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New Delhi**

**GSMA's submission to TRAI's Consultation Paper on Telecommunication Infrastructure
Sharing, Spectrum Sharing, and Spectrum Leasing**

Dear Sir,

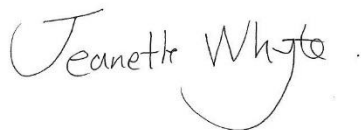
Greetings from the GSMA.

This is with reference to TRAI's Consultation Paper on Telecommunication Infrastructure Sharing, Spectrum Sharing, and Spectrum Leasing, seeking views of the stakeholders on various issues raised by the TRAI in the paper. GSMA would like to thank the TRAI for providing us with an opportunity to submit our comments and recommendations on this consultation paper.

Please find attached the GSMA's response to this consultation. We trust that our submission will merit your kind consideration before taking any final decision in the matter.

We remain available for any questions and further information/ clarification that may be required in this regard.

Yours sincerely,



**Jeanette Whyte
Head of Public Policy, APAC
GSMA**

Copy to:

1. Dr. P.D. Vaghela, IAS, Chairman, TRAI
2. Shri V. Raghunandan, Secretary, TRAI

GSMA's comments and recommendations on the TRAI consultation paper on Telecom Infrastructure sharing, Spectrum sharing and Spectrum leasing

At the outset, GSMA would like to express our gratitude to the Telecom Regulatory Authority of India for providing an opportunity to us for submitting our comments and recommendations on the consultation paper on Telecom Infrastructure sharing, Spectrum sharing and Spectrum leasing.

Infrastructure sharing is common across many countries, and it is important for regulators to have a regulatory framework that allows voluntary infrastructure sharing. Through this submission, GSMA would like to share its global understanding and positions on Infrastructure and Spectrum sharing as well as Spectrum leasing, followed by a deep dive on the specific questions which are asked in the paper.

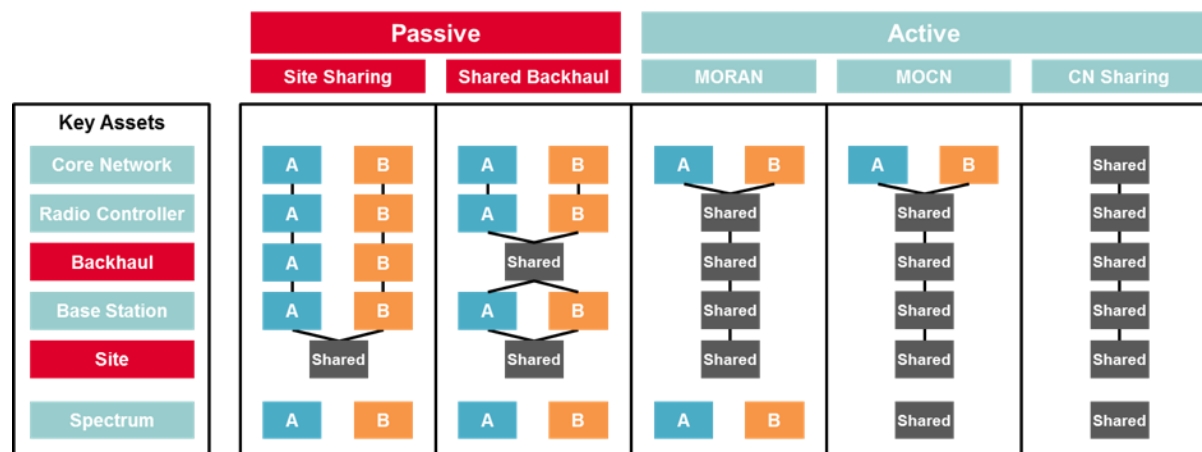
Passive and Active Infrastructure Sharing

Infrastructure sharing can provide additional capacity in congested areas where space for sites and towers are limited and help to expand coverage in underserved geographical areas. Infrastructure sharing helps in avoiding unnecessary duplication of infrastructure and helps in reduction of carbon footprint of mobile networks while also reducing costs for operators.

Infrastructure sharing is a voluntary cooperation between licensed operators based on their commercial needs. While it may, at times, be advantageous for mobile operators to share infrastructure, network deployment remains an important competitive advantage and any sharing should therefore be the result of commercial negotiation and not mandatory.

Infrastructure sharing can be passive or active. Passive sharing includes site sharing, when operators use the same physical components but have different site masts, antennas, cabinets and backhaul. A common example is shared rooftop installations. A second type of passive sharing is mast sharing, when the antennas of different operators are placed on the same mast or antenna frame, but the radio transmission equipment remains separate. In active sharing, operators may share the radio access network (RAN) or the core network. With core network sharing, operators may also share the core functionality, demanding more effort and alignment, particularly the compatibility of the operators' technology platforms. Infrastructure sharing reduces the site acquisition time which thereby accelerates the roll-out of coverage, optimises the use of assets and reduces the energy use which ultimately has a positive environmental impact.

The below diagram¹ shows the technical classification of infrastructure sharing which is captured from GSMA's Future Networks homepage.



MORAN (Multi-Operator Radio Access Network), where radio access networks are shared and dedicated spectrum is used by each sharing operator.

MOCN (Multi-Operator Core Network), where radio access networks and spectrum are shared and separate core networks maintained.

Core Network Sharing, where RAN, servers and core network functionalities are shared.

¹ <https://www.gsma.com/futurenetworks/wiki/infrastructure-sharing-an-overview/>

Infrastructure Sharing – Pros and Cons

Various network components can also be shared to varying extents and these have various advantages and disadvantages as mentioned in the below table².

Table 1

Sharing form	Pros	Cons
Passive infrastructure sharing	<ul style="list-style-type: none"> • Significant CAPEX/OPEX savings • Lowered risk of site acquisition • Full differentiation and complete control of spectrum • Control over sites to be shared • No/little regulatory obstacles • Easy migration to other sharing forms. • Environmental benefits 	<ul style="list-style-type: none"> • Availability of free space in existing sites (if existing sites are to be shared) • Similar cell planning may be required
MORAN, MOCN	<ul style="list-style-type: none"> • Limited marginal CAPEX savings compared to Site Sharing • Substantial marginal OPEX savings compared to passive infrastructure sharing • Control over base stations to be shared • Reduction of network footprint by sharing operators 	<ul style="list-style-type: none"> • Regulatory approval necessary • Complexity of operation • Requires long term commitment between operators • Difficult to exit from sharing agreement
Core Network sharing	<ul style="list-style-type: none"> • Further CAPEX/OPEX savings compared to MORAN/MOCN • Significant investment can be diverted to services • Maximum sharing for operators sharing existing infrastructure 	<ul style="list-style-type: none"> • Regulatory approval necessary • Complexity of operation and tight integration • Challenging to differentiate quality of service
National Roaming	<ul style="list-style-type: none"> • Significant CAPEX/OPEX savings • Clear ownership of equipment • Differentiation based on service layer • Low risk solution for both incumbent and new entrant 	<ul style="list-style-type: none"> • Regulatory approval necessary • Interconnection required • Reduced control over the network (e.g., outage of visited network can affect home network service) • End to end inter-PLMN QoS and inter-PLMN handover very challenging

The below table further elaborates the advantages and disadvantages of core network sharing.

² <https://www.gsma.com/futurenetworks/wiki/infrastructure-sharing-an-overview/>

Advantages	Disadvantages
Financial savings by sharing resources.	<p>Resilience of the overall telecommunication system may get compromised by sharing assets instead of keeping them separate for unforeseen situations like flooding, earthquake, fire, mergers or breakups, sale of companies, or changes in technology.</p> <p>As network security and subscriber policies are defined and managed in core network, exposing it to sharing can lead to much larger risks for entire network / sub-base.</p>
Fewer staff needed to run a single shared core network.	Fewer staff means fewer people with the knowledge and expertise in operations for future expansions or technology upgrades.
More cost effective to build a slightly bigger building which can be shared, than to duplicate a smaller one with all the same features (sufficient space and reliable power source, backup power generators, air-conditioning, fibre access, accessibility and so on).	Different operators might have different core equipment suppliers and may not want to share them and co-locating them does not bring meaningful economies of scale.

While signing up for any type of infrastructure sharing, operators need to be wary of aligning the operating license period along with the agreement period of sharing the infrastructure. It shouldn't happen that the infrastructure sharing agreement exceeds the operator's license period.

OUR SECTION/QUESTION-WISE COMMENTS AND RECOMMENDATIONS ARE AS FOLLOWS FOR YOUR KIND CONSIDERATION:

A. Issues relating to Infrastructure sharing

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

GSMA Response:

Yes, passive infrastructure sharing allows operators to enhance coverage and save costs. However, for core networks sharing there will be an associated risk of reducing resilience due to the networks ceasing to be independent.

In 5G, the trend has been to transition to virtualized functions running on cloud computing infrastructure, where the operator or a 3rd party cloud provider's infrastructure may offer sufficient capacity, resilience and separate geographic locations. This offers the ability to shift loads from one place to others as needed. By doing this, the network is no longer tightly coupled with the hardware it runs on and is distributed in the cloud, providing the required resilience and redundancy.

GSMA recommends that passive infrastructure sharing should be permitted across all telecommunication service licenses/authorisations.

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?

GSMA Response:

Sharing of active infrastructure should be voluntary and not mandatory. This may be permitted with sufficient consideration of the terms of sharing, accountability and responsibilities of parties with dispute resolution and workable exit clauses. If it makes sense to share a resource and there are no excessive and onerous terms, then it should be voluntary and subject to commercial arrangements. However, the risks associated with sharing of the core network should be duly considered. The sharing of core network may have direct impact on the quality of service due to technical incompatibilities and since most of the intelligent network elements are part of these core network elements, hence any failure in a shared core network can result into a single point of failure, impacting the services of all the MNOs who are involved in such sharing. These risks far outweigh any potential cost benefits that may be achieved with the sharing of core network elements.

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.

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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?

GSMA Response:

The existing infrastructure and network sharing guidelines are currently sufficient.

It is complex to implement the sharing of core networks due to the technical incompatibilities of the network elements viz. hardware, software. Sharing of core network elements also carries the risk of curtailing the growth and expansion of the current network infrastructure and may discourage new investments. The operators should do a risk assessment to ensure that the level of network infrastructure sharing allows them to be fully compliant to the terms and conditions of their license obligations.

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.

GSMA Response:

In the case of passive infrastructure-sharing, the present license conditions already permit it across all telecom service licenses/authorisations. However, in order to remove any ambiguity, enabling provisions for passive infrastructure-sharing should be introduced in all individual service authorisations under the Unified License (UL) and Unified License for Virtual Network Operator (UL-VNO).

In case of active infrastructure sharing, the existing framework should be continued.

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.

GSMA Response:

The Universal Service Fund (USF) is a good example where network infrastructure and services are already shared on voluntary basis to produce the best outcome for investment. The USF may also be used to increase network resiliency (more capacity, coverage, robust sites).

GSMA recommends there should not be any mandatory obligation on MNOs for sharing infrastructure in USF projects and any sharing should be done on a voluntary basis.

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.

GSMA Response:

GSMA highly recommends that there are no mandatory obligations to share infrastructure. All infrastructure sharing should be done on a voluntary basis alongside commercially agreed terms.

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

GSMA Response:

The charges paid by a MNO towards infrastructure sharing should be allowed as a deduction from its Gross Revenue (GR). Further, this should not be limited to USF projects only but should be extended to infrastructure sharing in all scenarios.

Under the current regime, infrastructure sharing among various licensees has been permitted. Further, the UL-VNO permits the infrastructure-sharing charges paid by a VNO to a Network Service Operators (NSO) -MNO to be deducted as pass-through for determining the Adjusted Gross Revenue (AGR) for the purpose of payment of LF and SUC. However, no similar provision exists in the UL for permitting the deduction of the infrastructure-sharing charges paid by one MNO to another MNO. This results in double levy in cases of unified licensees

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

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

The lack of mobile coverage in remote and rural areas is primarily an economic challenge as costs can be prohibitive, revenues lower and logistics complex. Those without coverage tend to live in sparsely populated rural areas with difficult terrain and where high investment costs and low return on investment (ROI) are major barriers for mobile internet providers. It can cost up to two times as much to deploy new base stations in rural areas and can be three times more expensive to operate than in urban areas, while revenues can be up to 10 times less. This means there are areas today where it is simply not commercially viable to expand mobile infrastructure. Hence, infrastructure sharing in rural areas is even more important as the towers have little traffic, and they are especially expensive to maintain in the rural areas. The challenge is not only to bring mobile coverage to these rural areas, but to do so sustainably and also bring competition and choice for consumers.

Reducing network deployment and operation costs are key to closing the coverage gap. Innovation has real potential to make rural coverage commercially feasible. Base station solutions for rural and remote locations are among the more commercially developed innovations. Cell-site innovations focus on providing lower cost, simplified or modular infrastructure. Renewable energy solutions, particularly solar-powered ones are an increasingly common feature of many rural deployments.

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.

GSMA Response:

Refer to table 1 which mentions national roaming, where one infrastructure is built, and other MNO subscribers roam onto it, however these are on voluntary basis. Building infrastructure in remote areas is costly as the CAPEX involved is high compared to building the same infrastructure in urban areas.

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.

GSMA Response:

Addressing structural issues in remote areas such as delays in getting government approvals, lack of reliable electricity, difficult terrains, etc would help to reduce the hardship faced by subscribers. The Service Level Agreements (SLAs) need to match the requirements of the situation. If SLAs are too onerous then there is an additional expense to meet these – for example, from other contracts: requiring 2 hours onsite service for a place that is 4 hours by road or on an island is not practical or necessary. For remote sites these can be allowed on government buildings at low or no cost and for local government to support easy site acquisition.

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?

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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.

(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.

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

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

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

GSMA Response:

The global success of mobile services has been built on a foundation of exclusively licensed spectrum as it supports widespread services and the certainty needed for long-term heavy network investment and high-quality service. Therefore, while spectrum sharing holds potential, it cannot replace the need for exclusively licensed mobile spectrum which underpins the long-term evolution of spectrum.

On the other hand, spectrum sharing presents a complementary approach to exclusive licensing, when well planned. Spectrum sharing has its own advantages as it can reduce the spectrum shortages faced in a market while also ensuring valuable spectrum does not lie fallow. It can enable more intensive spectrum use and higher volume of services, improves service quality and lowers the costs of service provision. All this supports greater capacity and more affordable services.

Inter-band spectrum sharing as defined by TRAI in the consultation document involves both pooling and inter-band carrier aggregation among two or more operators. Pooling (or MOCN) typically involves a single band with multiple operators while carrier aggregation typically involves a single operator aggregating multiple bands.

Internationally, there is usually no blanket prohibition and different forms of sharing are possible.

While spectrum sharing has benefits, there are also risks involved, for example, there could be potential implications on market competition and investment incentives. A case-by-case approach is often taken by regulators and considerations will be similar to a competition assessment. The regulator weighs the benefits and risks both of the sharing arrangements considering various factors such as:

- Benefits of sharing which include cost savings, improved QoS and coverage, better efficiency (e.g., larger contiguous blocks), environmental benefits.
- Risks which include reduced incentives for investment and network rollout, less service differentiation, reduced retail competition, lower network resilience.

Therefore, the GSMA recommends the following broad principles for spectrum sharing:

- Licensing authorities should allow voluntary spectrum sharing among operators. Industry favors a simple sharing framework that is investment-friendly and supports reliable, high quality mobile services.
- Regulation should facilitate these mechanisms through clearly defined spectrum rights, long licence terms and limited administrative costs.
- Authorities should only be notified of the agreements taking place so that it is clear who holds spectrum usage rights. Notification enables authorities to assess whether a proposed trade would create any risks to competition.
- Competition issues should be assessed based on the specific circumstances of each sharing arrangement.
- As exclusive licensing has been central to the success of mobile services and must continue, spectrum sharing decisions should be mindful of the need for additional exclusive spectrum.

- Fiscal incentives: To encourage optimum utilization of spectrum through inter-band sharing, fiscal incentives should be given like no LF/SUC on the revenue received by a MNO from another MNO for inter-band spectrum sharing.

D. Issues relating to Authorised Shared Access (ASA) of Spectrum

Q14. Whether there is a need to explore putting in place a regime to implement Authorised 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.

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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?

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

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

(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?

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

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

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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?

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

Kindly justify your response.

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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?

(b) Whether access service providers should be required to obtain approval or intimate 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?

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

(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?

(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?

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

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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.

GSMA Response:

Authorised Shared Access (ASA) is a tiered sharing framework to facilitate shared use of spectrum band where it is not possible or too costly to migrate incumbent existing users (e.g. government, defence). Sometimes also termed as “cognitive radio”, this form of sharing is enabled by geolocation databases and/or sensing technologies which can be very complicated.

As a part of ASA type of spectrum sharing, licensors/regulators have systems in place to coordinate usage of the same spectrum between different users in order to minimise interference. This coordination should establish exactly where spectrum can be shared and put in place technical usage conditions (e.g., transmission power levels, locations and times, exclusion zones, guard bands etc) that minimise interference.

In recent years, the ASA technique has been developed which makes use of geolocation data to enable devices to identify portions of spectrum available for sharing so that existing services are protected. These can be combined with sensing technologies which detect available frequencies for transmissions. Geolocation information can be stored centrally or distributed in devices but must be under the control and management of licensor/ regulator. Some of the examples of these sharing approaches are explained below. However, it must be noted that none of these approaches have been successful commercially on a large scale so far.

- TV White Space (TVWS) – This technique targeted unused broadcast TV spectrum for broadband provision, particularly for rural areas. There were various reasons for lack of commercial success such as:
 - Lack of long-term uncertainty over access to TVWS; the clearance of 800 MHz and 700 MHz spectrum for exclusive assignment for mobile services reduced amount of TVWS.
 - Lack of strong equipment ecosystem due to limited international momentum for this technique.
 - Challenging business case for rural broadband; small base of customers and lack of adequate supporting infrastructure.

- Citizens Broadband Radio Service (CBRS) – This technique implemented in USA with 3-tier sharing in 3.55-3.70 GHz did not have successful results. The efficiency of the CBRS approach for mobile network deployment is questionable, considering its complexity and the impacts of power level restrictions on deployment costs.³ Exclusive licensed spectrum is more appropriate for deployment of public mobile networks as evident through the decisions of MNOs to invest in exclusively licensed mid-band spectrum (3.45-3.55 and 3.7-3.98 GHz) for 5G rather than the CRBS priority access licences.
- Licensed Shared Access (LSA) – LSA is a two-tier approach with trials in several EU countries (e.g. Italy, Netherlands, Portugal) in 2.3 GHz involving sharing between different users including mobile, PMSE and other government use. However, to date, despite proof of concept, these solutions have not been commercialised.

The GSMA is of the view that such tiered sharing solutions are still commercially unproven and exclusive licensed spectrum remains the best approach. However, possible opportunities for ASA can be considered as part of overall spectrum sharing framework in India, in consultation with the industry and government agencies/ stakeholders together.

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.

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?

(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?

(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 roll-out 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?

(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?

³ [CBRS-Recon-Analytics.pdf \(ctia.org\)](#)

(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?

(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?

(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?

(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?

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

GSMA Response:

With spectrum leasing, licensed bands that have already been assigned to an organisation (such as a mobile operator) on an exclusive basis can be rented by another user, typically for a limited period of time and/or for a portion of the spectrum included in the licence. Examples include leasing spectrum to wireless internet service providers in rural areas or leasing to support localised private networks for use by industry verticals.

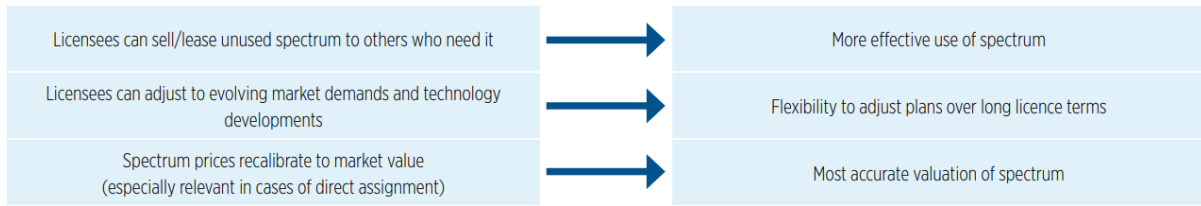
A primary motivation for spectrum leasing is the potential commercial benefit to lessors in terms of revenue generation and cost savings from leasing unutilised frequencies for certain uses or time periods. It can provide a flexible opportunity to meet the specific spectrum demands of industrial or enterprise customers, rural telecoms providers or other mobile operators. It is also generally simpler to achieve than trading, which typically requires the regulator's involvement.

Despite consensus among operators that voluntary leasing should be permitted, demand has not been universally strong where licences have allowed leasing. This has sometimes been due to regulatory frameworks that lack clarity and flexibility. Perceived risks from competition bodies or such authorities' involvement in contract negotiations can also be a demotivating factor that threatens leasing's potential.

As 5G develops and deployments progress, spectrum leasing could become more attractive and widespread for several reasons, including spectrum supply (e.g. greater availability in mid and high bands), and demand from different users that may want access to spectrum to provide the necessary local capability to realise an unaddressed business opportunity or to establish dedicated networks for industries.

According to the Digital Regulation Platform⁴, which is a joint effort by the ITU and World Bank, establishing a secondary market for spectrum trading and allowing spectrum leasing provides many benefits.

⁴ [Spectrum pricing and trading | Digital Regulation Platform](#)



Despite these benefits, there are various barriers being faced in uptake of spectrum leasing more widely, within or beyond the control of operators:

- **Regulatory barriers:** from outright prohibitions on spectrum leasing to the lack of a clear framework that allows leasing or governs aspects of the process.
- **Technical challenges:** the feasibility of leasing can be impacted by coordination or interference issues and is dependent on how much spectrum has been brought to market to support the deployment of advanced mobile technologies.
- **Commercial opportunity:** the costs of providing leasing services (for example, network set-up and integration) can be seen to outweigh relatively small revenues from low demand, making for an unattractive business case.

Despite these challenges, there is a clear market opportunity for spectrum leasing with potential benefits. To mitigate the risks and accentuate the benefits of leasing, policymakers and operators can take a number of steps to facilitate leasing, which should be underpinned in the first instance by market negotiation rather than regulation and supported by sufficient supply of spectrum. In line with the same, **the GSMA recommends the following key enablers for a holistic Spectrum Leasing framework:**

- **The creation of an enabling regulatory environment** - Regulators should implement clear policies to permit voluntary spectrum leasing, providing clarity on the process to lease spectrum and the roles and responsibilities of the lessor and lessee in relation to licence obligations and other conditions. There should be flexibility for sharing parties to determine the duration of leasing to support varied use cases and specific needs.
- **Support for voluntary commercial negotiations** - There is no one-size-fits-all model for leasing. However, an approach that encourages commercial negotiation aids price discovery and helps maximise the benefits.
- **The availability of sufficient affordable spectrum in the right bands** - A precondition for spectrum leasing to work at all is bringing a sufficient amount of spectrum to market.

In order to further create and encourage such secondary markets for spectrum such as spectrum leasing and trading, the TRAI should also review the need for levying any transaction charge such as the 1% charge currently applied on spectrum trading transactions.

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

GSMA Response:

By opening door for spectrum leasing, regulators can avoid setting aside spectrum for a particular use case. Set asides make it unlikely the spectrum will be used outside of the relatively small number of locations where verticals would want networks (e.g., factories, airports etc).



Set asides also have a risk that the spectrum may go unused in many areas and means less spectrum is available for public 5G services. Logically, making spectrum available for industrial users via reservations reduces the amount available to other parties, specifically operators. The resultant artificial scarcity can lead to higher prices being paid at auctions, which is linked to worse coverage, slower rollouts and lower broadband speeds of mobile networks.⁵

Guaranteeing spectrum supply and licence renewal is a key tool to creating a liquid secondary market for leasing, which can provide an explicit solution to meet vertical demand and presents a practicable alternative to set asides. While reserving spectrum for local or vertical use in priority 5G bands (i.e., 3.5/4.8/26/28 GHz) could jeopardise the success of public 5G services, leasing can provide verticals with access to spectrum while mitigating the risk of inefficient spectrum use. Leasing can therefore be a means of maximising the benefits of exclusively licensed spectrum.

For example, in Finland, the regulator included a leasing obligation to mobile operators' licences in the 3.5 GHz spectrum band to either participate in tenders for vertical contracts in localised areas or else sub-license spectrum to the vertical so they can build their own network where they have not been able to provide suitable services. Therefore, the **GSMA is of the view that leasing can be a positive spectrum management tool for regulators that preserves the benefits of market-based awards and avoids potentially harmful measures such as set-asides.**

⁵ [The Impact of Spectrum Set-Asides on 5G. February 2023.](#)