctions in that band should be co-terminus with the validity period of the first held auction?
Kindly justify your response

Response to Question 6 (a) to 6(c); The process of spectrum auction on the exclusive basis seems to be violating certain basic rights granted to the citizens of India under constitution. First of all it creates a monopolistic situation where in an entity which can corner or warehouse spectrum though it may not need it for time to come , just to promote its business, thoughts, ideology or just to thwart the competition.

The constitution of India Guarantees it citizens under Article 19 a) of The Constitution of the India , the freedom of speech and expression. Now if the exclusive assignment through auction of the C band or Ku band spectrum is done and there is no window for an aspirant to start its own channel then are we not taking away his or her right to freedom of speech and Expression ? Will it not amount to pseudo censorship ?. Will our country be served by such a thought and will we be able to develop an healthy intellectual exchange of thoughts. On one side TRAI advocates Ease of Doing business in Broadcasting Sector and on other side it is taking a view on the situation which may restrict entry in the industry of player who cannot set up a channel because he has to wait for the next cycle of auction and by then the purpose is defeated.

Under the Constitution of India, Article 19 (g) citizens have right to practise any profession or carry on any occupation , trade or business, Will not the exclusive assignment for a certain period even will not infringe on this right. By doing exclusive mechanism or by auction where a particular entity will be restricted not to carry a trade or go out of the trade if it is not so strong in financial terms or the target market does not supports the excessive bidding by another party who may have decided to hold an exclusive right over the whole spectrum and stifle the competition

Will the exclusive allocation of the spectrum will impact the right to freedom of expression or not is yet to be answered and how it is being protected. Tomorrow an

individual or a group can be denied spectrum under the pretext of exclusivity to prevent their right of expressions. We have seen the days when newsprint was issued by quotas , we had issues with it and many mal practices were observed, we had limited ventures coming forward in the sector. With ease in availability of the newsprint we had seen that many regional and local publications prospered. Thus socio economic aspect of these are high.

Q7. Whether any entity which acquired the satellite spectrum through auction/ assignment should be permitted to trade and/or lease their partial or entire satellite spectrum holding to other eligible service licensees, including the licensees which do not hold any spectrum in the concerned spectrum band? If yes, what measures should be taken to ensure rationale of spectrum auction and to avoid adverse impact on the dynamics of the spectrum auction? Kindly justify your response.

Response : In our opinion this question is hypothetical, we firstly have mentioned that auction is not the right way and should not be the way to move forward. Have answered in the responses above in different questions, why we are assuming at creating gatekeeper of the satellite spectrum. We feel that process of auction is not the right way.

Q8. For the existing service licensees providing space-based communication services, whether there is a need to create enabling provisions for assignment of the currently held spectrum frequency range by them, such that if the service licensee is successful in acquiring required quantum of spectrum through auction/assignment cycle in the relevant band, its services are not disrupted? If yes, what mechanism should be prescribed? Kindly justify your response.

Response : As we have already responded that auction is not the right way to move ahead, It has various issues technical, legal and financial. India is a country of diverse languages and cultures and that is the beauty of our nation . The size of each market is different and economics of each market is different . For example a TV channel in a regional language has a different economics then a channel in Hindi or another regional language. Thus trying to paint full industry with the same brush is not going to work, We have already seen in DD freedish, when an auction is conducted the regional players are marginalised and the platform is heavily loaded in favour of players. Similarly for other services we have each market having its own dynamics and thus auction is not the right way to handle the allocation of the satellite spectrum. The administrative mechanism has ensured the growth of all sectors and it should be continued.

Q9. In case you are of the opinion that the frequency spectrum in higher frequency bands such as C band, Ku band and Ka band for space- based

communication services should be assigned on shared (non- exclusive) basis, -

(a) Whether a broad framework for sharing of frequency spectrum among satellite communication service providers needs to be prescribed or it should be left to mutual coordination? In case you are of the opinion that broad framework should be prescribed, kindly suggest the framework and elements to be included in such a framework.

Response : We are of the view that ITU based mechanism of the sharing the spectrum is adequately built to ensure industry coordinates between itself , how the spectrum is reused and shared. India has followed it for long time and has seen no practical issue with it , thus we should continue the same and there seems to be no case of developing a new mechanism.

(b) Any other suggestions may kindly be made with detailed justification. Kindly justify your response.

Response : No additional thought , we have a robust mechanism already we need to keep on working with it and bring in timelines in decision making process.

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Q10. In the frequency range 27.5-28.5 GHz, whether the spectrum assignee should be permitted to utilize the frequency spectrum for IMT services as well as space-based communication services, in a flexible manner? Do you foresee any challenges arising out of such flexible use? If yes, in what manner can the challenges be overcome? Kindly elaborate the challenges and the ways to overcome them.

Response : Sharing of the spectrum between Satellite services and IMT services have their own concerns, there are issues of the interferences and thus raise an issue of compatibilities . It will be good if India can follow a practice that both services are allocated satellite spectrum and IMT spectrum separately . the spectrum in 28Ghz be allocated to the Satellite services only. and other spectrum which has been harmonised globally for terrestrial IMT services bands (e.g., 24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 and 66-71 GHz)

It is essential that we as a country follow practices being followed internationally, then it offers the best practices and also ensures that all the equipment's are aligned to work seamlessly.

Before any new allocation, past experiences also should be seen, the IMT industry has done a great job in bringing down the data prices and availability to the consumers in the cities but still we have a big digital divide , the remote is still not connected by IMT industry and that is why the Government is now looking to connect via Satellite using the USOF fund. It clearly shows the need of the Satellite spectrum to be preserved for the satellite industry.

We are of the opinion that a detailed inventory of the spectrum available to the IMT in 26Ghz band and 800 to 1000 Mhz be done , that how much has been utilised and what the plans for the balance to be used and what are roll out plans to all the geographies in the country , not just concentrated in Metros and Cities. Authority may like to study the international experiences where the allocations of the mm Wave has been done,

Q11. In case it is decided to permit flexible use in the frequency range of 27.5 - 28.5 GHz for space-based communication services and IMT services, what should be the associated terms and conditions including eligibility conditions for such assignment of spectrum? Kindly justify your response.

Response : The flexible use will always bring in confusion and uncertainity amongst operators both IMT and Satellite Services, The chances of interferences are always there and thus QOS will be impacted. We do not think that flexible use by sharing the same spectrum may not be allowed.

Q12. Whether there is a requirement for permitting flexible use between CNPN and space-based communication services in the frequency range 28.5-29.5 GHz? Kindly justify your response.

Response : The flexible use as mentioned in the response to issue at Sr no 11 is not the right way and splitting of the spectrum is not a viable and good practice as it will be in efficient , this spectrum is important for the Ka band services and the Ka band services allows tremendous benefits in bringing in the connectivity to the remotest areas where the maintenance of the terrestrial infrastructure is not practical. Ka band services are efficient in terms of the frequency reuse and the terminal equipment's.. In our view the frequency ranges between 28.5-29.5 GHz should be allocated to the Satellite based Services.

Q13. Do you foresee any challenges in case the spectrum assignee is permitted to utilize the frequency spectrum in the range 28.5-29.5 GHz for cellular based CNPN as well as space-based communication services, in a flexible manner? What could be the measures to mitigate such challenges? Suggestions may kindly be made with justification.

Response : As mentioned in the Q11 and Q12 that spectrum from 28.5 GHz to 29.5Ghz be allowed to be used by Satellite Services as sharing or co existence is not easy and the chances of interferences are always there. We have seen that any sharing arrangement between IMT and Satellite services providers on the spectrum sharing leads to interferences and thus impacts the services of the users. In case still if circumstances required that both the services need to be the same band, then piroirty should be allocated to Satellite services and IMT can use, on a non-interference/ non-protection basis.

Q14. Whether space-based communication services should be categorized into different classes of services requiring different treatment for spectrum assignment? If yes, what should be the classification of services and which type of services should fall under each class of service? Kindly justify your response. Please provide the following details:

Response : ITU has defined the services of the C band and Ku band for the broadcasting services and feeder links , For example 11-7-12.2 Ghz and 21.4 -22 GHz are allocated for the broadcasting services (downlink) and 14.5-14.8 , 17.3-18.1 and 24.65-25.25 for uplinks of the broadcasting services. Rest all the frequencies are allowed for generic use and with technology moving fast the multiple services can be launched in the different frequency bands, A case is that when Ku Band was not available much , then the Satellite news gathering was happening via C band and VSAT services were also on C band and now they have moved on Ku band. We feel that it may not be appropriate to categorise the Space based communication services .

Q15. What should be the methodology for assignment of spectrum for user links for space-based communication services in L-band and S-band, such as-

(a) Auction-based

(b) Administrative

(c) Any other?

Please provide your response with detailed justification.

Response : We have already mentioned in our responses above that Auction based methodology is not the right way forward , it has not succeed anywhere . The administrative based allocation has been working good for decades and there has not been seen any shortcoming in the process . It has allowed industry to grow, newer services to be launched , efficient use of the spectrum, has brought down the cost of the services and equipment's .We are of the firm view that administrative allocation is the best way forward

Q16. What should be the methodology for assignment of spectrum for user links for space-based communication services in higher spectrum bands like C-band, Ku-band and Ka-band, such as

a) Auction-based

(b) Administrative

(c) Any other?

Please provide your response in respect of different types of services (as mentioned in Table 1.3 of this consultation paper). Please support your response with detailed justification.

Response : In our view the services in C band and Ku band are being currently done in administrative manner and we have seen it working excellently without any issue . Many newer services have been launched like inflight connectivity, around 100 million Indian consumers are on DTH, there are multiple VSAT working in Ku band, C band has nearly 800 plus channels plus it is used for other critical missions and all this has been done based on administrative allocation, This has allowed reuse of the spectrum in shared manner. We will again reiterate that spectrum in Ku band and C band should be allocated on the Administrative basis only.

Q17. Whether spectrum for user links should be assigned at the national level, or telecom circle/ metro-wise? Kindly justify your response.

Response : The spectrum for the user links should be assigned at the national level, Satellite by itself has a wide coverage and will be most efficient way to use the spectrum available and the services can be provided on Pan India Basis.

Q18. In case it is decided to auction user link frequency spectrum for different types of services, should separate auctions be conducted for each type of services? Kindly justify your response with detailed methodology.

Response : We have already mentioned that auction is not the right way to handle the satellite spectrum, the best way is as current administrative allocation

Q19. What should be the methodology for assignment of spectrum for gateway links for space-based communication services, such as

(a) Auction-based

(b) Administrative

(c) Any other?

Response : Administrative methodology which has been in practice for some time and has been successfully developed the industry should be the method..

Q20. In case it is decided to auction gateway link frequency spectrum for different types of services, should separate auctions be conducted for each type of services? Kindly justify your response with detailed methodology.

Response : We have already given our views that auctioning is not the right way and gateway link frequencies should be allocated administratively

Q21. In case it is decided to assign frequency spectrum for space-based communication services through auction,

(a) What should be the validity period of the auctioned spectrum?

(b) What should be the periodicity of the auction for any unsold/available spectrum?

(c) Whether some mechanism needs to be put in place to permit the service licensee to shift to another satellite system and to change the frequency spectrum within a frequency band (such as Ka- band, Ku-band, etc.) or across frequency bands for the remaining validity period of the spectrum held by it? If yes, what process should be adopted and whether some fee should be charged for this purpose?

Kindly justify your response.

Response : Auctioning of the Satellite spectrum is not the solution, and all the Satellite Spectrum should be allocated administratively.

The question itself is having its own doubts that what should be periodicity , means no prior experience or instance of it being implemented, no prior experience in case a service provider wishes to change the satellite or band or has to shift due a unforeseen circumstances as Satellite failure , or transponder failures, then what . Today administratively the service provider or the satellite company brings in an alternate capacity. We have seen instances in India when a satellite of a DTH player had issues and customers , millions of them had to be shifted. Had then an auction practice in place then , how complicated it would have been where as in administrative use it could be done immediately.

Q22. Considering that (a) space-based communication services require spectrum in both user link as well as gateway link, (b) use of frequency spectrum for different types of links may be different for different satellite systems, and (c) requirement of frequency spectrum may also vary depending on the services being envisaged to be provided, which of the following would be appropriate:

(i) to assign spectrum for gateway links and user links separately to give flexibility to the stakeholders? In case your response is in the affirmative, what mechanism should be adopted such that the successful bidder gets spectrum for user links as well as gateway links.

or

(ii) to assign spectrum for gateway links and user links in a bundled manner, such that the successful bidder gets spectrum for user link as well as gateway link? In case your response is in the affirmative, kindly suggest appropriate assignment methodology, including auction so that the successful bidder gets spectrum for user links as well as gateway links.

Response : We have already responded in many questions above that auction should not be the way satellite spectrum be provided to service providers, it should be administratively.

Q23. Whether any protection distance would be required around the satellite earth station gateway to avoid interference from other satellite earth station gateways for GSO/ NGSO satellites using the same frequency band? If yes, what would be the protection distance (radius) for the protection zone for GSO/ NGSO satellites?

Response : There need not be any protection zone between earth stations for GSO and NGSO satellites, we have seen a single teleport can handle multiple antenna is C band, Ku Band and ka band without any issue.

Q24. What should be the eligibility conditions for assignment of spectrum for each type of space-based communication service (as mentioned in the Table 1.3 of this Consultation Paper)? Among other things, please provide your inputs with respect to the following eligibility conditions:

(a) Minimum Net Worth

(b) Requirement of existing agreement with satellite operator(s)

(c) Requirement of holding license/ authorization under Unified License prior to taking part in the auction process.

Kindly justify your response

Response : As all the service provider licenses have their own roll out obligations and we are suggesting that it should be administrative allocation of the satellite spectrum, thus there is no need to mention any separate roll out obligations .

It is worth mentioning that all the service providers have an agreement with the satellite companies and it has financial implications for both the parties and they will be keen to initiate the services at the earliest, thus in our view the spectrum should be allocated administratively and the roll out obligations are covered the respective licenses issued by government for provision of the services.

Q25. What should be the terms and conditions for assignment of frequency spectrum for both user links as well as gateway links for each type of space-based communication service? Among other things, please provide your detailed inputs with respect to roll-out obligations on space-based communication service providers. Kindly provide response for both scenarios viz. exclusive assignment and non-exclusive (shared) assignment with justification.

Response : As we have already stated that assignment of the frequency spectrum should be on the administrative basis and on non exclusive basis, the service

providers will try to use the spectrum at the earliest as it will be in their interest to launch the services. A satellite has a define life and the time spectrum is not used , the revenue opportunity window goes down. The roll out obligations are already enshrined in the service providers licenses , thus those are sufficient Therefore there is no need to specify separately any particular rollout requirements for space-based communications used by terrestrial service providers.

Q26. Whether the provisions contained in the Chapter-VII (Spectrum Allotment and Use) of Unified License relating to restriction on crossholding of equity should also be made applicable for satellite-based service licensees? If yes, whether these provisions should be made applicable for each type of service separately? Kindly justify your response.

Response : As we are suggesting that the spectrum be allocated administratively and satellite providers provide spectrum to the variety of the services , thus we feel there is no need for any cross holding restrictions . There are existing restrictions on the licensees like UL , DTH, HITS, VSAT operators etc and those should be enough on the service providers who are providing services to the users (B2B and B2C).

Q27. Keeping in view the provisions of ITU's Radio Regulations on coexistence of terrestrial services and space-based communication services for sharing of same frequency range, do you foresee any challenges in ensuring interference-free operation of space-based communication network and terrestrial networks (i.e., microwave access (MWA) and microwave backbone (MWB) point to point links) using the same frequency range in the same geographical area? What could be the measures to mitigate such challenges? Suggestions may kindly be made with justification.

Response : In respect of compatibility between microwave links and space-based communication sharing the same band in C-, Ku- or Ka-band, ITU has well defined procedures to minimise the incidents, as we have already mentioned in our earlier response that the use of the spectrum in C, Ku and Ka band is highly directional also, meaning that the ground equipment both the uplink and receive is directionally pointed to the satellite orbital location. There are chances of the terrestrial spectrum being interfering with the satellite spectrum, those are addressed by providing adequate shielding to the satellite earth stations or appropriate filters at the receive sites. It is also important to mention here that ITU from time to time comes out with the guidelines on the antenna systems to be used to address the issues of potential interferences.

Q28. In what manner should the practice of assignment of a frequency range in two polarizations should be taken into account in the present exercise for assignment and valuation of spectrum? Kindly justify your response.

Response : Satellite operators use of polarisation as the method to to increase the efficiency of the spectrum available to them. This way they can increase available bandwidth from the same satellite and thus it reduces the cost of provision of the

bandwidth to the Service provider. As we have submitted ours view that spectrum is to be allocated on administrative basis, thus there is no need to get into valuation of the available frequency based on polarity and thus should be considered only on the revenue as agreed by the service providers on the ground.

Q29. What could be the likely issues, that may arise, if the following auction design models (described in para 3.127 to 3.139) are implemented for assignment of spectrum for user links in higher bands (such as C band, Ku band and Ka band)?

a. ***Model #1: Exclusive spectrum assignment***

b. ***Model#2: Auction design model based on non-exclusive spectrum assignment to only a limited number of bidders***

What changes should be made in the above models to mitigate any possible issues, including ways and means to ensure competitive bidding? Response on each model may kindly be made with justification.

Response : We have submitted in earlier responses that satellite spectrum be allocated by administrative allocations as being done now.

The pitfalls of auction are much higher, it will deny many players who may not have deep pockets to outbid the bigger one , the bidders may just hoard the bandwidth and not allow the other players to come in. Each auction cycle will be time bound so in between a new player cannot even start his business. There will be a lack of choice for the consumer which may jack up the pricing of the service and even drop the quality of service. Future investments in the sector may shy away as they will see this as a return of the license raj in a different manner. As already mentioned that Satellite is spectrum is shared resource which is being done effectively and thus should continue to be dealt with in administrative manner .

Q30. In your opinion, which of the two models mentioned in Question 29 above, should be used? Kindly justify your response.

Response : We are of the view that the auction model as proposed is not suitable for the satellite spectrum as explained in our response to earlier questions it is suggested that the spectrum should be assigned on administrative basis.

Q31. In case it is decided to assign spectrum for user links using model # 2 i.e., non-exclusive spectrum assignment to limited bidders (n+ Δ), then what should be

(a) the value of Δ, in case it is decided to conduct a combined auction for all services

(b) the values of Δ, in case it is decided to conduct separate auction for each type of service

Please provide detailed justification.

Response : We are of the view that spectrum should be assigned on administrative basis that is why this question does not needs to be responded..

Q32. Kindly suggest any other auction design model(s) for user links including the terms and conditions? Kindly provide a detailed response with justification as to how it will satisfy the requirement of fair auction i.e., market discovery of price.

Response : No suggestion as we are of the opinion that spectrum should be assigned administratively.

Q33. What could be the likely issues, that may arise, if Option # 1: (Area specific assignment of gateway spectrum on administrative basis) is implemented for assignment of spectrum for gateway links? What changes could be made in the proposed option to mitigate any possible issues?

Response : Auctions pitfalls we have already explained in our earlier responses, thus will suggest spectrum allocation by administrative manner.

Q34. What could be the likely issues, that may arise, if Option # 2: Assignment of gateway spectrum through auction for identified areas/ regions/ districts is implemented for assignment of spectrum for gateway links? What changes could be made in the proposed option to mitigate any possible issues? In what manner, areas/regions/ districts should be identified?

Response : We have highlighted the pitfalls of auction of spectrum on the national and region wise etc as suggested, we have already explained in our earlier responses, thus will suggest spectrum allocation by administrative manner on national basis

Q35. In your view, which spectrum assignment option for gateway links should be implemented? Kindly justify your response.

Response : The space based services and spectrum in all bands should be open to all on a non exclusive manner to maximise the spectrum usage , the more spectrum is available and shared and reused this will enable launch more services at most cost effective prices to the consumers and will help in development of the national telecom infrastructure.

Q36. Kindly suggest any other auction design model(s) for gateway links

including the terms and conditions? Kindly provide a detailed response with justification as to how it will satisfy the requirement of fair auction i.e., market discovery of price?

Response : We have already mentioned that spectrum be allocated on administrative basis .

Q37. Any other issues/suggestions relevant to the subject, may be submitted with proper explanation and justification.

Response : We will urge the authority to consider the issue in a wholistic manner so that there is no conflict and all the players are able to access the spectrum at ease without creation of gatekeepers . In our view that the administrative allocation of the spectrum which is shared resource by all be followed.

Q38. In case it is decided for assignment of spectrum on administrative basis, what should be the spectrum charging mechanism for assignment of spectrum for space-based communications services

i. For User Link

ii. For Gateway Link

Please support your answer with detailed justification.

Response : On allocation of the spectrum on the administrative basis , the service providers , UL licensee , DTH Licensee's , VSAT service providers etc, have a percentage of the Annual Gross Revenue (AGR) as payable in lieu of the license. We should not load more as an additional charge for allocation of the spectrum as ultimately it will be recovered from the customers which may make the service expensive.

The allocation of the satellite spectrum which is a shared resource , in administrative manner should not be seen as a source of revenue, ease of availability of spectrum at appropriate price allows more and more services to be launched at an affordable cost. Thus we will request authority to consider that no further charge on the spectrum and it be allocated administratively.

As it is suggested we continue with administrative allocation of the satellite spectrum to the service providers , government earns revenue as a percentage of the AGR and this will propel newer services to be launched and will also bring the unconnected to the connected world , which add much more economic value addition.

Q39. Should the auction determined prices of spectrum bands for IMT /5G services be used as a basis for valuation of space-based communication spectrum bands

i. For user link

ii. ii. For gateway link

Please support your answer with detailed justification.

Response : The spectrum bands for IMT/5G Services are for exclusive use of the IMT and service provider is free to launch any service it feels can maximise its revenue. The satellite spectrum such as C band, Ku Band, Ka band are shared spectrum where multiple service providers provide their services keeping in line with the ITU Regulations as not to cause any interference to the other service provider. Thus the use cases for both the spectrum bands are different and can not be equated with each other in terms of the valuations. The service providers use satellite spectrum such as C band , Ku band, Ka band spectrum and pay license fee as specified in their respective licenses , which is a source of revenue based on the satellite spectrum. Thus will again reiterate that satellite spectrum may not be provided through auction but through the administrative allocations.

Q40. If response to the above question is yes, please specify the detailed methodology to be used in this regard?

Response : The response in the question 39 is no , thus needs no further response.

Q41. Whether the value of space-based communication spectrum bands

i. For user link

ii. For gateway link

be derived by relating it to the value of other bands by using a spectral efficiency factor? If yes, with which spectrum bands should these bands be related to and what efficiency factor or formula should be used? Please support your response with detailed justification.

Response : The attempt to put a value to the satellite spectrum such as C Band, Ku band, Ka Band etc which are shared spectrum, used by multiple services and multiple service providers, by comparing it by giving an analogy of the IMT spectrum which is used exclusive is not in the right direction. Any attempt to do that will impact the telecommunication services in India, as these bands are used to provide the backhaul and also provide digital connectivity to the regions which are unserved by the IMT service providers. The satellite bands cover large geographical areas and thus are able to provide the connectivity pan India. We have seen multiple times the critical role service providers have provided using satellite spectrum in times of natural disasters, in maritime , in national security. The service providers generate revenue using satellite spectrum and pay a licensee fee as applicable to their respective licenses. This means there is already revenue being paid to government. Any attempt to increase the cost of the service providers by trying to auction the satellite spectrum will impact the services to the customers as few operators may decide to go out as it may not be viable for them to offer services in the market.

Q42. In case of an auction, should the current method of levying spectrum fees/ charges for satellite spectrum bands on formula basis/ AGR basis as followed by DoT, serve as a basis for the purpose of valuation of satellite spectrum

i. For user link

ii. For gateway link

If yes, please specify in detail what methodology may be used in this regard.

Response : We are of the view that auction should not be the way forward but should be allocated on administrative basis.

Q43. Should revenue surplus model be used for the valuation of space-based spectrum bands

i. For user link

ii. For gateway link

Please support your answer with detailed justification.

Response : As mentioned in our response above that the satellite spectrum be allocated by administrative methods as auctions are not the right mode for a resource which is shared resource. The Revenue surplus model will have to make many assumptions over a long period of time, We all are aware that any project based on satellite spectrum has long gestation time and thus to estimate the revenue for period of 20 years will not be easier in case of shared spectrum when competing services can coexist . In case of the services today satellite based service providers pay WPC fee and the license fee as applicable as per the licensing conditions , this covers cost of the administrative allocation of the spectrum to them.

Q44. Whether international benchmarking by comparing the auction determined prices of countries where auctions have been concluded for space-based communication services, if any, be used for arriving at the value of space-based communication spectrum bands:

i. For user link

ii For gateway link

If yes, what methodology should be followed in this regard? Please give country-wise details of auctions including the spectrum band quantity put to auction, quantity bid, reserve price, auction determined price etc. Please support your response with detailed justification.

Response : We have not seen any model internationally to auction the satellite spectrum in C band, Ku band, and Ka band. Auctioning the spectrum may limit the satellite operators operating in the market, which will cause scarcity of the spectrum, impact the service providers .It will have an adverse impact on the program to connect

the remote places and bring them to the fold of digital world. Telcom service depend a lot on the satellite spectrum to provide them backhaul and also sometimes back up , thus we are of the view that auctioning of the satellite spectrum is not a right way. It should be allocated administratively as being currently done.

Q45. Should the international administrative spectrum charges/fees serve as a basis/ technique for the purpose of valuation in the case of satellite spectrum bands

i. For user link
ii. For gateway link

Please give country-wise details of administrative price being charged for each spectrum band. Please specify in detail terms and conditions in this regard.

Response : For administrative allocation which is the appropriate way to allocate the spectrum to the satellite service providers, there are charges being charged by WPC for issuing operating license and those should be sufficient to cover the administrative charges and there is an AGR being applied on the licensee providing the services thus we feel there is no need of any further charge to be applied for satellite based services.

Q46. If the answer to above question is yes, should the administrative spectrum charges/fees be normalized for cross country differences? If yes, please specify in detail the methodology to be used in this regard?

Response : The answer to the Q46 has been explained above and the present system has been effectively working and have been built in to keeping in view the administrative cost and the continuous revenue earning to the exchequer in form of the AGR from service providers.

Q47. Apart from the approaches highlighted above which other valuation approaches can be adopted for the valuation of space-based communication spectrum bands? Please support your suggestions with detailed methodology, related assumptions and other relevant factors.

Response : We will suggest that AGR based system should continue as it is most effective , transparent and gives a predictability to the service providers on the cost and they can build their long term business case on it.

Q48. Should the valuation arrived for spectrum for user link be used for valuation for spectrum for gateway links as well? Please justify.

Response : The gateway links are to facilitate the further services, they are the infrastructure on which the services ride. And thus the process trying to arrive a valuation on the spectrum for user link may not be applied for spectrum for gateway

links. All the spectrum at each link level should be administratively allocated and user links are a product which the gateway links distribute or get revenue from such as VSAT services, or ESIM's and already there is a AGR applicable on these services.

Q49. If the answer to the above is no, what should be the basis for distinction as well as the methodology that may be used for arriving at the valuation of satellite spectrum for gateway links? Please provide detailed justification.

Response : Already mentioned in the Q48, the gateways are infrastructure and they are to facilitate the ground services to the consumers. We should not be putting any additional costs on them as they have intensive capital cost requirements and then they facilitate the ground services , from where the revenue comes in form of AGR. Thus there should not be any additional cost be imposed on them.

Q50. Whether the value arrived at by using any single valuation approach for a particular spectrum band should be taken as the appropriate value of that band? If yes, please suggest which single approach/method should be used. Please support your answer with detailed justification.

Response : We would like to suggest that spectrum be allocated administrative only.

Q51. In case your response to the above question is negative, will it be appropriate to take the average valuation (simple mean) of the valuations obtained through the different approaches attempted for valuation of a particular spectrum band, or some other approach like taking weighted mean, median etc. should be followed? Please support your answer with detailed justification.

Response : We have been saying in all our responses that putting valuation to the shared resource is not possible as it has other factors also like orbital slot, capacity available over India, other customers on the satellite (important for video neighbourhood) , thus a simple mathematical valuation for a shared resource which is being used by multiple satellites is not appropriate method.

Q52. Should the reserve price for spectrum for user link and gateway link be taken as 70% of the valuation of spectrum for shared as well as for exclusive assignment? If not, then what ratio should be adopted between the reserve price for the auction and the valuation of the spectrum in different spectrum bands in case of (i) exclusive (ii) shared assignment and why? Please support your answer with detailed justification.

Response : What will be the basis of this 70% assumption , why not 10% or no percentage. What will be the basis of the valuation of the spectrum which is shared resource. We are of the opinion that the spectrum which is shared today and will be continued to be shared in future , is dependent on multiple other factors as brought out in our earlier responses should be allocated on administrative basis and current mechanism of the WPC fee and AGR be continued on the same.

Q53. If it is decided to conduct separate auctions for different class of services,

should reserve price for the auction of spectrum for each service class be distinct? If yes, on what parameter basis such as revenue, subscriber base etc. this distinction be made? Please support your answer with detailed justification for each class of service.

Response : We have responded in questions earlier that there should be administrative allocation of the Satellite Spectrum which is a shared resource and reiterate that we feel that auction should not be done for satellite spectrum and should be allocated on administrative basis

Q54. In case of auction based and/or administrative assignment of spectrum, what should the payment terms and associated conditions for the assignment of spectrum for space-based communication services relating to:

i. Upfront payment

ii. Moratorium period

iii. Total number of instalments to recover deferred payments

iv. Rate of discount in respect of deferred payment and prepayment

Please support your answer with detailed justification.

Response : For administrative allocations, the current practice of the WPC charges being asked affront and the AGR is payable quarterly is appropriate way to charge the fees.

ATTACHMENT 1 . SATELLITE SYSTEMS USING KU- AND KA-BANDS

Based on the table 1, there are around 200 GSO Ku-band operational satellites and more than 3500 NGSO Ku-band operational satellites worldwide. Meanwhile, around 70 out of 200 GSO Ku-band operational satellites have coverage over Asia, Europe and MENA region.

TABLE 1. SATELLITE SYSTEMS USING KU-BAND

Satellite Operator	COVERAGE[1]	TYPE	SATELLITES	NO SATELLITES
Intelsat	Americas	GEO	Galaxy 11, Galaxy 16, Galaxy 17, Galaxy 18, Galaxy 19, Galaxy 28, Galaxy 30, Galaxy 31, Galaxy 32, Galaxy 33, Galaxy 35, Galaxy 36, Galaxy 3C, Horizons 1, Horizons 2, Intelsat 16, Intelsat 21, Intelsat 23, Intelsat 34, Intelsat 902, Intelsat 904	21 in operation
			Galaxy 37/Horizons 4, Intelsat 40e, Intelsat 42, Intelsat 43	4 future (being manufactured)
	Europe, Africa, Middle East	GEO	Intelsat 10-02, Intelsat 14, Intelsat 17, Intelsat 20, Intelsat 25, Intelsat 28, Intelsat 32e, Intelsat 35e, Intelsat 37e, Intelsat 38, Intelsat 39, Intelsat 901, Intelsat 905, Intelsat 906	14 in operation
			Intelsat 41	1 future (being manufactured)
	Asia	GEO	Horizons 3e, Intelsat 1R, Intelsat 10, Intelsat 15, Intelsat 18, Intelsat 19, Intelsat 22, Intelsat 33e	8 in operation
			Intelsat 44	1 future (being manufactured)
SES	EMEA	GEO	ASTRA 1G, ASTRA 1KR, ASTRA 1L, ASTRA 1M, ASTRA 1N, ASTRA 2E, ASTRA 2F,	13 in operation

[1] Coverage is a simplification, as satellites are often designed to cover oceans with part of continents on both sides.

			ASTRA 2G, ASTRA 3B, ASTRA 4A, ASTRA 5B, SES-5, Monacosat	
	EMEA	GEO	ASTRA 1P, ASTRA 1Q	2 future (under procurement)
	North America	GEO	AMC-1, AMC-3, AMC-6, AMC-15, AMC-21, ASTRA 2C, CIEL-2, QUETZSAT-1, SES-1, SES-2, SES-3, SES-11, SES-15	13 in operation
	Global	GEO	ASTRA 2A, NSS-6, NSS-7, NSS-11, NSS-12, SES-4, SES-6, SES-7, SES-8, SES-9, SES-10, SES-12, SES-14, SES-17	14 in operation
	Global	GEO	SES-26	1 future (under procurement)
Eutelsat	Europe, Africa, Middle East	GEO	EUTELSAT 12WE, EUTELSAT 8WB, EUTELSAT 7WA, EUTELSAT 5WB, EUTELSAT 3E, EUTELSAT 7B, EUTELSAT 7C, EUTELSAT 9B, EUTELSAT 10B, HOT BIRD 13B, HOTBIRD 13C, HOTBIRD 13E, HOTBIRD 13F, HOTBIRD 13G, EUTELSAT 16A, EUTELSAT 21B, EUTELSAT 33E, EUTELSAT 36B, EUTELSAT 36C, EUTELSAT QUANTUM	20 in operations
	Asia	GEO	EUTELSAT 70B, EUTELSAT 172B	2 in operations
	Americas	GEO	EUTELSAT 65WA, EUTELSAT 113WA, EUTELSAT 115WB, EUTELSAT 117WA, EUTELSAT 117WB, EUTELSAT 133WA, EUTELSAT 139WA	7 in operations
	Global	GEO	EUTELSAT 36D, EUTELSAT FLEXSAT	2 future satellites
	Europe, Africa, Middle East	GEO	KONNECT, KONNECT VHTS, KASAT	3 satellites having TTC in Ku band
Rascomstar	Africa + South Europe	GEO	RQ1R@2.9°E	1 in operation
Hispasat	Europe, North Africa, Americas	GEO	HISPASAT-30W-5, HISPASAT-30W-6, HISPASAT-36W-1	3 in operation
	Europe, Americas	GEO	AMAZONAS-2, AMAZONAS-3, AMAZONAS-5, HISPASAT-74W-1	4 in operation
		GEO	AMAZONAS-NEXUS	1 future (just launched, reaching GSO)
OneWeb	Global	LEO	ONEWEB-xxx	618 in operation
			Completion of Gen-1 by end of March 2023	36 to be launched
Telenor	Europe	GEO	Thor 5, Thor 6, Thor 7	3 in operation
Nilesat	MENA, Africa	GEO	Nilesat 201, Nilesat 301	2 in operation
Yahsat	EMEA and Asia	GEO	Al Yah 1	1 in operation
ARABSAT	EMEA	GEO	ARABSAT-5A, -6A, BADR4, BADR5, BADR6, BADR7, HellasSat-2, HellasSat-3, & HellasSat-4	9 in operation
	EMEA	GEO	ARABSAT-7A, BADR-8	2 to be launched
Dish	Americas	GEO	ECHOSTAR XVI, ECHOSTAR X, ECHOSTAR XI, ECHOSTAR XIV, TERRESTAR-1	5 in operation
EchoStar	Americas	GEO	ECHOSTAR IX, AMC-2, ECHOSTAR-105	3 in operation

Telesat	Americas	GEO	Anik F1, Anik F1R, Anik F2, Anik F3, Anik G1, Nimiq 4, Nimiq 5, Nimiq 6, Telstar 14R, Telstar 19 VANTAGE	10 in operation
	Americas, Europe, Middle East, Africa	GEO	Telstar 11N, Telstar 12 VANTAGE	2 in operation
	Asia	GEO	Telstar 18 VANTAGE	1 in operation
Optus	Asia	GEO	Optus C1/Optus D1/Optus D2/Optus D3/Optus 10	5 in operation
	Asia	GEO	Optus 11	1 future satellite
Chinasat	Asia	GEO	Chinasat 6D, Chinasat 9, Chinasat 9B, APSTAR 6C	4 in operation
	Asia Pacific	GEO	APSTAR 5C, APSTAR 6D, APSTAR 9	3 in operation
	Asia, Europe	GEO	Chinasat 10	1 in operation
	Asia, Africa, Middle East	GEO	Chinasat 11, APSTAR 7	2 in operation
	Asia Pacific, Africa, Europe,	GEO	Chinasat 12	1 in operation
	Africa	GEO	Chinasat 15	1 in operation
	Asia Pacific, North America	GEO	Chinasat 19	1 in operation
	Asia & Middle East	GEO	Chinasat 6E, Chinasat 10R, Chinasat 9C	3 future satellites
AsiaSat	APAC	GEO	AsiaSat 4, AsiaSat 5, AsiaSat 7, AsiaSat 9	5 in operation
	EMEA		AsiaSat 8	
JSAT/SJC	APAC	GEO	JCSAT-110A, JCSAT-110R, JCSAT-4B, JCSAT-3A, JCSAT-5A, JCSAT-17, SUPERBIRD-C2, JCSAT-1C, JCSAT-2B, SUPERBIRD-B3, JCSAT-12, JCSAT-16	12 in operation
MEASAT	APAC	GEO	MEASAT-3A, MEASAT-3B, MEASAT-3D	3 in operation
ARSAT	America	GEO	ARSAT-1, ARSAT-2	2 in operation
Space-X	Global	LEO	STARLINK-xxx	>3000 in operation
NIGCOMSAT	Africa, Europe	GEO	NIGCOMSAT-1R	1 in operation
PT. Bank Rakyat Indonesia (Persero), Tbk.	Asia	GEO	BRIsat	1 in Operation

TABLE 2. SATELLITE SYSTEMS USING KA-BAND

Satellite Operator	COVERAGE	TYPE	SATELLITES
Amazon	Global	LEO	Kuiper
Amos Spacecom	AMOS-3: Europe, Middle East and US East Coast AMOS-4: Asia and Africa AMOS-17: Africa, Middle East and Asia	GEO	AMOS-3, AMOS-4, AMOS-17
AsiaSat	Regional	GEO	AsiaSat 7, AsiaSat 9

Satellite Operator	COVERAGE	TYPE	SATELLITES
Avanti	Europe, Middle East, Africa, Americas	GEO	HYLAS-2, HYLAS-3, HYLAS-4
Chinasatcom	China, South East Asia	GEO	Chinasat-16, Chinasat-26 (2021)
EchoStar/Hughes	Americas	GEO	EchoStar IX, EchoStar XVII (Jupiter 1), EchoStar XIX (Jupiter 2), EchoStar XXIV (Jupiter 3) (2023), Spaceway (SW03), Eutelsat 65WA, Telesat T19V, Al Yah 3.
Eutelsat	Asia Pacific, Americas, Europe, Africa	GEO	EUTELSAT 172B, EUTELSAT 65WA, EUTELSAT 3B, KONNECT VHTS, KONNECT, EUTELSAT 7B, EUTELSAT 7C, EUTELSAT 10B, HOTBIRD F1, HOTBIRD F2, EUTELSAT 16A, EUTELSAT 36C, EUTELSAT 139WA
Hispasat	Europe, North Africa, Americas	GEO	HISPASAT-30W-5, HISPASAT-30W-6, HISPASAT-36W-1, AMAZONAS-3, AMAZONAS-5, HISPASAT-74W-1 AMAZONAS NEXUS
Inmarsat	Global	GEO	Inmarsat-5 F1, F2, F3, F4 , GX-5, Inmarsat-6 F1, Inmarsat-6 F2
Intelsat	Global	GEO	EuropeStar, Epic IS-29e, IS-33e, IS-37e, IS-36, IS-20, Galaxy 15R, Galaxy 30, IS-40e, Galaxy 23, Galaxy 28, IS-32e
Kacific	South Asia, Pacific	GEO	Kacific-1
Measat	Asia	GEO	MEASAT-5, MEASAT-3d
NBN Co.	Australia	GEO	SkyMuster
NIGCOMSAT Ltd	Nigeria, South Africa and Europe	GEO	NIGCOMSAT-1R, NIGCOMSAT-2B, NIGCOMSAT-2D
Nilesat	Middle East	GEO	Nilesat 201 , Nilesat 301
OneWeb	Global	LEO	618 in orbit
OHB	Global	GEO	Future H2Sat
Rivada Space Networks	Global	LEO	Constellation of 576 satellites
Satria Nusantara Tiga (SNT)	Indonesia	GEO	Multifunction Satellite of Satria-1
SES	Global	GEO	Astra 2E, 2F, 2G, 3B, 4A, 5B, AMC-15, SES-5, SES-8, SES-10, SES-12, SES-14, SES-15, SES-17
SES O3b	Global	MEO	20 in orbit for O3b MEO constellation; 11 next generation O3b mPower (2022)
SpaceX	Global	LEO	Starlink Constellation

Satellite Operator	COVERAGE	TYPE	SATELLITES
Telenor	Europe, Middle East	GEO	THOR 5, THOR 6, THOR 7
Telesat	North America	GEO	Anik F2, Anik F3
	Eastern Seaboard	GEO	T12V
	SE Asia	GEO	T18V
	North Atlantic, Caribbean, Northern Canada	GEO	T 19V
	Global	LEO	Telesat LightspeedTM (2026+)
Thaicom	Asia Pacific	GEO	THAICOM 4 (IPSTAR)
Turksat	Europe, Middle East, Central, Africa	GEO	Turksat 4A, Turksat 4B, Turksat 5B
Viasat	Global	GEO	ViaSat-1, ViaSat-2, ViaSat-3 & 4 (2022+)
Yahsat	Middle East, Africa, Americas, Asia	GEO	AY2, AY3