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**Subject: ISPAI Response to TRAI Consultation Paper on Telecommunication Infrastructure Sharing, Spectrum Sharing, and Spectrum Leasing**

Dear Sir,

We congratulate the Authority to have come out with this Consultation paper on the matter captioned above and sincere thanks for providing us the opportunity to submit our response on this important issue.

We have enclosed our comprehensive response for your consideration.

We believe that the Authority would consider our submissions positively on the subject matter.

Thanking you,

With Best Regards,  
For Internet Service Providers Association of India



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Encl: As above

**ISPAI Response to TRAI CP on Telecommunication Infrastructure Sharing, Spectrum Sharing, and Spectrum Leasing**

The framework for leasing should not be prescriptive. Policy should be there to enable spectrum leasing amongst all licensed entities including ISP, NLD, ILD etc. which is likely to create a secondary market for spectrum and proliferate efficient and better usage of a scarce natural resource. It should also facilitate spectrum sharing amongst all licensees irrespective of one of the licensee's holding spectrum in that band or licensee not holding any spectrum at all enabling full flexibility to the licensees for sharing their spectrum to get the optimal spectrum efficiency for this scarce resource.

Telecom infrastructure created by use of USO fund should be mandated to be shared among all licensed telecom service providers & capacity should be reserved for other service providers as well on first come first served basis. In this way USO funded infrastructure benefits can be extended to other service provider's subscribers, thus a much larger beneficiary base. This also avoids duplicate asset creation in these areas that will result in appropriate optimization of USO funds, also the benefit would be wide reached and not restricted to the subscribers of the USP. Further, adequate provision should also be made to allocate funds from Universal Services Obligation Fund (USOF) for incentivizing Licensed Service Providers who are promoting connectivity to rural and remote areas

Regarding passive infrastructure-sharing, we recognize the issue highlighted by the Authority that enabling provisions for passive infrastructure-sharing are present in some specific service authorizations and not others. However, we believe the intention of the Licensor (DoT) was not to give the benefit of passive infrastructure-sharing to some licensees and not to others. It seems that it was inadvertent rather than intentional that enabling provisions were included in some authorizations and not in others. Hence a much-needed clarity may be brought in under the licensing, addressing this anomaly.

The infrastructure sharing charges should be allowed as pass-through while determining AGR for the purposes of payment of License Fee (LF) and Spectrum Usage Charge (SUC) in case of Unified License (UL), just like UL-VNO.

We also recommend removing the 1% transaction charge on spectrum trading in the interest of creating a robust, liquid, and efficient secondary market.

**Q1. Should passive infrastructure sharing be permitted across all telecommunication service licenses/ authorizations? Kindly justify your response.**

**ISPAI Comments-**

We understand that extant license conditions already permit passive infrastructure-sharing across all telecommunication service licenses/authorizations.

It is our contention that the intention of the Licensor (DoT) was not to give the benefit of passive infrastructure-sharing to some licensees while withholding it from others. It is only inadvertent that such enabling provisions were included in some authorizations and not in others.

In fact, this becomes clearer when other provisions of the licenses are studied. For instance, the generic **clause 33.2 in Part-I of UL** permits all licensees to share active infrastructure. An enabling provision for the same is also present in the specific Access Service Authorisation, but no such provision is present in the Internet Service Authorization (ISPs). It is not the intention of the Licensor to allow active infrastructure-sharing to Access Service Providers and not to ISPs. The generic clause permits all kinds of licensees to share their infrastructure, and it is just a

matter of inadvertence that an enabling clause has been left out of a specific authorization. Similarly, the Internet Service Authorization under the UL-VNO permits sharing of passive infrastructure only with other VNO Licensees and not with Unified Licensees. These are not matters of policy but mere anomalies that have crept in because of the compartmentalization of different authorizations at different points in time.

However, in the interests of bringing clarity, we suggest that enabling provisions for passive infrastructure-sharing may be introduced in all individual service authorizations under the UL and UL-VNO. However, we submit that this suggestion is made only to remove ambiguity, and that **passive infrastructure-sharing is already permitted across all telecommunication service licenses/authorizations.**

All passive as well as active infrastructure sharing among all telecommunication service licenses/ authorizations be fully allowed without any restrictions. This will avoid the duplication of infrastructure, reduce CAPEX of all telecom licensee, and at the same time allows consumers to select their preferred service providers. This will also end the monopolies and will create effective competition in market.

**Q2. Should other active infrastructure elements deployed by service providers under various licenses/ authorizations, which are not permitted to be shared at present, be permitted to be shared among licensees of telecommunication services?**

**AND**

**Q3. If your response to the Q2 is in the negative, which active infrastructure elements should not be permitted to be shared?**

**Further, which active infrastructure elements should be permitted to be shared with which licensees'/ authorization holders? Kindly provide details for each authorization with detailed justification.**

### **ISPAI Comments-**

At present, the UL Licensees are permitted to share active infrastructure limited to antenna, feeder cable, Node B, Radio Access Network (RAN) and transmission systems only. In addition, sharing of infrastructure related to Wi-Fi equipment such as Wi-Fi router, Access Point, etc. is also permitted to Unified Licensees.

Yes, as described in response to Q1, all possible infrastructures passive as well as active must be allowed to be shared among all service providers/ authorization holders. This would enable a larger resource pool sharing and hence greater cost efficiencies (both capital cost and operating cost), enhanced service coverage and improved time to market for all digital services. This would also allow the operators to make more investments on improving quality of service. This would also help to reduce consumption of power, space and other resources, thus making the telecom infrastructure more efficient and environmentally sustainable. License provision should enable / permit active infrastructure sharing among licensed TSPs on a bilateral basis with the option of sharing all or some of the active infrastructure network elements depending upon their business model and network requirements.

**Q4. In case it is decided to permit sharing of any additional active infrastructure elements among licensees,**

- (a) **What precautionary conditions should be put in place to avoid disruption in telecommunication services due to any unforeseen situation? The response may be provided for each active infrastructure element.**
- (b) **Whether there is a need to have a provision for permission from/ intimation to the Licensor before commencement of such sharing? If yes, what provisions and timelines need to be prescribed for each active infrastructure element?**

**ISP AI Comments-**

Please refer to response to Q2 & Q3.

- a. For all critical government must ensure redundancy or multiple resource availability, which can be achieved through allowing proper business environment, and for some far flung area, same can be funded thru USOF fund
- b. No additional permission needs to be kept, to avoid unnecessary delay. At the most intimation may be asked and that too can be made online submission thru portal.
- c. Sharing of active Infrastructure on a bilateral basis among license telecom service providers only. The option of sharing active infrastructure would help licensed telecom service providers to better design their networks, make them more resilient and cost effective. This would in turn also enhance competition in the telecom market, benefiting the end customers.
- d. Government should setup a neutral governing body having representations from DoT, TRAI and Industry, that will introduce a framework for active infrastructure sharing and all license service providers should adhere to the recommended framework. The neutral governing body should also administer failure, if any, in the shared network elements. Hence, there is no need for permission from/ intimation to the Licensor prior to commencement of such sharing because sharing would be carried out between license service providers only based on mutual agreements.

**Q5. Whether any other amendment is required to be made in the telecommunication services licenses/ authorizations with respect to the provisions relating to both active and passive infrastructure sharing to bring clarity and remove anomaly? If yes, clause-wise suggestions in the telecommunication services licenses/ authorizations may kindly be made with detailed justification.**

**ISP AI Comments-**

Please refer response in Q1, Q2 & Q3.

Furthermore, in the case of passive infrastructure-sharing, the present license conditions already permit it across all telecom service licenses/authorizations. However, by way of abundant caution and to remove any ambiguity as also highlighted by the Authority, enabling provisions for passive infrastructure-sharing should be introduced in all individual service authorizations under the UL and UL-VNO. To maintain uniformity, such enabling provisions may be in line with clause 4.2(i) of Chapter-VIII of the UL.

In case of active infrastructure-sharing, the extant framework should be continued with and that there is no need to expand the present scope any further. Thus, no amendment is required to be made in the telecommunication services licenses/ authorizations with respect to the provisions relating to active infrastructure-sharing.

For commercial aspect, all payments paid for using infrastructure, and received for sharing infrastructure must be allowed as deduction in AGR. This will promote even incumbent service providers to share their resources in effective manner. Non levy of license fee will act as a catalyst to create infrastructure among all stake holders.

Sharing of passive infrastructure is permitted only between VNOs and not with the UL Access Service Providers other than Network Service Operators (NSOs) with whom VNO is parented. This need to be addressed.

UL-VNO Licensees shall be allowed to take requisite infrastructure from IP-1 registered entities, UL licensee's / standalone licensees other than its Parent NSOs. However, UL-VNO Licensee will be allowed to sell services only of its Parent NSOs.

Further, UL-VNO licensee for Access Services shall also be allowed to have parenting with more than one NSOs (UL-VNO (Access Service) Licensee) in same LSA separately for Wireline Access Services and Wireless Access Services. Such licensing restrictions are required to be addressed. Such enablement will provide flexibility to UL-VNO (Access Service) licensee to rollout its access services more efficiently and in a time bound manner.

**Q6. Should there be any obligation on telecom service providers to share infrastructure that has been funded, either partially or fully, by the Government through Universal Service Obligation (USO) Fund or otherwise, with other telecom service providers? Kindly justify your response.**

**ISP AI Comments-**

Yes, it must be mandated to share without any discrimination among all service providers/ authorization holders. Even the pricing of such sharing also needs to be decided based on capacity built, and not on capacity utilized.

Telecom infrastructure created by use of USO fund should be mandated to be shared among licensed telecom service providers & capacity should be reserved for other service providers as well. In this way USO funded infrastructure benefits can be extended to other service providers subscribers, thus a much larger beneficiary base. This also avoids duplicate asset creation in these areas that will result in appropriate optimization of USO funds, also the benefit would be wide reached and not restricted to the subscribers of the USP as TSP who invested in the USO project have recovered the portion of the Cost by the way of subsidy.

Mandatory sharing of telecom infrastructure on a non-discriminatory basis would help telecom companies focus on designing new digital services to telecom customers, enhance competition and make services more affordable.

**Q7. In case it is decided to impose some obligations on telecom service providers to share the infrastructure funded by Government with other telecom service providers, is there a need to provide a broad framework for sharing of such infrastructure? If yes, kindly suggest the key aspects of such framework with detailed justification.**

**ISPAI Comments:**

Working group of all stake holders can be formed to prepare detail guidelines as it is a subject with diverse interest.

Infrastructure sharing framework should be based on below points:

- Ensure non-discriminatory, fair sharing of USO funded infrastructure among all licensed service providers in a time bound manner.
- Building of infrastructure with max. capacity considering other service providers requirements & future roadmaps.
- No or minimum passive infrastructure rentals based on market trends.  
Infrastructure design like Tower/Mast/Power capacity and design to accommodate multiple licensed service providers.

The USO Fund should be utilized for Indian Submarine Cable network for Domestic traffic (figure 3.1 of TRAI CP No 15/2022). This cable network should be built on principals of open access available to all licenses for backhaul of domestic traffic and international traffic on separate fibre pairs.

**Q8. Any other suggestion to facilitate infrastructure sharing may kindly be made with proper explanation and justification.**

**ISPAI Comments-**

All future building, residential, commercial or government must be mandated to create the infrastructure which can be shared among all stake holders to provide telecom services without any repeated work. Even municipal corporations, or utility companies also need to be encouraged to create common infrastructure, for upcoming deployment. Telecom infrastructure must also be included in all town planning, and building design as necessity.

Allowing active as well as passive infrastructure can best be understood with following example. In an apartment of 20 storied , If FTTH infrastructure is already deployed , and a central OLT is kept in society office , where every service provider can come and plug-in their input demarcated by different VALNs , to reach their subscriber. This model can not only save lot of CAPEX and OPEX cost for telecom operators, It will also avoid the repeated cost incurred by service providers, and will save the aesthetics of the building, and that too after giving liberty to subscribers to chose their preferred service provider. Similar model is already working with GFGNL (SPV for Bharatnet Phase-2 in Gujarat) which allows all service providers to share their GPON network by giving a revenue share

**B. Connectivity Issues Faced by the Subscribers in Remote and Far-flung Areas of the Country**

**Q9. What measures could be taken to encourage roaming arrangements among telecom service providers in remote and far-flung areas? What could be the associated regulatory concerns and what steps could be taken to address such concerns? Kindly provide details on each of the suggested measures with justification.**

**Q10. What could be the other ways to ease out the hardship faced by the subscribers in remote and far-flung areas due to connectivity issues of the home network provider? Kindly provide detailed response with justification**

**ISPAI Comments-** No Comments

**C. Issues relating to inter-band spectrum sharing among access service providers**

**Q11. Whether inter-band access spectrum sharing among the access service providers should be permitted in the country?**

**ISPAI Comments-**

**Yes**, Spectrum Sharing is considered by Industry as much needed solution for efficient and effective utilization of this limited and valuable natural resource. Spectrum sharing between service providers leads to enhanced spectral efficiency by combining/ pooling the spectrum holding of two or more service providers. It leads to more efficient use of the spectrum which is a limited natural resource. Given the growing demand for spectrum and the need to ensure most efficient and optimal use of spectrum, we recommend that inter-band access spectrum sharing should be permitted among all the licensed service providers.

Spectrum sharing can provide additional network capacities in places where there is network congestion due to spectrum crunch and would further contribute to socio-economic development of the country. Inter-band spectrum sharing is also an important element for effective active infrastructure sharing among service providers. If two service providers pool their spectrum holdings, spectral efficiency increases non-linearly. Spectrum sharing makes use of carrier aggregation to achieve higher data rates. This will ensure better optimization of scarce resources (spectrum) and make use of it efficiently and effectively.

**Q12. In case it is decided to permit inter-band access spectrum sharing among access service providers, please provide detailed inputs to the following questions:**

**(a) What measures should be put in place to avoid any potential adverse impact on competition and dynamics of spectrum auction? Kindly justify your response.**

**ISPAI Comments:**

Internationally, spectrum sharing is generally treated as a part of active infrastructure sharing amongst all licensed service providers including ISPs. As per the data available on ITU website, spectrum sharing is permitted in 109 countries. Inter-band will only be opted for by service providers only if there is genuine requirement. It would help the service providers to expand services to new geographies, improve cost efficiencies and further improve quality of service for end consumers. It would help in the socio-economic development of underserved regions by bringing on more competition. Spectrum sharing should be allowed on a bilateral basis between licensed service providers only.

**(b) Considering that surrender of spectrum has been permitted in the country, what provisions need to be included in the guidelines for inter-band access spectrum sharing so that any possible misuse by the licensees could be avoided? Kindly justify your response.**



**ISP AI Comments:**

The current policy to permit operators to surrender spectrum after a lock-in period of 10 years has been a thought through policy by the DOT that gives operators the flexibility to re-align plans and investments as per changing business dynamics. This was also done to ensure the most optimal utilization of a limited network resource. Allowing Inter-band spectrum sharing would help service providers to better plan their network and improve return on investments. Also as stated in response to previous questions, it would help improve utilization of available spectrum and maximize efficiency

**(b) What should be the broad framework for inter-band access spectrum sharing? Whether the procedure prescribed for intra-band access spectrum sharing could be made applicable to inter-band access spectrum sharing as well, or certain changes are required to be made?**

**ISP AI Comments:**

Framework for inter-band access spectrum sharing can be based similar to 'Guidelines for Sharing of Access Spectrum' issued on 11.10.2021 by DoT, GOI.

We recommend the following changes but not limited to:

- Inter-band Spectrum sharing should be permitted between two licensed service providers without the mandate to have the spectrum in the same band.

**(c) What should be the associated charges, and terms & conditions for inter-band access spectrum sharing?**

**ISP AI Comments-**

Charges to be mutually agreed between the operators.

**Q13. Any other issues/ suggestions relevant to the spectrum sharing between access service providers, may be submitted with proper explanation and justification.**

**ISP AI Comments-**

Spectrum assignment by DoT today is technology agnostic i.e., any spectrum in any frequency band can be used to deploy any technology. Therefore, keeping the same intent in view, all types of spectrum sharing should be permitted amongst all types of service providers under various licenses/ authorizations and not limited to Access Service Providers. There should be level playing field amongst all licensed service providers and most efficient use of spectrum should be done by the Government, which is a limited natural resource. This would also help improve quality and reach of services to large base of customers.

Spectrum Management is an important policy enabler for Digital India. In this regard, following are the suggestions should be considered by the Authority:

- ISPs being a licensee under section (4) of the Indian Telegraph Act 1885, should be allowed to participate in spectrum sharing among all licensees for IMT / 5G Spectrum.



- Under the spectrum sharing, leasing of spectrum should be permitted to enable spectrum holder licensee to lease out the access spectrum to other licensed Service Providers by for efficient utilization of this scarce natural resource.

#### **D. Issues relating to Authorized Shared Access (ASA) of Spectrum**

**Q14. Whether there is a need to explore putting in place a regime to implement Authorized Shared Access (ASA), wherein an access service provider as a secondary user could use the frequency spectrum assigned to a non-TSP primary user (government agencies and other entities) on a dynamic spectrum sharing basis? Kindly justify your response.**

#### **ISPAI Comments:**

Authorized shared access (ASA) of spectrum, involves the concept of primary and secondary users, wherein a secondary user can use the same frequency spectrum when the primary user is not using it. Standard practices for ASA have been implemented globally to enable shared access spectrum to more operators can implement networks and roll out affordable services. In this regard one can refer to, USA based Automated Frequency Coordination (AFC), Spectrum Access System (SAS) and European Telecommunications Standards Institute based Licensed Shared Access (LSA).

In this regard, it is pertinent to mention herein that considering the increasing data usage owing to increasing digitalization, uptake of data hungry applications, proliferation of IoT based solutions, there is certainly a need to explore putting in place a regime for authorized shared access of spectrum, wherein the spectrum assigned/ earmarked for Government/ other users on a primary basis could be used by the other licensed service providers on a secondary basis.

We also wish to submit that industries have always been backbone of the nation. New technologies such as Artificial Intelligence, Machine Learning, Computer vision, Metaverse, AR-VR etc. are going to play an important role in the growth and digital journey of the Enterprises. Since last few years there is significant development in these technologies and wherever deployed have shown great potential. To leverage the benefit of these technologies, communication media such as 5G which provides significant opportunities and will eventually become backbone of the digital transformation and is playing a major role in Industry 4.0 transformation for the Enterprises and industry verticals

As has been held by the Hon'ble Supreme Court that the spectrum is a national asset and is a very scarce resource. From many decades, many government entities, PSUs, and Defense services organizations have been allocated various spectrum bands for their captive communication use. These Govt. bodies may not be operating throughout the telecom circles in a ubiquitous nature such as public mobile network services providers. Their operations are geographically limited to captive areas only. Current spectrum allocation policy framework doesn't allow other users to use that spectrum for their services. However, this spectrum if coordinated efficiently, can be re-allocated multiple times to Captive Non-Public Network (CNP) services for Enterprises and Industry verticals provided there is no interference or any security related issues to the primary user's network. As consultation paper itself mentions that such kind of policy frameworks are already exists in Europe and US Regions and have been operating quite effectively. We endorse and request TRAI to adopt such best practices. This will help in not only meeting the growing requirements of additional spectrum and achieving optimal utilization but will also ensure proliferation of Industry 4.0 applications

**Q15. In case it is decided to implement ASA technique for secondary use of frequency spectrum assigned to non-TSP primary users, please provide your response to the following questions with detailed justification:**

**(a) What are the potential spectrum bands in which ASA implementation can be considered?**

**ISPAI Comments:**

Below are the Potential spectrum bands that can be considered for ASA implementation –

- 470 - 585 MHz (TV White space)
- 14 - 14.5 GHz, 28.5 – 29.1 GHz, 29.5 – 31 GHz (Co-existence of FWA along with Ku/Ka band uplink transmission, P2P microwave links)

**(b) What measures should be taken to encourage and motivate the incumbent users for participation in the spectrum sharing through ASA technique?**

**ISPAI Comments:** No Comments

**(c) What should be the broad framework for implementation of ASA technique?**

**ISPAI Comments:**

The broad framework for implementation of ASA technique can be based on

- Use of geographic locations databases for all users to coordinate spectrum assignments.
- More agile wireless equipment that can interact directly with a dynamic frequency coordination database.
- Efficient power controlling mechanisms for secondary users to minimize noise levels

**(d) Is there a need for putting in place a mechanism for dispute handling including interference issues in case of ASA? If yes, what should be the framework?**

**ISPAI Comments:**

- As mentioned in response to question no. 15(b), interference handling is the key to make ASA successful, a coordinated and controlled mechanism is needed which keeps the repository of primary and secondary usage of spectrum.
- In case of any dispute between both the entities then ASA shall hold the final right to take the decision. In USA, under the CBRS spectrum policy framework, there are authorized SAS administrators appointed by FCC their local Telecom services regulator for providing shared spectrum access in North America.

**(e) What methodology should be adopted for spectrum assignment to secondary users? What could be the spectrum charging mechanism for such assignment?**

**ISPAI Comments:**

As responded for Q.15 (d) above, like a CBRS spectrum policy framework in USA, DoT can create a policy framework for shared spectrum access in India and appoint WPC as an authorized Shared spectrum access system administrator. However, Shared spectrum access system administrator must ensure fair distribution of spectrum among the secondary users & at the same time safeguard the incumbent users. An online portal can be developed with all the relevant spectrum bank details and prior allocation database to provide feasibility for enterprises and Industry verticals to apply for their campus / location / factory plants with nominal administrative charges. Guidelines can be prepared for coverage / transmit power limitations at the perimeter of the campus / location of the enterprise / industry vertical to ensure that the spectrum usage is confined the prescribed property and to avoid any kind of interference.

**(f) Who should be entrusted the work of managing shared access of spectrum?**

**ISPAI Comments:**

WPC as Authorized Shared spectrum access system administrator governed by DoT should be entrusted the work of managing shared access of spectrum.

**Q16. Whether there is a need to permit the ASA technique-based dynamic spectrum sharing among access service providers? If yes,**

**(a) What are the possible regulatory issues involved and what could be the possible solutions?**

**ISPAI Comments–**

We recommend permitting ASA technique based dynamic spectrum sharing among service providers.

ASA technique based dynamic spectrum sharing should be allowed to licensed service providers only. A robust technology-based mechanism as suggested in response to questions above to put in place to ensure no interference amongst users of shared spectrum.

**(b) What measures should be put in place to avoid any adverse impact on competition and dynamics of spectrum auction? Kindly justify your response.**

**ISPAI Comments–**

There will not be any adverse impact on competition and dynamics of spectrum auction as ASA technique is utilizing small chunk of spectrum band (from incumbent captive users) for limited time as per availability and priority of primary users.

**Q17. In case it is decided to permit ASA technique-based dynamic spectrum sharing among access service providers in the country, please provide your response to the following questions with justification:**

**(a) Whether there is a need for prescribing any framework for such shared use? If yes, what should be the framework?**

**ISPAI Comments:**

In our considered view, there is a need for prescribing framework for adherence by all the stakeholders. ASA technique framework can be based on following:

- Use of geographic locations databases for all secondary users to coordinate spectrum assignments.
- Significant improvements in the computation power to efficiently and rapidly run advanced propagation analysis and coordinate devices and users in near real-time.
- Efficient power controlling mechanisms for secondary users to minimize noise level.

**(b) Whether access service providers should be required to obtain approval or intimate to DoT before entering into such arrangement?**

**ISPAI Comments:**

In our view, there is no requirement to obtain approval or intimation to DoT before entering into such arrangement.

**(c) Whether any fee (one time, or recurring), should be prescribed on the spectrum sharing party(ies)? If yes, what should be the fee and who should be liable to pay such fee?**

**ISPAI Comments:**

It is suggested that a nominal fee may be charged from spectrum sharing party (ies) to meet administrative expenses

**(d) What should be the treatment of spectrum shared through ASA technique for the purpose of computation of spectrum cap?**

**ISPAI Comments:**

Spectrum capping should be computed considering the quantum of spectrum and number of service providers participating in the sharing of spectrum

**(e) Whether there is a need for an independent entity for managing spectrum access? If yes, who should be entrusted this work? If not, how should the spectrum access be managed?**

**ISPAI Comments-**

There is need for a neutral governing body under DoT, for managing spectrum access.

**(f) Is there a need for putting in place a mechanism for dispute handling including interference issues or should it be left to the access service providers? If yes, what should be the framework?**

**ISPAI Comments-**

Authorized Shared spectrum access system administrator can be setup for dispute handling and interference issues among primary & secondary users.

**(g) What other terms and conditions should be applicable for the sharing parties?**

**ISPAI Comments-**

The sharing of spectrum to be permitted with licensed telecom service providers only

**Q18. Suggestions on any other spectrum sharing technique(s), which needs to be explored to be implemented in India, may kindly be made along with the relevant details and international practice. Details of likely regulatory issues with possible solutions, interference management, dispute handling etc. may also be provided.**

**ISPAI Comments-**

ISPAI suggest to explore the AFC (Automated Frequency Coordination) implemented in USA by FCC apart from listed techniques mentioned in the consultation paper like SAS and LSA:

- The AFC systems will determine which frequencies are available for outdoor devices. Once per day each AFC system is required to access to the database to obtain the most up-to-date information on licensed primary user links including their transmitter and receiver locations, frequencies, bandwidths, polarizations, transmitter EIRP, antenna height, and make and model of antenna and equipment etc.
- The rules specify the propagation model the AFC system must use for determining frequency availability and power levels, which depends on the distance between the outdoor devices and the licensed primary user base station.
  - For separation distances of 30 meters or less, the AFC system will use a free space pathloss model.
  - When the separation distance is greater than 30 meters, but less than 1 kilometer, the AFC system will use the WINNER II model. The WINNER II model is one of the most widely used and well-known channel models in the world and was developed from measurements conducted by the WINNER organization, as well as results from academic literature. When using the WINNER II model, the AFC system should use site-specific information, including building and terrain data, for determining the line-of-sight/non-line-of-sight path component where this information is available. For evaluating paths where this data is not available, the rules specify probabilistic combining of the line-of-sight and non-line-of-sight path into a single path-loss.
  - For distances greater than 1 kilometer, the AFC system will use the Irregular Terrain Model (ITM) combined with a clutter model for the local environment. When using the ITM, the rules specify that AFC systems are to use 1 arc-second digital elevation terrain data and, for locations where such data is not available, use the most granular digital elevation terrain data available. To account for the effects of clutter, such as from buildings and foliage, the AFC system should combine use of the ITM with statistical clutter model ITU-R P.2108 for urban and suburban environments and the ITU-R P.452-16 clutter model for rural environments.
- As per FCC, AFC system operators are required to serve for a five-year term which can be renewed by the Commission based on the operator's performance during the term.
- If an AFC system operator discontinues service or its term is not renewed, it must transfer its database along with the information necessary to access the database to another designated AFC system operator.

### **E. Issues relating to Leasing of Spectrum**

**Q19. Where there is a need to permit spectrum leasing among access service providers? Kindly justify your response.**

#### **ISPAI Comments:**

- ISPAI strongly submits to the Authority that there is dire need to permit spectrum leasing not only amongst Access Service Providers but also among all licensed service providers including ISPs. ISPAI, as a ISP representative association strongly submits that Spectrum leasing would further expand the market by way of more Operators using the licensed spectrum which will strengthen the competition thereby benefitting both the Customer as well as Government.
- There is global precedent in spectrum leasing which should be followed in India also wherein leasing of spectrum should be permitted as standard practice among TSPs for e.g. countries like USA, Canada, Malaysia have already permitted leasing of access spectrum to other TSPs.

Thus, under the Spectrum Sharing guidelines, leasing of spectrum should be permitted to enable efficient utilization of this scarce natural resource among all licensed telecom service providers.

**Q20. In case it is decided to permit spectrum leasing among access service providers, please provide detailed response to the following questions:  
(a) Whether spectrum leasing should be permitted for short term period only, or for both short-term as well as long term?**

#### **ISPAI Comments:**

Spectrum leasing should be permitted amongst all licensed telecom service providers both for short term and long term. It would promote efficient use of spectrum and may particularly be needed for short-term time-bound events that require significant amount of capacity for broadcast and user applications as well as of longer-term use to offer services to customers by service providers.

**(b) In case only short-term leasing is to be permitted, what should be the maximum duration for such spectrum leasing? Should there be any restrictions on renewal of such short-term lease?**

**(c) In case it is decided to permit long term leasing, please provide your response to the following questions with justification:**

**(i) What measures should be put in place to avoid any adverse impact on competition and dynamics of spectrum auction?**

**(ii) Whether there should be a maximum duration for which spectrum leasing may be permitted?**

**ISPAI Comments:**

ISPAI submits that the duration of the spectrum leasing can be proportional to the duration of the short events or purpose for which TSPs have leased the same. There should not be any restrictions on the renewal of such leases. A standard framework can be created which incorporates all the short-term, long-term spectrum leasing and the tenure of such arrangements.

**(d) What should be the applicable roll-out obligations for the Lessee (the access service provider which takes spectrum through leasing arrangement from the Lessor)? Whether the spectrum leasing should have any effect on the rollout obligations applicable for the Lessor (the access service provider which has leased out the spectrum)? Whether the provisions for roll-out obligation require to be different for short-term and long-term spectrum leasing?**

**ISPAI Comments–**

There should not be any separate Mandatory Roll out obligations (MRO) for spectrum lessee, as because leasing shall be done only on specific demand by lessee business requirements. Mandatory roll-out obligations are prescribed by the government to ensure optimum use of spectrum and availability of service to larger set of customers. The sites rolled out by the lessee of the spectrum should count towards meeting the roll-out obligations of the lessor, if any. This would be another way to ensure that the objectives of mandatory roll-out obligations prescribed by Government for allocation of spectrum are being effectively met.

**(e) Should the spectrum leasing charges be levied on similar lines as applicable for spectrum trading? If no, what charges should be made applicable in case of spectrum leasing?**

**ISPAI Comments-**

There should be no charges on spectrum leasing since the TSPs are willing to lease spectrum have already paid the market determined price via auctions, and any revenue accretion would give incremental AGR share to the exchequer, there is no need to add any further additional charge/fee.

**(f) Should there be a lock-in period, after acquisition of spectrum, to become eligible for spectrum leasing as applicable in spectrum trading? If yes, what should be the lock-in period post which, spectrum holder would become eligible to lease it to another access service provider?**

**ISPAI Comments–**

There should be No lock-in period. There should not be any type of lock-in period for leasing of spectrum post-acquisition of the spectrum.

**(g) Whether there is a need for an approval from, or intimation to DoT before the proposed leasing of spectrum? If yes, whether prior approval/ prior intimation requirement be different for long-term and short-term spectrum leasing? What should be the timelines for approval from, or intimation to DoT in each case?**



**ISPAI Comments-**

There should not any mandate to seek approval from DoT while leasing spectrum. However, intimation to DoT to be made for spectrum leasing agreement irrespective of whether it is short term or long-term leasing.

**(h) Whether the spectrum held by an access service provider on short-term, or long-term lease be included to calculate compliance to spectrum caps?**

**ISPAI Comments-** No Comments

**(i) Considering that surrender of spectrum has been permitted in the country, what provisions need to be created in the guidelines for leasing of spectrum between access service providers so that any possible misuse by the licensees could be avoided?**

**ISPAI Comments-**

The guidelines may include the provision of surrendering spectrum before pre-determined tenure to avoid misuse of the provisions of spectrum leasing. Also, there should be mutual agreement between lessor and lessee before surrender of leased spectrum by the lessor

**(j) What other terms and conditions need to be prescribed in respect of spectrum leasing between access service providers?**

**ISPAI Comments-**

The sharing of spectrum to be permitted with licensed telecom service providers only and the same should not be limited only to Access Service Providers.

**Q21. Any other issues/ suggestions relevant to the spectrum leasing, may be submitted with proper explanation and justification.**

**ISPAI Comments-** No Comments.

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